U.S. ARMY ENGINEER DIVISION
HUNTSVILLE, ALABAMA

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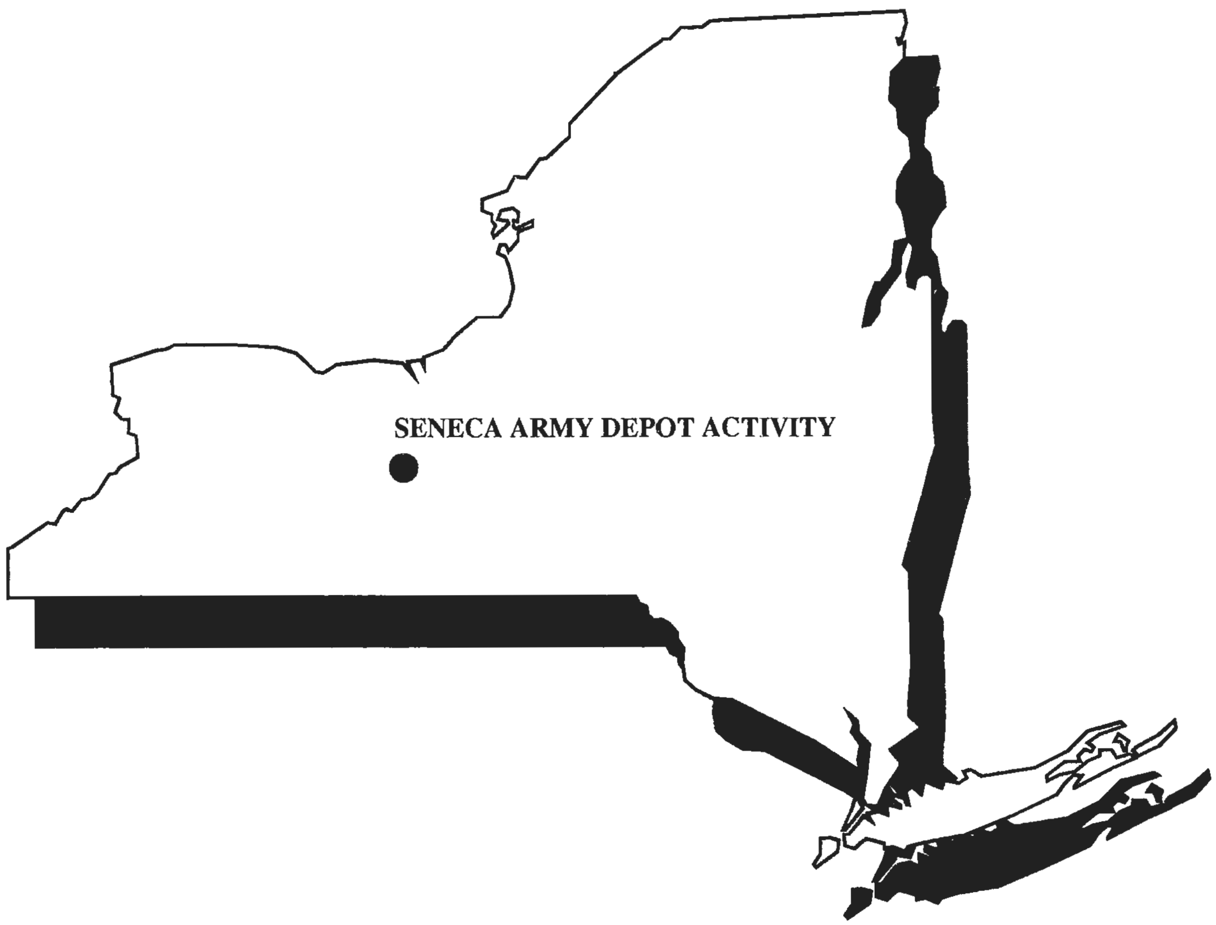

DRAFT

FEASIBILITY STUDY
AT THE ABANDONED DEACTIVATION FURNACE (SEAD-16)
AND THE ACTIVE DEACTIVATION FURNACE (SEAD-17)

NOVEMBER 1997

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1.0 INTRODUCTION

1.1 PURPOSE AND ORGANIZATION OF REPORT

This Feasibility Study (FS) report for the Abandoned Deactivation Furnace (SEAD 16) and the Active Deactivation Furnace (SEAD 17) sites at the Seneca Army Depot Activity (SEDA) is a continuation of the Remedial Investigation/Feasibility Study (RI/FS) process required for compliance with the Comprehensive Environmental Response and Compensation Liability Act (CERCLA) of 1980 and the Superfund Amendments Reauthorization Act (SARA) of 1986. This program has been performed under the guidance of the US Environmental Protection Agency (EPA), Region II, and the New York Department of Environmental Conservation (NYSDEC). The RI was completed in 1996 and the final draft RI report was submitted to EPA and NYSDEC. The purpose of the RI was to fully characterize the nature and extent of human health and environmental risks posed by the SEAD-16 and 17 sites.

SEDA is under the command control of the Tobyhanna Army Depot in Tobyhanna, PA. SEDA is currently an active Army facility, however, the depot has been placed on the closure list for BRAC 95. SEAD-16 (inactive since the mid-1960s) and SEAD-17 (inactive since 1989) are part of SEDA. Both sites are in proximity to the SEDA complex. SEAD 16 is abandoned with no current site uses. Site use at SEAD 17 is temporarily discontinued. The current intended future land use of the SEAD-16 and 17 has been determined by the Local Redevelopment Authority (LRA) in conjunction with the Army to be industrial/commercial. As required by CERCLA and Army regulations, if control of parcels at SEDA is released or transferred and the site-use changes, the Army must perform any remedial actions necessary to ensure that the site conditions resulting from a change is land use are protective of human health and the environment.

A baseline risk assessment (BRA) was conducted for the RI at the SEAD-16 and 17. The risk assessment included an analysis of four receptor categories. These are: 1) current on-site worker, 2) future on-site construction workers, and 3) future on-site industrial workers, and 4) future trespassers. A hazard index and cancer risk were calculated for each applicable receptor exposure route, and a total receptor risk was also calculated. The risk calculations, presented in the RI report and summarized in **Table 1-1** for SEAD-16 and **Table 1-2** for SEAD-17, indicate that under the current land use scenarios for current on-site workers, the risks are within the acceptable levels defined by EPA. For SEAD-16, under the future industrial site use scenario, the site risks exceed the EPA defined target levels for future site construction and industrial workers. Site risks are within acceptable EPA levels for future trespassers under the future industrial site use scenario for SEAD-16. These risks are almost entirely due to the ingestion of

TABLE 1-1

CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16

RECEPTOR	EXPOSURE ROUTE	HAZARD INDEX	CANCER RISK
CURRENT SITE WORKER	Inhalation of Dust in Ambient Air	6.90E-02	6.94E-11
	Ingestion of Onsite Soils	1.45E-02	1.30E-06
	Dermal Contact to Onsite Soils	8.78E-04	6.50E-08
TOTAL RECEPTOR RISK (Nc & Car)		8.44E-02	1.36E-06
FUTURE INDUSTRIAL WORKER	Inhalation of Dust in Indoor Air	5.72E-01	0.00E+00
	Ingestion of Indoor Dust	8.68E+00	3.17E-05
	Dermal Contact to Indoor Dust	2.65E+00	8.04E-06
	Ingestion of Onsite Soils	1.45E-02	1.30E-06
	Dermal Contact to Onsite Soils	8.78E-04	6.50E-08
TOTAL RECEPTOR RISK (Nc & Car)		1.19E+01	4.11E-05
FUTURE ON-SITE CONSTRUCTION WORKERS	Inhalation of Dust in Ambient Air	8.62E-01	3.47E-11
	Ingestion of Onsite Soils	8.71E-01	3.12E-06
	Dermal Contact to Onsite Soils	1.10E-02	3.25E-08
TOTAL RECEPTOR RISK (Nc & Car)		1.74E+00	3.15E-06
FUTURE TRESSPASSER (Child)	Inhalation of Dust in Ambient Air	4.83E-02	9.72E-12
	Ingestion of Onsite Soils	2.03E-01	2.50E-06
	Dermal Contact to Onsite Soils	2.44E-03	3.61E-08
	Ingestion of Onsite Surface Water while Wading	2.89E-02	6.81E-08
	Dermal Contact to Surface Water while Wading	1.79E-03	4.58E-07
	Ingestion of Onsite Sediment	3.67E-01	8.98E-07
	Dermal Contact to Sediment while Wading	1.46E-02	3.27E-08
TOTAL RECEPTOR RISK (Nc & Car)		6.66E-01	4.00E-06

TABLE 1-2

CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 17

RECEPTOR	EXPOSURE ROUTE	HAZARD INDEX	CANCER RISK
CURRENT SITE WORKER	Inhalation of Dust in Ambient Air	6.90E-02	6.94E-11
	Ingestion of Onsite Soils	1.45E-02	1.30E-06
	Dermal Contact to Onsite Soils	8.78E-04	6.50E-08
TOTAL RECEPTOR RISK (Nc & Car)		8.44E-02	1.36E-06
FUTURE INDUSTRIAL WORKER	Inhalation of Dust in Ambient Air	8.86E-03	3.98E-07
	Ingestion of Onsite Soils	2.19E-02	1.79E-06
	Dermal Contact to Onsite Soils	4.84E-02	6.55E-08
TOTAL RECEPTOR RISK (Nc & Car)		7.92E-02	2.25E-06
FUTURE ON-SITE CONSTRUCTION WORKERS	Inhalation of Dust in Ambient Air	8.86E-03	1.59E-08
	Ingestion of Onsite Soils	5.16E-01	1.08E-06
	Dermal Contact to Onsite Soils	4.30E-03	1.17E-08
TOTAL RECEPTOR RISK (Nc & Car)		5.29E-01	1.11E-06
FUTURE TRESSPASSER (Child)	Inhalation of Dust in Ambient Air	4.96E-04	4.45E-09
	Ingestion of Onsite Soils	7.67E-02	1.25E-06
	Dermal Contact to Onsite Soils	3.36E-02	9.09E-09
	Ingestion of Onsite Surface Water while Wading	1.04E-02	7.33E-08
	Dermal Contact to Surface Water while Wading	8.91E-06	2.34E-09
	Ingestion of Onsite Sediment	9.57E-02	5.61E-07
	Dermal Contact to Sediment while Wading	4.76E-03	0.00E+00
TOTAL RECEPTOR RISK (Nc & Car)		2.22E-01	1.90E-06

and dermal contact to site soils. For SEAD-17, site risks for future land use scenarios for all potential receptors are within acceptable EPA target levels.

This FS will focus on the current and intended future land uses as the basis for remedial action decisions. This report is organized in accordance with "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA," EPA/540/G-89/004, October 1988 and the New York State Department of Conservation's "Revised TAGM—Selection of Remedial Actions at Inactive Hazardous Waste Sites." Section 1.0 is divided into five subsections which provide an overview of site conditions, including a brief review of the RI report. Section 1.2 describes the site background. Sections 1.2.1 and 1.2.2 describe the site history, including a site description and the local geologic and hydrogeologic setting. Section 1.3 summarizes the nature and extent of contamination. Section 1.4 discusses the contaminant fate and transport, and Section 1.5 presents the conclusions of the Baseline Risk Assessment (BRA).

Section 2.0 identifies and describes the initial screening of the remedial technologies. Remedial action objectives are developed for each media of concern (e.g., surface soils), and general response actions are considered which meet the remedial objectives for each media. The remedial technologies within each response category are screened for technical feasibility and implementation at SEAD-16 and 17. The discussion of remedial technologies are divided into focused on soil/sediment treatment technologies. The same technologies are applicable at both SEAD-16 and 17. Because of the small volumes for remediation, it is assumed that both sites will be remediated as a unit.

Technologies remaining from the initial screening are combined into remedial alternatives and are presented in Section 3.0. Alternatives for each media are evaluated through preliminary screening to determine their relative merit for use in the remedial action. These alternatives assume implementation at SEAD-16 and 17 as a unit. Separate programs are not considered for either site independently. Section 4.0 describes the treatability testing that may be necessary for alternatives that include innovative technologies prior to their implementation of the remedial actions. In Section 5.0, the remedial action alternatives are screened and evaluated in detail. Also included in Section 5.0 are detailed descriptions of the technologies and their implementation, as well as cost estimates.

1.1.1 Operable Units

In order to facilitate the remedial actions, both SEAD-16 and SEAD-17 have been combined into separate operable units from several operable units. An operable unit, as defined by EPA (40 CFR 300.5) is:

> "a discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a site may be divided into a number of operable units, depending on the complexity of the problems associated with the site. Operable units may address geographical portions of a site, specific site problems, or initial phases of an action, or may consist of any set of actions performed over time or any actions that are concurrent but located in different portions of the site."

SEAD-16 has been combined into one Solid Waste Management Unit (SWMU), as has SEAD-17.

1.2 SITE BACKGROUND

1.2.1 Site Description

SEDA is an active military facility constructed in 1941. The site 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 Highways 96 and 96A adjoin SEDA on the east and west boundaries, respectively. Since its inception in 1941, SEDA's primary mission has been the receipt, storage, maintenance, and supply of military items.

As shown in **Figure 1-2**, SEAD-16 and SEAD 17 comprise only a few acres within the 10,587 acres that make up the entire SEDA facility. SEAD-16 and 17 were previously used by the Army for munitions deactivation. SEAD-16 is located in the east-central portion of SEDA. It is characterized by 2.6 acres of fenced land (**Figure 1-3**). SEAD 17 is located in the east-central portion of SEDA. It is characterized by an elongated deactivation furnace building that is surrounded by a crushed shale road (**Figure 1-4**).

1.2.1.1 Geologic 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.

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY

RECORD OF DECISION
OPEN BURING GROUNDS

DEPT.	DWG NO.
ENVIRONMENTAL ENGINEERING	729895-01002

FIGURE 1-1

LOCATION MAP

SCALE	DATE
1"= 8 MILES APPROX.	NOVEMBER 1997

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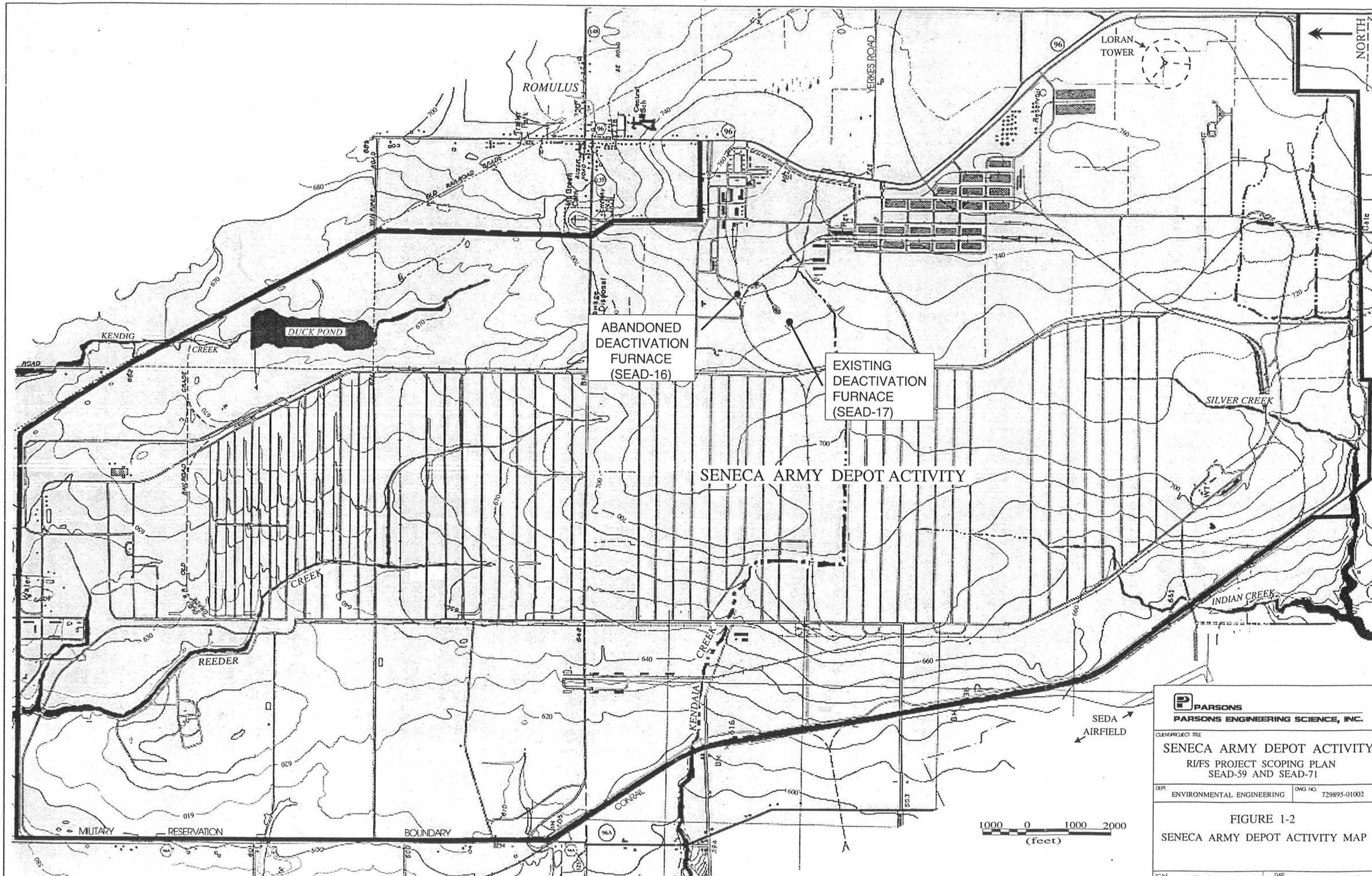

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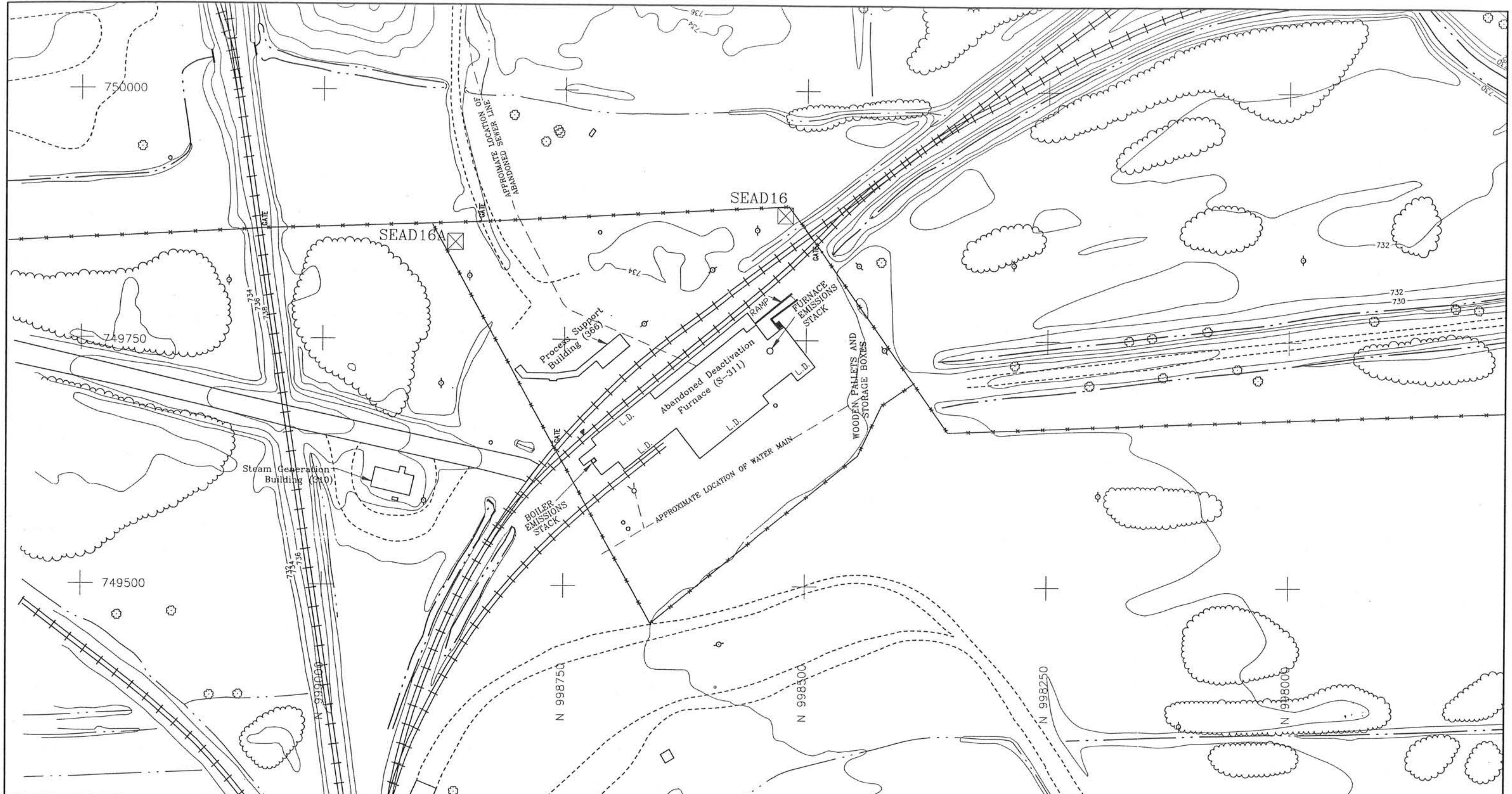

LEGEND

MINOR WATERWAY	SURVEY MONUMENT
MAJOR WATERWAY	L.D. LOADING DOCK
FENCE	ROAD SIGN
UNPAVED ROAD	DECIDOUS TREE
BRUSH LINE	FIRE HYDRANT
LANDFILL EXTENTS	MANHOLE
RAILROAD	GUIDE POST
GROUND SURFACE ELEVATION CONTOUR (760)	POLE
	UTILITY BOX
	CORDINATE GRID (250' GRID)
	OVERHEAD UTILITY POLE
	MAILBOX/RR SIGNAL

50 0 50 100
1" = 100'

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PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS
SEAD-16 ABANDONED DEACTIVATION FURNACE

DEPT. ENVIRONMETAL ENGINEERING
Dwg. No. 729895-01001

FIGURE 1-3
SEAD-16 SITE PLAN

SCALE 1" = 100'
DATE DECEMBER 1996
REV A

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS
SEAD-17 ACTIVE DEACTIVATION FURNACE

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	729895-01001

FIGURE 1-4
SEAD-17 SITE PLAN

SCALE	DATE	REV
1" = 100'	DECEMBER 1996	A

The Hamilton Group, 600 to 1500 feet thick, is divided into four formations. They are, from oldest to youngest, the Marcellus, Skaneateles, Ludlowville, and Moscow formations. The western portion of SEDA is generally located in the Ludlowville Formation while the eastern portion is located in the younger Moscow Formation. The Ludlowville and Moscow formations are characterized by gray, calcareous shales and mudstones and thin limestones with numerous zones of abundant invertebrate fossils that form geographically widespread encrinites, coral-rich layers, and complex shell beds. The Ludlowville Formation is known to contain brachiopods, bivalves, trilobites, corals and bryozoans (Gray, 1991). In contrast, the lower two formations (Skaneateles and Marcellus) consist largely of black and dark gray sparsely fossiliferous shales (Brett et al., 1991). Locally, the shale is soft, gray, and fissile.

The predominant surficial geologic unit present at the site is dense till. The till is distributed across the entire Depot and generally ranges in thickness from 3 feet to approximately 15 feet, although it is generally between 6 and 10 feet thick; at a few locations the thickness of the till is greater than 30 feet. The till is generally characterized as brown to olive-gray silt and clay, with little fine sand and variable amounts of fine to coarse gravel-sized inclusions of dark gray shale. Larger diameter clasts of shale (as large as 6 inches in diameter) are sometimes present in the basal portion of the till and are probably rip-up clasts removed from the weathered shale zone and incorporated into the till by the once-active glacier. Grain size analyses of the till show a wide distribution of particle sizes within the till (Metcalf & Eddie, 1989), however, there is a high percentage of silt and clay with the balance comprised of coarser particles. The porosities of 5 gray-brown silt clay (i.e., till) samples ranged from 34.0 percent to 44.2 percent with an average of 37.3 percent (USAEHA, 1985).

Darien silt-loam soils, 0 to 18 inches thick, have developed over the Wisconsin age till at both SEAD-16 and SEAD-17. These soils are poorly drained and have a silt clay loam and a clay subsoil. In general, the topographic relief associated with these soils is 3 to 8 percent.

Regionally, four distinct hydrologic units have been 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. Regionally, the water table aquifer of the unconsolidated surficial glacial deposits of the region would be expected to flow in a direction consistent with the dropping ground surface elevations. Geologic cross-sections from Seneca Lake and Cayuga Lake have been constructed by the State of New York, (Mozola, 1951). This cross-section information, along with groundwater flow directions established at numerous sites on SEDA and stream drainage patterns in the area, suggests that a groundwater divide exists approximately half way between the two finger lakes; the divide is believed to run approximately parallel to Route 96 near the eastern boundary of SEDA. Further evidence for the divide is provided in Parsons ES (1995). SEDA is located on the western slope of this divide and, therefore, regional groundwater flow on the depot is expected to be west toward Seneca Lake.

The geologic information reviewed indicates that the upper portions of the shale formation would be expected to yield small, yet adequate, supplies of water for domestic use. For mid-Devonian shales such as those of the Hamilton group, the average yields, (which are less than 15 gpm), are consistent with what would be expected for shales (LaSala, 1968). The deeper portions of the bedrock, (i.e., at depths greater than 235 feet) have provided yields up to 150 gpm. At these depths the high well yields may be attributed to the effect of solutioning on the Onondaga limestone, which is at the base of the Hamilton Group. Based on well yield data, the degree of solutioning is affected by the type and thickness of overlying material (Mozola, 1951). Solution effects on limestones (and on shales which contain gypsum) in the Erie-Niagara have been reported by LaSala (1968). This source of water is considered to comprise a separate source of groundwater for the area. Very few wells in the region adjacent to SEDA utilize the limestone as a source of water, which may be due to the drilling depths required to intercept this water.

1.2.2 Site History

SEDA was constructed in 1941 and has been owned by the United States Government and operated by the Department of the Army since this time. Prior to construction of the depot, the site was used for farming. The Abandoned Deactivation Furnace (SEAD-16) has been in use from approximately 1945 to the mid-1960s. Small arms munitions, both obsolete and unserviceable, were destroyed by incineration. There were no air pollution or dust control devices installed on the furnace during the time that it operated. The overhead pipes connecting Building S-311 and 366 were used to convey propellants in the deactivation process; it is also likely that propellants were stored in these buildings.

1.2.2.1 Previous Investigations

SEAD-16 and 17 are described in four previous reports. The first report is a SWMU Classification Report (Parsons ES, 1994a) that describes and evaluates the Solid Waste Management Units at SEDA. This report was intended to provide a cursory evaluation of all the SWMUs at SEDA. The second report is the Work Plan for CERCLA Expanded Site Inspection (ESI) of Ten Solid Waste Management Units written by Parsons Main, Inc. in January 1993. This report detailed the site work and sampling to be performed under the Expanded Site Investigation (ESI) The third report, the SWMU Classification Report (Parsons ES, 1995a), presents the results of a more detailed investigation of SEAD-16 and SEAD-17. The fourth report, which only applies to SEAD-16, is a Final Closure Report for the Underground Storage Tank Removal at Seneca Army Depot Activity, Romulus, New York (Science Applications International Corporation, May 1994). This report describes the removal, sampling, and conformatory laboratory analysis activities for two USTs at SEAD-16.

All previous investigations of the SEAD-16 and 17 site are summarized in chronological order in the RI.

1.3 NATURE AND EXTENT OF CONSTITUENTS OF CONCERN

The nature and extent of the chemicals of concern at the SEAD-16 and 17 were evaluated through a comprehensive field investigation program. Primary media investigated at the SEAD-16 and 17 included building materials, indoor air quality, surface and subsurface soil (from borings), surface water and sediment (from on-site ditches and drainage swales), and groundwater (from monitoring wells).

Concentrations above the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) clean-up guidelines were measured in this area at all depths from land surface to the top of the weathered shale. TAGMS are used by NYSDEC for establishing cleanup guidelines. The TAGMS are not promulgated standards and therefore are not ARARs but rather are To Be Considered (TBC) guidelines. As such, remedy selection will be based upon other enforceable standards that are ARARs. However, if appropriate, TAGMs may be used to help determine treatment volumes such as cubic yards of soil.

Surface water at SEAD-16 and 17 have not been classified by NYSDEC. However, because the drainage ditches near SEAD 16 and SEAD-17 form the headwaters for Kendaia Creek, the lower portion of which is designated as Class C surface water by NYSDEC, the Class C standards were used to provide a basis of comparison for the on-site surface water chemical data. The Class C Standards are not strictly applicable to the surface water found at SEAD-16.

Sediment results were compared to the most conservative New York State Guidelines for sediment, including: New York State lowest effect level (NYS LEL), New York State human health bioaccumulation criteria (NYS HHB), New York State benthic aquatic life acute and chronic toxicity criteria (NYS BALAT and NYS BALCT, respectively), and New York State wildlife bioaccumulation criteria (NYS WB).

All analytical results and their respective guidance values have been included in Appendix A.

SEAD-16

On the basis of the analytical results obtained for the 7 media at SEAD-16, the most significant impact to the site is from metals. Impacts from SVOCs and pesticides were also identified.

In the soil at SEAD-16, metals and SVOCs, predominantly PAH compounds, were found to be pervasive, particularly in the surface and subsurface soils adjacent to the Abandoned Deactivation Furnace. Lead, copper, arsenic, and zinc were detected in almost all of the surface soil samples at concentrations above their respective TAGM values. On the basis of the surface soil data, the highest concentrations of metals were clearly located in the area between the Abandoned Deactivation Furnace Building (S-311) and the Process Support Building (366). In the subsurface soil, copper and lead were found to be the most pervasive. The highest concentrations of PAH compounds in surface soils were detected in samples from locations adjacent to the northwestern corner of the Abandoned Deactivation Furnace Building. Nitroaromatic compounds were also present in the surface and subsurface soil near both buildings. Impacts from pesticides, PCBs, and herbicides in soil were less significant than the impacts from SVOCs and metals.

In the shallow groundwater aquifer, seven metals were detected above their respective NYS Class GA or federal MCL standards. Impacts from SVOCs and nitroaromatics were less significant. No VOCs, pesticides, or PCBs were detected in groundwater at SEAD-16.

Generally, surface water impacts were from metals, six of which were found at concentrations that exceeded their standards at several locations. The metals included lead, copper, zinc, cadmium, selenium, and iron. Three of these metals (lead, copper and zinc) were also found to be widely distributed in surface soils on-site, and thus, surface soils are a likely source area for the metals found in the surface water samples. SVOCs were found in a few surface water samples, but only one was above the NYS Class C standard. Many of the other chemical constituents analyzed for were not present in the samples. No VOCs, pesticides, PCBs, or nitroaromatics were detected in the samples

Sediment impacts were primarily from SVOCs and pesticides, which were pervasive. Several pesticide compounds exceeded their respective NYS sediment criteria and by far the most significant exceedences were in the sediment sample, SW/SD16-1, which was collected from the northeastern corner of the Abandoned Deactivation Furnace. Several metals were detected at concentrations above the NYS LEL with the highest concentrations found at SW/SD16-3 and SW/SD16-10. Impacts from nitroaromatics were less significant.

In the building material samples collected from the Abandoned Deactivation Furnace Building (S-311) and the Process Support Building (366), metals, SVOCs, and nitroaromatics were detected above their TAGM values. The metals antimony, copper, lead, and zinc were detected in all 12 of the building material samples at concentrations above their respective TAGM values. The SVOCs found were mostly PAHs, and among these benzo(a)pyrene was found at the highest concentration (1,500 μg/Kg). The maximum concentration of total carcinogenic PAHs was 54,000 μg/Kg, which was found in a propellant residue sample (BS-10). The highest concentrations of nitroaromatics were found in the vacuum system recovery vats in Building 366, where 2,4-dinitrotoluene was found at concentrations of 19,000,000 μg/Kg and 3,700,000 μg/Kg. Impacts from VOCs, pesticides, PCBs, and herbicides were less significant. Asbestos was detected at 13 locations in the two buildings in such materials as pipe insulation, roofing material, and floor tiles.

SEAD-17

On the basis of the analytical results obtained for the five media at SEAD-17, the most significant impacts to the site are from metals. Impacts from SVOCs, pesticides, PCBs, herbicides, and nitroaromatics were also found..

In the soil at SEAD-17 , metals were found to be pervasive in the surface and subsurface soils.. Twenty-one metals were detected in the surface soils at concentrations above their respective TAGM values. Antimony, arsenic, copper, lead, mercury, and zinc were detected in almost all of the surface soil samples at concentrations above their respective TAGM values. In the subsurface soils, lead was detected in all samples at concentrations above the TAGM value. The metals were generally evenly distributed around Building 367 at SEAD-17, although some of the highest concentrations were located immediately to the southwest of the building. A potential source for some the high concentrations of metals in this area of the site is a discharge pipe, which has an outfall near location SS17-18, that drains the retort inside Building 367. Impacts from VOCs, SVOCs, pesticides, PCBs, herbicides, and nitroaromatics in soil were less significant than the impacts from metals.

Generally, the groundwater at SEAD-17 has not been significantly impacted by any of the chemical constituents. Low concentrations of SVOCs were detected. Two metals did exceed their criteria values. Additionally, no VOCs, pesticides, PCBs, or nitroaromatics were detected in the groundwater.

Surface water impacts were not widespread and many of the chemical constituents analyzed for were not present in the samples. Most of the impacts from metals occurred in the surface water samples from the drainage ditch south of the Deactivation Furnace. No VOCs, pesticides, PCBs, or nitroaromatics were detected in the samples.

Sediment impacts were from SVOCs, pesticides, and metals. Impacts from SVOCs were most significant at one location in the drainage ditch in the northeastern corner of the site. Pesticides were found in the drainage ditches in the western and northeastern portions of the site. Metals impacts were found at SW/SD17-3, which is located in the drainage ditch in the eastern portion of the site. No PCBs or nitroaromatics were detected.

1.4 FATE AND TRANSPORT

Analysis of the fate and transport mechanisms for the chemicals of concern at the SEAD-16 and 17 considered site specific factors as well as expected chemical and physical behaviors of the contaminants. Soil, sediment, and surface water samples collected off-site, and downstream of the site were used to quantify the extent of impacts to various media.

Based on the distributions and concentrations of parameters measured on the sites, inorganics are believed to be the most significant in terms of determining their transport. On this basis, cursory transport modeling or inorganics was performed. This modeling was intended to provide some insight as to which organics may pose a future threat to groundwater at both SEAD-16 and SEAD-17. It may also be used to provide a focus and direction for future, more detailed modeling at SEAD-16 and SEAD-17. Transport modeling of the other constituents was not performed.

Inorganics of concern at SEAD-16 and SEAD-17 are Arsenic, Antimony, Copper, Cadmium, Lead, Silver, and Zinc. These metals are transported primarily by leaching and groundwater flow. Soil and groundwater samples collected during the RI confirm that these materials are present in the surface and subsurface soils as well as in the groundwater. Once these materials have entered the subsurface, they may migrate through the unsaturated vadose zone and/or infiltrate into the groundwater system. A series of publicly available models was used to evaluate the transport of inorganics at SEAD-16 and SEAD-17. These models are used and accepted by the USEPA to conservatively estimate soil inorganic contributions to underlying groundwater via the leaching pathway. A detailed discussion of these numerical models and their application, assumptions used, input parameters, and sensitivity analyses is included in the RI Report (Parsons ES, 1997) and in Appendix E. The following summarizes model results.

SEAD-16

The results of the model indicate that base case maximum leaching concentrations were for lead and copper (55.73 mg/l and 65.27 mg/l, respectively), each of which is above its applicable groundwater standard. The times for these maximum concentrations to occur were predicted to be 785 years for lead and 170 years for copper. The second highest maximum concentration was for zinc, at 26.45 mg/l in 130 years. A sensitivity analysis showed that worst case scenario leaching concentrations could be as much as 305.12 mg/l in 145 years for lead and 194.66 mg/l in 60 years for copper. The worst case concentration for zinc was predicted to be 170.05 mg/l in 20 years.

The concentrations above were assumed to be concentrations of solute at the unsaturated-saturated zone interface in order to predict worst-case concentrations that will impact the groundwater. Modeling results indicate that lead will exceed its EPA MCL of 15 µg/l in 205 years, and reach a maximum concentration in groundwater of 2,721 µg/l in approximately 785 years. Copper will exceed its EPA MCL of 200 µg/l in 85 years, and reach a maximum concentration in groundwater of 3,190 µg/l in approximately 175 years. Zinc will exceed its EPA MCL of 300 µg/l in 65 years, and reach a maximum concentration in groundwater of 1,428 µg/l in approximately 130 years.

SEAD-17

The results of the model indicate that base case maximum leaching concentration was for zinc, at 8.20 mg/l, which is above its applicable groundwater standard. The second highest maximum concentrations were for lead and copper at 3.60 mg/l and 3.41 mg/l, respectively, which is also above their applicable groundwater standards. The times for these maximum concentrations to occur were predicted to be 120 years for zinc, 170 years for copper, and 785 years for lead. A sensitivity analysis showed that worst case scenario leaching concentrations for zinc, copper, and lead could be as much as 52.01 mg/l in 20 years, 10.07 mg/l in 55 years, and 19.72 mg/l in 145 years, respectively.

The concentrations above were assumed to be concentrations of solute at the unsaturated-saturated zone interface in order to predict worst-case concentrations that will impact the groundwater. Modeling results indicate that lead and zinc will exceed their respective EPA MCLs of 15 µg/l and 300 µg/l in 340 years and 50 years. Maximum concentrations in groundwater will reach 274 µg/l in approximately 785 years for lead and 578 µg/l in 120 years for zinc. Although cadmium concentrations at the unsaturated-saturated zone interface were only predicted to reach a maximum of 0.59 mg/l in 20 years (worst case), because of the large area over which cadmium was detected, it is expected to exceed its groundwater standard of 5 µg/l 30 years, and to reach a maximum of 14.64 µg/l in approximately 55 years. The high concentration of copper predicted at the unsaturated-saturated zone interface is not expected to exceed its groundwater standard of 200 µg/l.

1.5 RISK ASSESSMENT

The objectives of the baseline risk assessment are to: help determine whether additional response actions are necessary at the site, to provide a basis for determining residual chemical levels that are adequately protective of human health and the environment, to provide a basis for comparing potential health impacts of various remedial alternatives, and to evaluate selection of the "No Action" remedial alternative, where appropriate. To meet these objectives, the *Risk Assessment Guidance for Superfund* (RAGS) (USEPA, 1989a) was followed wherever possible and applicable.

The baseline risk assessment is divided into two basic components: the human health evaluation and the ecological risk assessment evaluation. Separate risk calculations are presented for current and future on-site land-use scenarios.

1.5.1 Baseline Human Health Risk Assessment

The current and future intended land use for SEAD-16 and 17 will not change from current land use which is industrial. There are no current plans to use this site for residential purposes. The future intended use of the site was determined by the BRAC process in July 1995.

Human health risk assessments were calculated for four exposure scenarios:

1) current on-site worker;
2) future on-site worker; and
3) future on-site construction worker; and
4) future potential trespasser.

SEAD-16

Future on-site industrial and on-site construction workers are the receptors exhibiting a potential for adverse noncarcinogenic health threats above the USEPA target level. As shown on Table 1-1, the RME hazard index of 11.9 calculated for the future industrial worker scenario is due primarily to ingestion of indoor dust. The RME hazard index of 1.74 calculated for the future on-site construction worker scenario is due to both ingestion of outdoor dust and ingestion of onsite soils. The cancer risks for all receptors and pathways are below USEPA target levels. The highest calculated RME cancer risk is 3.17×10^{-5} for ingestion of indoor dust by future industrial workers.

SEAD-17

Potential receptors exhibiting the greatest risk for adverse noncarcinogenic health threats are future on-site construction workers. As shown on Table 1-2, the RME hazard index of 0.839 is due primarily to ingestion of on-site soil for future on-site construction workers. This is below the USEPA target level of 1.0. The cancer risks for all receptors and pathways are also below UESPA target levels. The highest calculated RME cancer risk is 1.79×10^{-6} for ingestion of on-site soils by future industrial workers.

1.5.2 Baseline Ecological Risk Assessment

The ecological risk assessment was performed following the guidance presented in the New York State *Division of Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites* (NYSDEC 1994), *the Framework for Ecological Risk Assessment* (EPA, 1992f), and the *Procedural Guidelines for Ecological Risk Assessment at U.S. Army Sites, Vol. 1* (Wentsel et al., 1994). The results of the ERA indicate that the COPCs identified at SEAD-16 and 17 are considered to pose a negligible risk to the ecosystem surrounding the site.

The SEAD-16 and 17 ERA has included both a qualitative and quantitative assessment of the ecological status of the Unit. Phase I field evaluations included the characterization and description of the local wildlife habitat and ecological conditions within the study area. The conclusions determined from these field efforts indicated a diverse and healthy aquatic and terrestrial environment. No overt acute toxic impacts were evidenced during the field evaluation.

Quantitative sediment and surface water analytical data were compared to USEPA and NYSDEC guidelines for the protection of aquatic and macroinvertebrate life in sediments and surface water. Additionally, as a supplement to specific guidelines, criteria, which are protective of terrestrial wildlife and vegetation in soils, were also considered.

The quantitative ecological risk evaluation, which involved comparisons of the ecological assessment endpoint exposures with the toxicity reference values, initially suggested that a slight possibility exists for the COPCs to present a small potential for environmental effects. In addition, six inorganic elements and two endosulfan compounds at SEAD-16 present a potential for greater exposure to result in environmental effects. However, the effects from these analytes have not been observed during fieldwork, i.e. the ecological community appears diverse and normal. Furthermore, upon considering the weight of evidence presented in the Ecological Risk Summary section (Sections 6.6.4.3.1 and 7.6.4.3.1 of the RI, Parsons ES, 1997) and the very conservative assumptions used in the ERA, the COPCs identified at SEAD-16 and 17 are considered to pose a low risk to the ecosystem of the SEAD-16 and a negligible risk to the ecosystem of the SEAD-17 study area.

2.0 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

2.1 INTRODUCTION

The purpose of this section is to develop and screen an appropriate range of remedial technologies that will eventually be combined as remedial alternatives and undergo further screening in **Section 3.0**. Technologies were developed following the standard USEPA method of identifying and screening technologies/processes. The approach consists of six steps:

- Develop remedial action objectives that specify media of interest, chemical constituents of concern, and the results of the BRA in **Sections 6.0** and **7.0** of the SEAD-16 and 17 RI.
- Develop general response actions for each medium of interest that will satisfy each remedial action objective for the site.
- Estimate quantities of media to which general response actions will be applied to meet remedial action objectives.
- Identify remediation technologies/processes associated with each general response action. Screen and eliminate technologies/processes based on technical implementibility.
- Evaluate technologies/processes and retain processes that are representative of each technology.
- Assemble and further screen the retained technologies/processes into a range of alternatives as appropriate. In **Section 5.0** the remaining alternatives are analyzed in detail.

This six-step approach to technology screening and alternatives development is described in the following subsections.

2.2 REMEDIAL ACTION OBJECTIVES

2.2.1 General Remedial Action Objectives

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) clean-up process is a risk based process when considering remedial action. It requires that the overall objective of any remedial response is to reduce the environmental and human health risks of the chemicals present in the various environmental media to within established EPA target ranges. Remedial action objectives are developed to meet this overall objective, and specify media of concern, potential exposure pathways, and remediation goals. These goals establish acceptable exposure levels that are used as a basis for developing remedial alternatives.

The National Contingency Plan (NCP) requires that CERCLA remedial actions comply with applicable or relevant and appropriate requirements (ARARs). ARARs are promulgated standards that are applicable to the process of site clean-up after a remedial action has been chosen for implementation. Chemical specific standards, action specific standards, location specific standards, and federal and state environmental regulations are all examples of potential ARARs. However, there are currently no promulgated state or federal standards that establish soil or sediment quality, which are the media of interest at SEAD-16 and 17 as discussed in the following sections.

In addition, CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, requires that a CERCLA remedial action must:

- 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.

Remedial action objectives for SEAD-16 and 17 have been developed which consist of medium specific objectives designed to be protective of human health and the environment. Where practicable, consideration was given to the NCP preference for permanent solutions. These objectives are:

The remedial action objectives for the SEAD-16 and 17 operable units are as follows:

- Prevent public or other persons from direct contact with adversely impacted soils, sediments, solid waste and surface water that may present a health risk.
- Eliminate or minimize the migration of hazardous constituents from soil to groundwater and downgradient surface water.
- Prevent off-site migration of constituents above levels protective of public health and the environment.
- Restore soil, and sediments to levels that are protective of public health and the environment.

The following sections describe how these general remedial action objectives were determined and the development of remedial actions to attain these objectives. Technologies capable of accomplishing the remedial action objectives have been screened for applicability and are assembled into remedial alternatives in **Section 3.0**.

2.2.2 Media of Interest

The selection of the media of interest was based upon two general remedial action objectives: those media that contribute the greatest risk and cause an exceedance of an EPA target risk level, and those media that do not comply with ARARs. The remedial investigation has examined all media at SEAD-16 and 17. Discrete samples of the on-site and off-site surface water, the on-site sediment, the on-site soil and the on-site groundwater and Buildings S-311 and 366 at SEAD-16 have been sampled and analyzed using EPA and NYSDEC established analytical techniques. This process has yielded high quality data meeting all established Data Quality Objectives (DQO's) which has been used to determine the need for and extent of remediation.

The media of interest and the locations that may require a remedial action were selected by evaluating the benefits gained by implementing such an action. The benefits of a CERCLA remedial effort is defined by the extent that a proposed action will eliminate or decrease the risk to within acceptable levels. Reasonable decisions are then possible regarding the media and the extent of specific areas that need to be addressed. In this manner, if the conclusion is reached to perform a remedial action then the volume of material to be treated and the benefits produced by such an action are clear.

Although lead, a heavy metal found in the site soils and sediments at both sites, was not part of the risk analysis, it should be considered. Lead was not considered in the risk assessment because the EPA has withdrawn the allowable Reference Dose (RfD) values for lead. However, based on prior discussion and agreement between the Army and the EPA regarding lead in soils at the OB Grounds at SEDA (Parsons ES, 1997), a negotiated value of 500 mg/kg in soils is considered the EPA guidance value for lead in soils at SEDA. This value is used to evaluate the extent of remediation at SEAD-16 and 17. Similarly, a value of 31 mg/kg for lead in sediments will be used to evaluate remediation of sediments at SEAD-16 and 17. This value is based on the NYSDEC Lower Exposure Limit, which is not a promulgated regulation but a guidance value used for evaluation of SEDA sites as agreed between the Army and the EPA.

Based on the results of the BRA and an evaluation of lead concentrations, surface soil, subsurface soil, and sediment were determined to require Remedial Action Objectives (RAOs) at both sites. In addition, at SEAD-16, the indoor air and surfaces inside the abandoned Buildings S-311 and 366 also require RAOs. **Tables 2-1** summarizes RAOs for SEAD-16, and **Table 2-2** summarizes RAOs for SEAD-17.

2.2.2.1 Soil

In the soil at SEAD-16, metals and SVOCs, predominantly PAH compounds, were found to be pervasive, particularly in the surface and subsurface soils adjacent to the Abandoned Deactivation Furnace. Of the metals that were detected, 14 metals were considered to be more toxic. Lead, copper, arsenic, and zinc were detected in almost all of the surface soil samples at elevated concentrations. On the basis of the surface soil data, the highest concentrations of metals were clearly located in the area between the Abandoned Deactivation Furnace Building (S-311) and the Process Support Building (366). In the subsurface soils, copper and lead were found to be most pervasive. The highest concentrations of PAH compounds in surface soils were detected in samples collected from locations adjacent to the northwestern corner of the Abandoned Deactivation Furnace Building. Nitroaromatic compounds were also present in the surface and subsurface soils near both buildings. Impacts from pesticides, PCBs, and herbicides in soil were less significant than the impacts from SVOCs and metals. This media has therefore been retained as a media of interest.

Table 2-1
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 AREAS FOR REMEDIATION

CASE	REMEDIAL ACTION OBJECTIVES	BASIS	CLEAN UP GOAL	DESCRIPTION OF AREA TO BE REMEDIATED[1]	AREA[2] (ft^2)	DEPTH (in)	VOLUME (yd^3)	SAMPLING LOCATIONS REMEDIATED OR EXCAVATED[3]
1	a) Prevent ingestion/direct contact with indoor building surfaces and debris with excess heavy metals	a) Protection of Future On-Site Workers	NA	Material and Debris Inside Buildings S 311 and 366	26,139	NA	100	FS16-1, FS16-2, FS16-3, FS16-4, FS16-5, FS16-6, FS16-7, FS16 8, BS-10, BS-11, FS-50
2	a) Prevent ingestion/direct contact with surface soil having excess heavy metals b) Prevent surface soil migration to drainage ditches and Kendaia Creek	a) Protection of Current and Future On-site Workers b) Protection of Surface Water	Pb <500 mg/kg	Surface Soils on East and Southeast Sides of Building S-311 Cumulative Volume	36,452	6	675 775	SS16-2 through 5, SS16-8, SS16-11, SS16-14, SS16-16, SS16-19 through 24, SS16-26 through 28, SS16-30, SS16-35, SB16-1
3	a) Prevent ingestion/direct contact with sediment having excess heavy metals b) Prevent sediment migration in surface water	a) Protection of Terrestrial and Aquatic Ecology b) Protection of Surface Water	Pb <31 mg/kg	Sediment in Drainage Ditches on Southeast Corner of S-311 Cumulative Volume	20,018	6	371 1,146	SS16-2 through 5, SS16-8, SS16-11, SS16-14, SS16-16, SS16-19 through 24, SS16-26 through 28, SS16-30, SS16-35, SB16-1, **SD/SW16-1 through 10**
4	a) Prevent ingestion/direct contact with subsurface soil having excess heavy metals b) Minimize potential for leaching to groundwater	a) Protection of Current and Future On-site Workers b) Protection of Ground Water	Pb <500 mg/kg	Subsurface soil on Southeast and Northeast Side of Bldg S-311 Cumulative Volume	1,375	24	76 1,222	SS16-2 through 5, SS16-8, SS16-11, SS16-14, SS16-16, SS16-19 through 24, SS16-26 through 28, SS16-30, SS16-35, SB16-1, SD/SW16-1 through 10, **SB16-2, SB16-5**

Notes:
1) For Case 4, area to be remediated/excavated includes an additional 24 inches in depth within the areas considered by Case 1 (see Figure 2-1).
2) Areas for case 1 is the total plan areas of Buidings S-311 and 366 and is not necessarily related to volume to be removed; Areas for Cases 2-4 are surface extent of soils/sediments to be excavated.
3) Bold items in Sampling Location Column are additional locations to be remediated/excavated when the case is considered.

Table 2-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 AREAS FOR REMEDIATION

CASE	REMEDIAL ACTION OBJECTIVES	BASIS	CLEAN UP GOAL	DESCRIPTION OF AREA TO BE REMEDIATED[1]	AREA (ft^2)	DEPTH (in)	VOLUME (ft^3)	SAMPLING LOCATIONS REMEDIATED OR EXCAVATED[2]
1	a) Prevent ingestion/direct contact with surface soil having excess heavy metals b) Prevent migration of soil to drainage ditches and Kendaia Creek	a) Protection of Current and Future On-site Workers b) Protection of Surface Water	Pb <500 mg/kg	Surface Soils North and Northeast of Bldg 367, Southwest Corner and Southeast of Bldg 367	45,475	6	842	SS17-1, SS17-4 through 9, SS17-12 through 14, SS17-16, SS17-18, SS17-26, SS17-27, SS17-28, SS17-35, SS17-36, SS17-37
				Cumulative Volume			842	
2	a) Prevent ingestion/direct contact with sediment having excess heavy metals b) Prevent sediment migration in surface water to drainage ditches and Kendaia Creek	a) Protection of Terrestrial and Aquatic Ecology b) Protection of Surface Water	Pb <31 mg/kg	Sediments in Drainage Ditches East and Northeast, West and Northwest of Building 367	4,350	6	81	SS17-1, SS17-4 through 9, SS17-12 through 14, SS17-16, SS17-18, SS17-26, SS17-27, SS17-28, SS17-35, SS17-36, SS17-37, **SD/SW-17-1 through 8**
				Cumulative Volume			923	
3	a) Prevent ingestion/direct contact with subsurface soil having excess heavy metals b) Minimize potential for leaching to groundwater	a) Protection of Current and Future On-site Workers b) Protection of Ground Water	Pb <500 mg/kg	Sursurface Soils North and Northwest of Building 367	475	24	35	SS17-1, SS17-4 through 9, SS17-12 through 14, SS17-16, SS17-18, SS17-26, SS17-27, SS17-28, SS17-35, SS17-36, SS17-37, SD/SW-17-1 through 8, **SB17-2**
				Cumulative Volume			958	

Notes:
1) For Case 3, area to be remediated/excavated includes an additional 24 inches in depth within the areas considered by Case 1 (see Figure 2-1).
2) Bold items in Sampling Location Column are additional locations to be remediated/excavated when the case is considered.

In the soil at SEAD-17 , metals were found to be pervasive in the surface and subsurface soils.. Twenty-one metals were detected in the surface soils at elevated concentrations, including antimony, arsenic, copper, lead, mercury, and zinc. In the subsurface soils, lead was detected in all samples at elevated concentrations. The metals were generally evenly distributed around Building 367 at SEAD-17, although some of the highest concentrations were located immediately to the southwest of the building. A potential source for some the high concentrations of metals in this area of the site is a discharge pipe, which has an outfall near location SS17-18, that drains the retort inside Building 367. Impacts from VOCs, SVOCs, pesticides, PCBs, herbicides, and nitroaromatics in soil were less significant than the impacts from metals.

A detailed description of soil analytical results can be found in the SEAD-16 and 17 RI (Parsons ES, 1997).

2.2.2.2 Sediment

At SEAD-16, sediment impacts were primarily from SVOCs, metals, and pesticides, which were pervasive. Several pesticide compounds exceeded their respective NYS sediment criteria and by far the most significant exceedences were in the sediment sample, SW/SD16-1, which was collected from the northeastern corner of the Abandoned Deactivation Furnace. Several metals were detected at concentrations above the NYS LEL with the highest concentrations found at SW/SD16-3 and SW/SD16-10. Impacts from nitroaromatics were less significant.

At SEAD-17 sediment impacts were also from SVOCs, pesticides, and metals. Impacts from SVOCs were most significant in the drainage ditch in the northeastern corner of the site. Pesticides were found in the drainage ditches in the western and northeastern portions of the site. Metals impacts were found at SW/SD17-3, which is located in the drainage ditch in the eastern portion of the site. No PCBs or nitroaromatics were detected.

A detailed description of soil analytical results for sediment can be found in the SEAD-16 and 17 RI (Parsons ES, 1997).

2.2.2.3 Groundwater

In the groundwater at SEAD-16 seven metals were detected above the respective NYS Class GA or federal MCL standards. Impacts from SVOCs and nitroaromatics were less significant. No VOCs, pesticides, or PCBs were detected in the groundwater at SEAD-16.

The groundwater at SEAD-17 has not been significantly impacted by any of the chemical constituents. Low concentrations of SVOCs were detected. Two metals, lead and thallium did exceed their Federal EPA MCL values. Additionally, no VOCs, pesticides, PCBs, or nitroaromatics were detected in the groundwater.

A detailed discussion of analytical results for groundwater can be found in the SEAD-16 and 17 RI.

Although lead was detected in groundwater, from a risk standpoint there are no exposure pathways for groundwater that would increase risk for human receptors. In addition, several site factors inhibit the movement of contaminants in groundwater and preclude the likelihood that groundwater could acquire an exposure pathway.

Hydraulic conductivities in both the till/weathered shale and in competent shale are low. Groundwater velocities calculated in Section 3.0 of the RI are between 0.4 and 1.4 feet per day, which is 151-504 feet per year. Groundwater moving at this speed will travel one mile in 10-35 years and the nearest drinking water will is located well outside of a one mile radius around the site.

A similar situation exists for SEAD-17. Hydraulic conductivities are low, and groundwater velocities calculated in Section 3.0 of the RI are between 1.0 and 1.3 feet per day, or 365-475 feet per year. The time to travel one mile is 11-14 years, and any drinking water wells in the area are located well outside a one-mile radius of the site.

Although metals may be subject to movement with soil water and in this way be transported to groundwater, the rate of migration does not equal the rate of water movement due to fixation and adsorption reactions (Dragun, 1988). Metals may become immobilized by mechanisms of adsorption and precipitation, which prevent movement. In the case of lead, which is a primary constituent of concern at SEAD-16 and 17, soluble lead added to soil reacts with clays, phosphates, sulfates, carbonates, hydroxides and organic matter such that its mobility is greatly reduced. Reduced mobility of lead coupled with low hydraulic conductivities, therefore, extremely limit the likelihood that lead will travel far enough to pose risks to human health or the environment.

In addition, the future land use of SEAD-16 and 17 has been designated for industrial purposes, not as a residential area. From the standpoint of land use, it is unlikely that private wells would be installed in the overburden/weathered shale aquifer at SEAD-16 and 17 for the purpose of extracting groundwater to drink.

Further, even if in the unlikely event that groundwater was to be used as a source of drinking water, it is unlikely that the aquifer could be used for that purpose. For groundwater to be used as a reasonable source of drinking water, requirements for quality and quantity must be satisfied. These requirements are established the NYS Department of Health (NYSDOH) and are detailed in the bulletin titled *Rural Water Supply,* which sets forth the requirements for an individual water supply system. NYSDOH indicates that a private well should be developed from a water bearing formation at a depth greater than 20 feet below the ground surface. In the case of SEAD-16 and 17 a depth greater that 20 feet would be below the overburden/shale aquifer where all groundwater measurements have been obtained from. Water at depths greater than 20 feet would be less available than water in the shallower overburden/shale formation due to the poor hydraulic characteristics of the bedrock. Typical water wells in the area drilled to depths in the bedrock approaching 200 feet or more.

Therefore, groundwater is not a media of interest. However, limiting contaminant sources in soil that may migrate has been considered in the formulation of the remedial action objectives.

2.2.2.4 Surface Water

Generally, surface water impacts at SEAD-16 were from metals, six of which were found at concentrations that exceeded their standards at several locations. The metals included lead, copper, zinc, cadmium, selenium, and iron. Three of these metals (lead, copper and zinc) were also found to be widely distributed in surface soils on-site, and thus, surface soils are a likely source area for the metals found in the surface water samples. SVOCs were found in a few surface water samples, but only one was above the NYS Class C standard. Many of the other chemical constituents analyzed for were not present in the samples. No VOCs, pesticides, PCBs, or nitroaromatics were detected in the samples.

Surface water impacts at SEAD-17 were not widespread and many of the chemical constituents analyzed for were not present in the samples. Most of the impacts from metals occurred in the surface water samples from the drainage ditch south of the Deactivation Furnace. No VOCs, pesticides, PCBs, or nitroaromatics were detected in the samples.

Since the impacts to surface water appear to be caused by contaminants in soils at both sites, protection of surface water is a remedial action objective. However, due to the limited extent of impacts to surface water, it is not retained as a media of interest.

2.2.2.5 Building Materials

In the building material samples collected from the Abandoned Deactivation Furnace Building (S-311) and the Process Support Building (366) at SEAD-16, SVOCs and nitroaromatics were detected at elevated levels. The metals antimony, copper, lead, and zinc were also detected in all 12 of the building material samples at elevated concentrations. The SVOCs found were mostly PAHs, and among these benzo(a)pyrene was found at the highest concentration (1,500 μg/Kg). The maximum concentration of total carcinogenic PAHs was 54,000 μg/Kg, which was found in a propellant residue sample (BS-10). The highest concentrations of nitroaromatics were found in the vacuum system recovery vats in Building 366, where 2,4-dinitrotoluene was found at concentrations of 19,000,000 μg/Kg and 3,700,000 μg/Kg. Impacts from VOCs, pesticides, PCBs, and herbicides were less significant. Asbestos was detected at 13 locations in the two buildings in such materials as pipe insulation, roofing material, and floor tiles. The surfaces of the buildings are therefore retained as media of interest. A detailed discussion of analytical results for building materials can be found in the SEAD-16 and 17 RI (Parsons ES, 1997).

2.2.2.6 Air

Both ambient air and air inside Building S-311 at SEAD-16 were evaluated as a potential media of interest. Ambient air was discounted as a media of interest for the following reasons. As part of the risk assessment process, the human health impacts due to the inhalation of fugitive dust in ambient air was considered using EPA approved atmospheric dispersion models of the on-site soil material. This evaluation indicated that ingestion of fugitive dust was generally at least of magnitude lower in carcinogenic risk than the most significant risk pathway, which was ingestion of on-site soil. For example, for the current industrial on-site worker at SEAD-16, the carcinogenic risk due to inhalation of dust is 6.94×10^{-11}, whereas the carcinogenic risk due to ingestion of soil is 1.30×10^{-6} (see **Table 1-1**). Although non-carcinogenic risk was about the same and even if this pathway was considered significant, the focus of any risk reduction efforts would be with the on-site surface soils rather than the ambient air.

The indoor air samples form the abandoned Building S-311 at SEAD-16 show similar risk assessment results to ambient air in that ingestion and dermal contact of indoor dust contribute much more significantly to human health risk. In addition, the source of contaminants in indoor air is likely particles and dust from indoor surfaces, which are the focus of risk reduction efforts rather than the indoor air itself. Therefore, indoor air has been discounted as a media of interest.

2.2.3 Potential Exposure Pathways

As described in the BRA in **Sections 6.0 and 7.0** of the RI and summarized in **Section 1.0** of this report, the risks at SEAD-16 and 17 are primarily due to ingestion of site soils and inhalation of dust from site soils and building debris. Pathways considered for the future trespasser receptor scenario included surface water ingestion and dermal contact, as well as sediment ingestion and dermal contact. However, the risks calculated from these exposure pathyways were well below acceptable levels. There are no exposure pathyways for groundwater. Accordingly, the remedial action objectives focus on site soils and sediments.

2.2.4 Remedial Action Objective Summary and Site Specific Goals

Because the hazard index at SEAD-16 for future industrial and construction workers is above the EPA acceptable level of 1.0, remedial action must be undertaken to reduce human health risk. In addition, lead is present in soils above the action levels previously discuss of 500 mg/kg at both sites. This level is the clean up goal for surface soil and subsurface soils at both sites. In addition, 31 mg/kg is the clean up goal for sediment. Because ingestion and inhalation of dust in Buildings S-311 and 366 at SEAD-16 contribute significantly to risk to future industrial workers, removal of debris from these buildings to decrease hazardous dust particles causing unacceptable risk is warranted. There is no chemical-specific clean up goal for the buildings, however, confirmatory sampling is included in the remedial alternatives to ensure that removal is effective in reducing risk to acceptable levels in the buildings.

Tables 2-1 and 2-2 summarize the remedial action objectives and clean up goals. A detailed discussion of these goals and the resulting degree of risk reduction is presented in **Section 2.4**.

2.3 RESPONSE ACTIONS

This section presents the general response actions that have been considered applicable at SEAD-16 and 17. These actions will be used to identify specific remedial technologies that would achieve the RAOs described in previous sections.

Based upon the characteristics of the waste and the site conditions determined during the RI, the appropriateness of an action is based upon effectiveness, implementabilty and cost. Appropriate response actions are those actions that involve control of inorganics in soil and sediment. Controlling the inorganics will assure that exposure to humans and ecological receptors are prevented and will accomplish the remedial action goals for soil and sediments. Since groundwater, surface water and air are not media of concern, general response actions for these media other than prevention of further degradation of the quality of these media have not been considered. Unlike actions for organics compounds, response actions for inorganic constituents do not involve breaking down the components via a treatment process to a less innocuous substance. Instead, the actions that are appropriate for metals are those that prevent exposure by isolation, such as within a landfill, or by chemically or physically binding the metals into a stabilized matrix. In some cases, if site conditions are favorable, it is possible to accomplish this in-situ, otherwise some excavation and consolidation of materials from disperse locations will be required prior to isolation or treatment.

The screening process has identified the following general response actions as applicable for site remediation at both SEAD-16 and 17:

- No Action,
- Institutional Control Actions,
- Containment Actions,
- In-situ Treatment Actions,
- Excavation/Removal/Ex-situ Treatment Actions and
- Excavation/Removal/Disposal Actions.

A brief synopsis of the screening process and the reasons for selecting these general response actions is provided.

No Action involves leaving the site in the current conditions and allowing unrestricted use of the property. This action does not involve additional monitoring, security or any measures to minimize the risk to ecological receptors or human health. Since No Action does not involve any remedial action, there are no remedial technologies or process options that are applicable. This action has been retained for further consideration because it will provide a baseline for comparing the benefits of implementing other actions. This action will not reduce human or ecological risks.

Institutional control actions represent the lowest level of response activity and consists of monitoring, security, physical restrictions such as fencing, and land use restrictions such as deed restrictions. Institutional control actions minimize the possibility of receptor contact with wastes by removing the receptor or modifying the exposure pathway. Since institutional control actions are only applicable to the receptor, they do not involve reductions in the volume, toxicity or control of wastes at the site, and would not reduce risk to ecological receptors.

Unlike many CERCLA sites that are abandoned, SEAD-16 and 17 located within the boundaries of the an active military installation. Consequently, land use is restricted to authorized personnel. Security measures are currently in place that prevent unauthorized use of the site. In addition, there are institutional controls currently in-place that require the Army to disclose the conditions of the site and restrict land use, as appropriate, to meet the risks associated with the future use of the site. These requirements include: CERCLA, 42 United States Code Section 120 (h)(1), as amended by the Community Environmental Response Facilitation Act (CERFA) (Public Law 102-426), which requires that any prospective owner of a site regulated under CERCLA must be notified that hazardous substances were stored and Army Regulation; and AR 200-1, paragraph 12-5, which requires that the Army must perform an Environmental Baseline Study (EBS) prior to the transfer of any Army property and must provide disclosure to the potential owner of all the potential hazards. The EBS follows similar processes required under CERCLA and includes an assessment of the risks associated with the use of the property to be transferred. These regulations are intended to assure that agreements between the Army and prospective property owners have considered the risks associated with future land use. Deed restrictions as part of an agreement for the transfer of property are actions that will allow limited, yet productive, use of the property.

The risk analysis is essential in determining what exposure scenarios are allowable for future land uses. It can be used as a basis for a land use restriction in the property deed or, if the exposure scenario indicates unacceptable risk in one portion of a parcel, then that portion can be restricted for use by limiting access via a physical barrier, security or other means. In general, some form of monitoring will be associated with this action to assure that the conditions remain constant. However, land use restrictions will not reduce ecological risk.

Containment actions are applicable to source control actions by restricting the movement or migrations of waste materials and minimizing potential impacts to receptors. These actions involve placement of a physical barrier that may include both horizontal and vertical barriers to isolate the waste materials. Some consolidation of materials may be required to minimize the area that will require isolation. The range of containment technologies include capping, slurry walls, sheet pilings or horizontal barriers using the block displacement method of grouting. Since these actions do not involve volume or toxicity reductions they will require a monitoring program to assure the integrity of the action.

In-situ treatment actions have been identified as applicable general response actions. This effort generally involves either in-situ mixing the waste with an agent preventing further migration or could include in-situ heating of the waste/soil matrix until vitrification is achieved. In either case, the soil/waste matrix is transformed into a stabilized, non-leaching, mass, without excavation. Vendors with specialized equipment are required to achieve the proper mixing with solidification agents or the high temperatures required to achieve vitrification.

Removal of debris and cleaning of Buildings S-311 and 366 at SEAD-16 are applicable as source control actions to reduce unacceptable risks from indoor dust and air. These actions would involve removal of all excess and unnecessary materials from both buildings. Cleaning procedures range from simple actions such as sweeping or high pressure wash to more complex solutions such as sand blasting or frozen CO_2 decontamination. These actions are evaluated in the next section. Confirmation testing will be required to ensure the effectiveness of the applied action. Removal of debris will be conducted in conjunction with excavation activities.

General response actions that involve excavation followed by treatment using either solidification/stabilization or soil washing techniques was also identified as applicable. These actions involve technologies that treat the waste/soil matrix in a treatment train. This train involves unit operations combined in a manner that produces the desired affect, be it solidification via mixing with an appropriate admixture, volume reduction via soil washing or acid leaching.

Another action that was considered viable for consideration at this facility is excavation followed by disposal in a landfill. The landfill can be either an off-site facility or a facility that will be constructed on-site. Under such an action, waste materials will be excavated, placed in the landfill and monitored. If a landfill facility were to be constructed on-site, a facility siting study will be required to assure compliance with the requirements of 6 NYCRR Part 360.

2.4 ESTIMATE OF QUANTITIES TO BE REMEDIATED

The amount of material that will require a remedial action has been estimated by considering how various volume scenarios, i.e. cases, will meet the remedial action objectives. As part of this effort, Parsons ES has quantified the reduction in risk, for both non-carcinogenic and carcinogenic. The remedial action objectives involve reducing the concentration of the on-site soil and sediment to the clean-up levels in **Tables 2-1 and 2-2**.

The data analysis has been structured to consider a logical progression of adding material to be remediated until the final goal is achieved. This analysis has determined the volume of soil requiring a remedial action as well as the corresponding reductions in risk and lead levels achieved by removing this volume of soil. Additionally, the analysis includes the indoor building area to be remediated and the corresponding reduction in risk. As a consequence to meeting the remedial action objectives that are based primarily on lead, other compounds not specifically identified as part of the remedial action objectives are also reduced. The most significant contributor of carcinogenic risk in soil is the class of semivolatile organic compounds called Polynuclear Aromatic Hydrocarbons (PAH)s. Several of these compounds, identified by EPA as carcinogens, have been detected in the on-site surface soil samples. The presence of these compounds are not unexpected since PAHs are produced as Products of Incomplete Combustion (PIC)s. It is known that the processes performed at SEAD-16 and 17 burning of munitions and therefore it is likely that this process resulted in the formation of these residual burning products. The data is also consistent with the conceptual site model which predicted the occurrence of compounds as predominately a surface phenomenon. In all cases, the samples which contained the highest concentrations of these compounds were collected in the surface soil to the site buildings where the burning occurred.

The most significant contributors to the non-carcinogenic risk in the risk assessment are the metals, such as Ba, Cu and Zn. The risk analysis indicates that the non-carcinogenic risk levels are below the EPA target value of a HI less than 1 for current land use exposure scenarios considered. However, the risk levels are above the EPA target value for future land use scenarios at SEAD-16. An analysis of the effects of remediation on risk reduction is presented in **Tables 2-3 and 2-4**. This analysis provides an indication of the additional reductions in the non-carcinogenic risk produced by each case.

<u>SEAD-16</u>

Four cases have been considered in determining the areas and volume of material that will require remedial attention. Three of these scenarios are based upon a logical progression of

TABLE 2-3a
Seneca Army Depot Activity
SEAD-16 AND 17 FEASIBILITY STUDY

CALCULATION OF TOTAL NONCARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME)
SEAD-16 ALTERNATIVE CASES FOR SOIL REMEDIATION RISK ASSESSMENT

CASE	EXPOSURE SCENARIO	HAZARD INDEX										
		Inhalation - Dust-Amb Air	Ingestion On-site soil	Dermal On-site soil	Inhalation Dust-Indoor	Ingestion Dust-Indoor	Dermal Dust-Indoor	Ingestion Surf Water	Dermal Surf Water	Ingestion Sediment	Dermal Sediment	TOTAL HAZARD INDEX
BASE	*Current Site Worker*	6.9E-02	1.5E-02	8.8E-04	-	-	-	-	-	-	-	8.4E-02
	Future Industrial Worker	-	1.5E-02	8.8E-04	5.7E-01	8.7E+00	2.7E+00	-	-	-	-	**1.2E+01**
	Future On-Site Construction Worker	8.6E-01	8.7E-01	1.1E-02	-	-	-	-	-	-	-	**1.7E+00**
	Future Child Trespasser	4.8E-02	2.0E-01	2.4E-03	-	-	-	2.9E-02	1.8E-03	3.7E-01	1.5E-02	6.7E-01
1	*Current Site Worker*	6.9E-02	1.5E-02	8.8E-04	-	-	-	-	-	-	-	8.4E-02
	Future Industrial Worker	-	1.5E-02	8.8E-04	0.0E+00	0.0E+00	0.0E+00	-	-	-	-	1.5E-02
	Future On-Site Construction Worker	8.6E-01	8.7E-01	1.1E-02	-	-	-	-	-	-	-	**1.7E+00**
	Future Child Trespasser	4.8E-02	2.0E-01	2.4E-03	-	-	-	2.9E-02	1.8E-03	3.7E-01	1.5E-02	6.7E-01
2	*Current Site Worker*	6.9E-02	2.1E-04	0.0E+00	-	-	-	-	-	-	-	6.9E-02
	Future Industrial Worker	-	2.1E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-	-	-	-	2.1E-04
	Future On-Site Construction Worker	8.6E-01	2.4E-01	0.0E+00	-	-	-	-	-	-	-	**1.1E+00**
	Future Child Trespasser	4.8E-02	2.5E-03	0.0E+00	-	-	-	2.9E-02	1.8E-03	3.7E-01	1.5E-02	4.6E-01
3	*Current Site Worker*	6.9E-02	2.1E-04	0.0E+00	-	-	-	-	-	-	-	6.9E-02
	Future Industrial Worker	-	2.1E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-	-	-	-	2.1E-04
	Future On-Site Construction Worker	8.6E-01	2.4E-01	0.0E+00	-	-	-	-	-	-	-	**1.1E+00**
	Future Child Trespasser	4.8E-02	2.5E-03	0.0E+00	-	-	-	2.9E-02	1.8E-03	0.0E+00	0.0E+00	8.1E-02
4	*Current Site Worker*	6.9E-02	1.6E-04	0.0E+00	-	-	-	-	-	-	-	6.9E-02
	Future Industrial Worker	-	1.6E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-	-	-	-	1.6E-04
	Future On-Site Construction Worker	8.6E-01	1.3E-01	0.0E+00	-	-	-	-	-	-	-	9.9E-01
	Future Child Trespasser	4.8E-02	1.8E-03	0.0E+00	-	-	-	2.9E-02	1.8E-03	0.0E+00	0.0E+00	8.1E-02

Note: Values in boldface exceed the USEPA defined targets

TABLE 2-3b
Seneca Army Depot Activity
SEAD-16 AND 17 FEASIBILITY STUDY

CALCULATION OF TOTALCARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME)
SEAD-16 ALTERNATIVE CASES FOR SOIL REMEDIATION RISK ASSESSMENT

CASE	EXPOSURE SCENARIO	CANCER RISK										TOTAL CANCER RISK
		Inhalation Dust-Amb Air	Ingestion On-site soil	Dermal On-site soil	Inhalation Dust-Indoor	Ingestion Dust-Indoor	Dermal Dust-Indoor	Ingestion Surf Water	Dermal Surf Water	Ingestion Sediment	Dermal Sediment	
BASE	Current Site Worker	6.9E-11	1.3E-06	6.5E-08	-	-	-	-	-	-	-	1.4E-06
	Future Industrial Worker	-	1.3E-06	6.5E-08	0.0E+00	3.2E-05	8.0E-06	-	-	-	-	4.1E-05
	Future On-Site Construction Worker	3.5E-11	3.1E-06	3.2E-08	-	-	-	-	-	-	-	3.1E-06
	Future Child Trespasser	9.7E-12	2.5E-06	3.6E-08	-	-	-	6.8E-08	4.6E-07	9.0E-07	3.3E-08	4.0E-06
1	Current Site Worker	2.3E-11	3.4E-06	1.5E-08	-	-	-	-	-	-	-	3.4E-06
	Future Industrial Worker	-	3.4E-06	1.5E-08	0.0E+00	0.0E+00	0.0E+00	-	-	-	-	3.4E-06
	Future On-Site Construction Worker	1.1E-11	8.2E-06	7.5E-09	-	-	-	-	-	-	-	8.2E-06
	Future Child Trespasser	3.2E-12	7.6E-06	8.4E-09	-	-	-	6.8E-08	4.6E-07	9.0E-07	3.3E-08	9.1E-06
2	Current Site Worker	2.3E-11	3.4E-06	1.5E-08	-	-	-	-	-	-	-	3.4E-06
	Future Industrial Worker	-	3.4E-06	1.5E-08	0.0E+00	0.0E+00	0.0E+00	-	-	-	-	3.4E-06
	Future On-Site Construction Worker	1.1E-11	8.2E-06	7.5E-09	-	-	-	-	-	-	-	8.2E-06
	Future Child Trespasser	3.2E-12	7.6E-06	8.4E-09	-	-	-	6.8E-08	4.6E-07	9.0E-07	3.3E-08	9.1E-06
3	Current Site Worker	2.3E-11	3.4E-06	1.5E-08	-	-	-	-	-	-	-	3.4E-06
	Future Industrial Worker	-	3.4E-06	1.5E-08	0.0E+00	0.0E+00	0.0E+00	-	-	-	-	3.4E-06
	Future On-Site Construction Worker	1.1E-11	8.2E-06	7.5E-09	-	-	-	-	-	-	-	8.2E-06
	Future Child Trespasser	3.2E-12	7.6E-06	8.4E-09	-	-	-	6.8E-08	4.6E-07	0.0E+00	0.0E+00	8.1E-06
4	Current Site Worker	1.8E-11	3.7E-06	1.5E-08	-	-	-	-	-	-	-	3.7E-06
	Future Industrial Worker	-	3.7E-06	1.5E-08	0.0E+00	0.0E+00	0.0E+00	-	-	-	-	3.7E-06
	Future On-Site Construction Worker	8.9E-12	8.9E-06	7.6E-09	-	-	-	-	-	-	-	8.9E-06
	Future Child Trespasser	2.5E-12	8.3E-06	8.4E-09	-	-	-	6.8E-08	4.6E-07	0.0E+00	0.0E+00	8.8E-06

Note: Values in boldface exceed the USEPA defined targets

TABLE 2-4a
Seneca Army Depot Activity

CALCULATION OF TOTAL NONCARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME)
SEAD-17 ALTERNATIVE CASES FOR SOIL REMEDIATION RISK ASSESSMENT

CASE	EXPOSURE SCENARIO	HAZARD INDEX							
		Inhalation Dust-Amb Air	Ingestion On-site soil	Dermal On-site soil	Ingestion Surf Water	Dermal Surf Water	Ingestion Sediment	Dermal Sediment	TOTAL HAZARD INDEX
BASE	*Current Site Worker*	7.1E-04	5.5E-03	1.2E-02	-	-	-	-	1.8E-02
	Future Industrial Worker	8.9E-03	2.2E-02	4.8E-02	-	-	-	-	7.9E-02
	Future On-Site Construction Worker	8.9E-03	5.2E-01	4.3E-03	-	-	-	-	5.3E-01
	Future Child Trespasser	5.0E-04	7.7E-02	3.4E-02	1.0E-02	8.9E-06	9.6E-02	4.8E-03	2.2E-01
1	*Current Site Worker*	5.2E-04	3.7E-03	3.1E-03	-	-	-	-	7.4E-03
	Future Industrial Worker	6.5E-03	1.5E-02	1.2E-02	-	-	-	-	3.4E-02
	Future On-Site Construction Worker	6.5E-03	2.8E-01	0.0E+00	-	-	-	-	2.8E-01
	Future Child Trespasser	3.7E-04	5.2E-02	8.7E-03	1.0E-02	8.9E-06	9.6E-02	4.8E-03	1.7E-01
2	*Current Site Worker*	5.2E-04	3.7E-03	3.1E-03	-	-	-	-	7.4E-03
	Future Industrial Worker	6.5E-03	1.5E-02	1.2E-02	-	-	-	-	3.4E-02
	Future On-Site Construction Worker	6.5E-03	2.8E-01	0.0E+00	-	-	-	-	2.8E-01
	Future Child Trespasser	3.7E-04	5.2E-02	8.7E-03	1.0E-02	8.9E-06	0.0E+00	0.0E+00	7.2E-02
3	*Current Site Worker*	5.2E-04	3.9E-03	3.1E-03	-	-	-	-	7.5E-03
	Future Industrial Worker	6.5E-03	1.6E-02	1.2E-02	-	-	-	-	3.4E-02
	Future On-Site Construction Worker	6.5E-03	2.8E-01	0.0E+00	-	-	-	-	2.9E-01
	Future Child Trespasser	3.7E-04	5.4E-02	8.6E-03	1.0E-02	8.9E-06	0.0E+00	0.0E+00	7.4E-02

TABLE 2-4b
Seneca Army Depot Activity

CALCULATION OF TOTAL CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME)
SEAD-17 ALTERNATIVE CASES FOR SOIL REMEDIATION RISK ASSESSMENT

CASE	EXPOSURE SCENARIO	CANCER RISK							
		Inhalation Dust-Amb Air	Ingestion On-site soil	Dermal On-site soil	Ingestion Surf Water	Dermal Surf Water	Ingestion Sediment	Dermal Sediment	TOTAL CANCER RISK
BASE	*Current Site Worker*	3.2E-08	4.5E-07	1.6E-08	-	-	-	-	5.0E-07
	Future Industrial Worker	4.0E-07	1.8E-06	6.6E-08	-	-	-	-	2.3E-06
	Future On-Site Construction Worker	1.6E-08	1.1E-06	1.2E-08	-	-	-	-	1.1E-06
	Future Child Trespasser	4.5E-09	1.3E-06	9.1E-09	7.3E-08	2.3E-09	5.6E-07	0.0E+00	1.9E-06
1	*Current Site Worker*	2.0E-08	4.5E-07	2.0E-08	-	-	-	-	4.9E-07
	Future Industrial Worker	2.6E-07	1.8E-06	8.2E-08	-	-	-	-	2.1E-06
	Future On-Site Construction Worker	1.0E-08	1.1E-06	1.0E-08	-	-	-	-	1.1E-06
	Future Child Trespasser	2.9E-09	1.3E-06	1.1E-08	7.3E-08	2.3E-09	5.6E-07	0.0E+00	1.9E-06
2	*Current Site Worker*	2.0E-08	4.5E-07	2.0E-08	-	-	-	-	4.9E-07
	Future Industrial Worker	2.6E-07	1.8E-06	8.2E-08	-	-	-	-	2.1E-06
	Future On-Site Construction Worker	1.0E-08	1.1E-06	1.0E-08	-	-	-	-	1.1E-06
	Future Child Trespasser	2.9E-09	1.3E-06	1.1E-08	7.3E-08	2.3E-09	0.0E+00	0.0E+00	1.3E-06
3	*Current Site Worker*	2.0E-08	4.5E-07	2.1E-08	-	-	-	-	4.9E-07
	Future Industrial Worker	2.5E-07	1.8E-06	8.3E-08	-	-	-	-	2.2E-06
	Future On-Site Construction Worker	1.0E-08	1.1E-06	1.0E-08	-	-	-	-	1.1E-06
	Future Child Trespasser	2.9E-09	1.3E-06	1.2E-08	7.3E-08	2.3E-09	0.0E+00	0.0E+00	1.4E-06

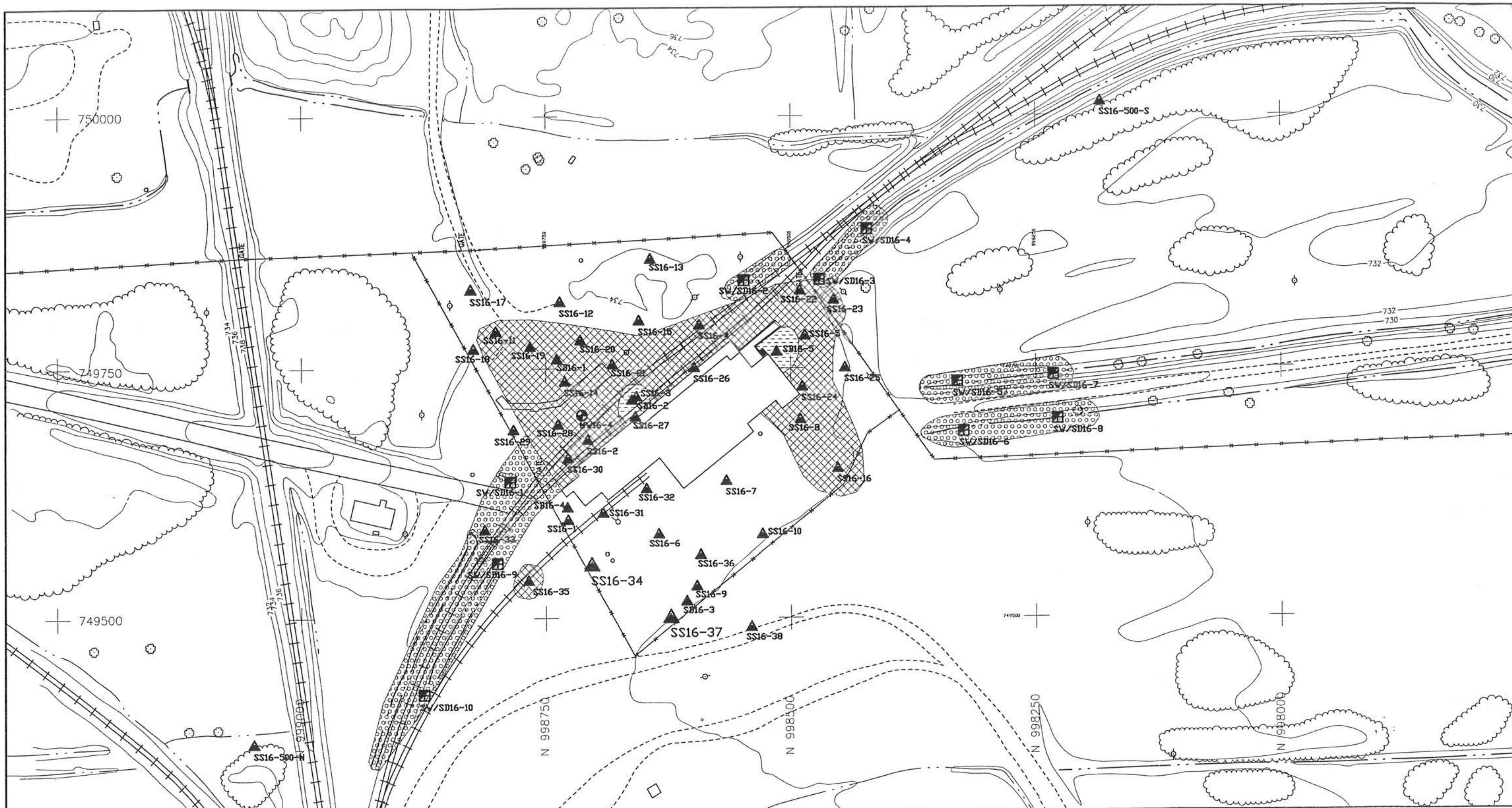
increasing soil volumes and are provided on **Table 2-1** and shown in **Figure 2-1**. The first case is only relevant to Buildings S-311 and 366 and does not consider soils. Cases 2 through 4 add soil remediation scenarios. As shown in **Table 2-9**, as the building debris and soil volumes associated with the various remedial strategies depicted as Cases 1 through Case 4 are removed. The non-carcinogenic and carcinogenic risks are reduced. As shown on **Table 2-3A**, all cases must be carried out to reduce the non-carcinogenic risk to acceptable levels.

Case 1 includes contaminated building materials and debris from abandoned Buildings S-311 and 266 at SEAD-16. The contaminated materials in the buildings are identified in the RI include soil piles and soil/sludge covering concrete floors, shell casings, filter drums, ash residues in the furnace area, and miscellaneous construction debris. The volume of material to be removed is estimated to be approximately 100 CY based on visual inspections during field investigations. It is assumed that when the contaminated materials and debris are removed from the buildings, the hazardous components in dust and indoor air will also be removed. Confirmation sampling inside the buildings will confirm this assumption. The resulting decrease in risk to future industrial workers from Case 1 is shown on **Table 2-3**.

Case 2 includes surface soil volume, which have lead concentrations greater than 500 mg/kg. The location of these areas are shown on **Figure 2-1** and described on **Table 2-1**. The volume removed is approximately 675 CY of soil. Removal of Case 2 soils will result in a maximum lead concentration of 460 mg/kg for on-site soils, which is below the clean up goal of 500 mg/kg for human health protection.

Case 3 includes the soil volume from Cases 2 and building remediation from Case 1, plus sediments which have lead concentrations above 31 mg/kg. The areas are shown on **Figure 2-1** and are described in **Table 2-1**. The sediments will be removed to a depth of 6" in the drainage swales where the samples were collected to 50 feet downgradient as well as sediments upgradient that come from SEAD-16. The cumulative total volume to be remediated for Case 3 is approximately 1,153 CY of material. The maximum lead concentration for on-site soils remains at 44 mg/kg. **Table 2-3** indicates the decrease in non-carcinogenic and carcinogenic risk.

Case 4 adds subsurface soils with lead concentrations above 500 mg/kg to the Cases 2 and 3 soil volumes and the building remediation from Case 1. The areas are depicted on **Figure 2-1** and are described in **Table 2-1**. The cumulative total volume to be remediated for Case 4 is approximately 1,262 CY of material. The maximum lead concentration is decreased to 21.4



LEGEND

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

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

SOIL BORING LOCATION SB16-4

MONITORING WELL LOCATION MW16-7

CASE 1

CASE 2

CASE 3

N

ACAD\SENECA\16-17RIF\SD16RDA.DWG

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS
SEAD-16 ABANDONED DEACTIVATION FURNACE

DEPT. ENVIRONMETAL ENGINEERING

Dwg. No. 729895-01002

FIGURE 2-1
SEAD-16 SOIL AND SEDIMENT AREAS TO BE REMEDIATED

SCALE 1" = 100'

DATE OCTOBER 1997

REV A

mg/kg. In addition, the concentrations of the metals barium, copper, and zinc are reduced. The decrease in non-carcinogenic and carcinogenic risk is presented on **Table 2-3**.

SEAD-17

Three cases have been considered in determining the areas and volume of material that will require remedial attention. These scenarios are based upon a logical progression of increasing soil volumes and are provided on **Table 2-2** and shown in **Figure 2-2**. The impacts of Cases 1 to 3 upon the carcinogenic and non-carcinogenic risk values are presented in **Table 2-4.**

Case 1 includes surface soil volume, which have lead concentrations greater than 500 mg/kg. The location of these areas are shown on **Figure 2-2** and described on **Table 2-2**. The total cumulative volume removed is approximately 842 CY of soil. Removal of Case 1 soils will result in a maximum lead concentration of 460 mg/kg for on-site soils, which is below the clean up goal of 500 mg/kg for human health protection.

Case 2 includes the soil volume from Cases 1 and 2 plus sediments which have lead concentrations above 31 mg/kg. The areas are shown on **Figure 2-2** and are described in **Table 2-2**. The sediments will be removed to a depth of 6" in the drainage swales where the samples were collected to 50 feet downgradient as well as sediments upgradient that come from SEAD-16. The cumulative total volume to be remediated for Case 3 is approximately 1,379 CY of material. The maximum lead concentration for on-site soils remains at 44 mg/kg. **Table 2-4** indicates the decrease in non-carcinogenic and carcinogenic risk.

Case 3 adds subsurface soils with lead concentrations above 500 mg/kg to the Cases 1 and 2 soil volumes. The areas are depicted on **Figure 2-2** and are described in **Table 2-2**. The cumulative total volume to be remediated for Case 4 is approximately 1,434 CY of material. The maximum lead concentration is decreased to 21.4 mg/kg. In addition, the concentrations of the metals barium, copper, and zinc were reduced. The decrease in non-carcinogenic and carcinogenic risk is presented on **Table 2-4**.

2.5 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

This section describes identification and initial screening of technologies. Detailed screening of alternatives is discussed in **Section 3.0**.

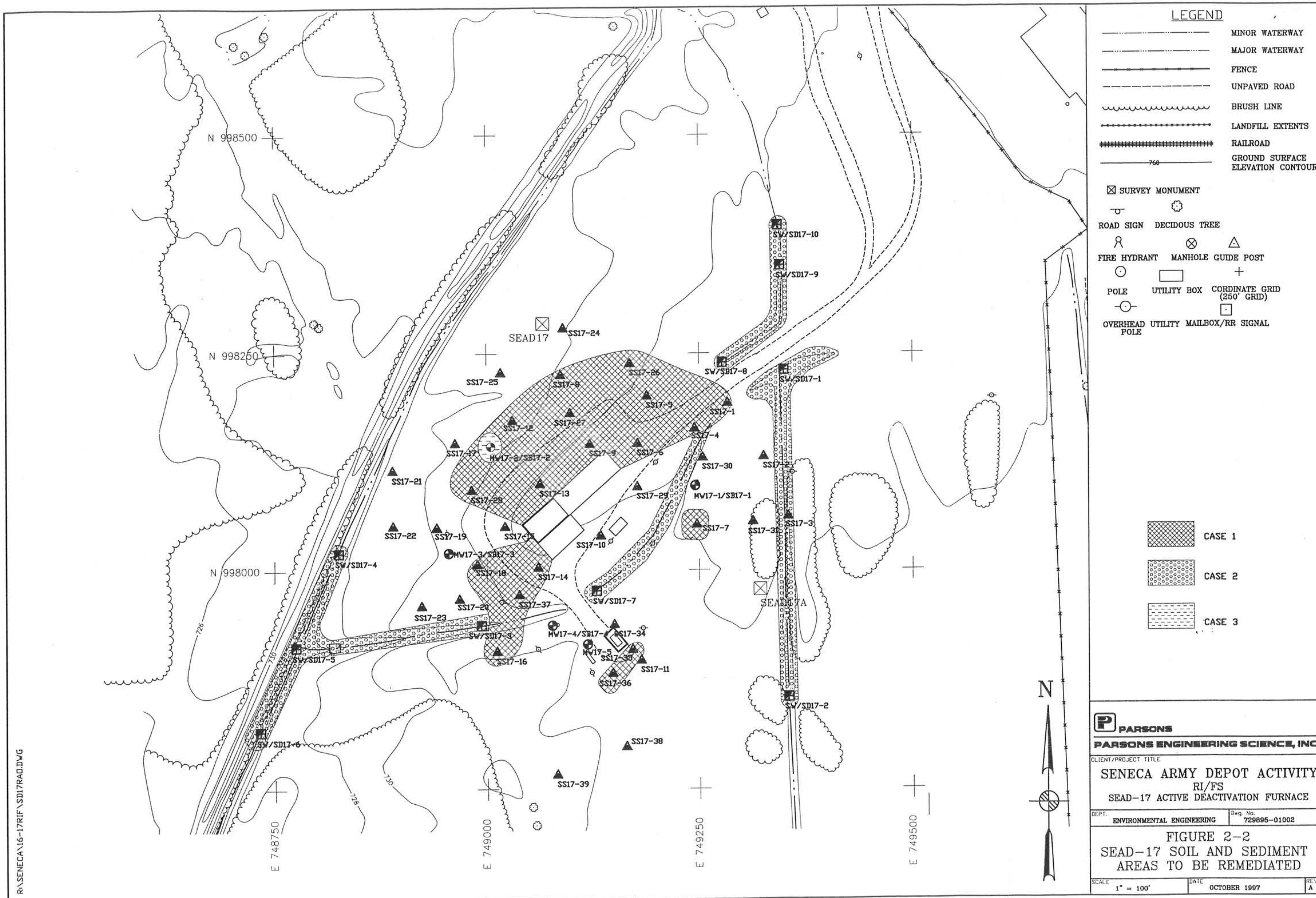


FIGURE 2-2
SEAD-17 SOIL AND SEDIMENT AREAS TO BE REMEDIATED

2.5.1 Identification of Technologies

Remedial action technologies and processes have been identified for consideration as possible remediation options for clean-up of soil and sediment at SEAD-16 and 17. The list of technologies and processes presented was developed from several sources as follows:

- Standard engineering handbooks,
- Remediation equipment and service vendors,
- Engineering experience in remedial actions,
- EPA references including but not limited to :
  - "Technology Screening Guide for Treatment of CERCLA Soils and Sludges " (EPA 1988),
  - "Handbook on In Situ Treatment of Hazardous Waste - Contaminated Soils" (EPA 1990),
  - "Handbook for Stabilization/Solidification of Hazardous Waste (EPA 1986),
  - "Handbook on Remediation of Contaminated Sediments" (EPA 1991a),
  - "The Superfund Innovative Technology Evaluation (SITE) Program" (EPA 1992a) and
  - "Vendor Information System for Innovative Treatment Technologies (VISITT)" (EPA 1993)
  - "Alternative Treatment Technology Information Center (ATTIC) Database"

Table 2-5 presents remedial action technologies arranged according to categories for general response actions for remediation of soil/sediment. The process operations and a description of the technology is also presented. The decision to retain a technology is summarized in the screening comments portion of the table. Those technologies that have been shaded have been removed from consideration, however, each technology is briefly described in the following section.

2.5.2 Screening of Technologies

Technology screening considers only the technical implementability of a process. Technical implementability involves an evaluation of the waste characteristics that would limit the effectiveness or feasibility of technology, and the site characteristics, such as the depth of the water table, that would preclude the use of a technology.

Screening was based on the following criteria:

TABLE 2-5
SEAD-16 AND 17 FEASIBILITY STUDY
SENECA ARMY DEPOT

SEAD-16 AND SEAD-17
TECHNOLOGY SCREENING

GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPERATIONS	DESCRIPTION	SCREENING COMMENTS
No Action	None	Not Applicable	No Action	Applicable, since required as baseline response for comparison to other technologies. Will not meet the RAOs for lead in soil or sediment. Not protective of human health or ecology. Will not reduce risk to acceptable levels.
Institutional Controls	Access Control	Fencing	Access to SEAD-16 and 17 is restricted by construction of a permanent, low-maintenance fence. Warning signs posted.	Applicable. Technically feasible and effective in reducing or eliminating human exposure. Will not reduce potential for migration unless used in conjunction with other technologies.
	Land Use Restrictions	Deed Modifications	Deed for property modified to restrict future sales and land use, or U.S. Government holds deed in perpetuity.	Not Applicable. BRAC Process defined future land use as Industrial. Will not meet RAOs for reducing potential for migration or restrict human or ecological exposure.
	Monitoring	Soil and Groundwater Monitoring	Periodic soil or groundwater sampling. Documents the extent that affected media have been impacted by constituents.	Applicable. Technically feasible but not effective in reducing or eliminating human or ecological exposure unless used in conjunction with other actions.
	Alternative Water Supply	City water line or bottled water	Extend city supply line to area or provide bottled water.	Not applicable since no drinking water wells are affected.
Containment	Capping	Soil Cap	Consolidate, level, and contour as necessary. Place one to four feet of clean fill, grade and seed	Not Applicable, technically feasible for site conditions but clay or synthetic cap is preferred for reliability, long term integrity
		Clay Cap	Add six inch to one foot clay layer beneath soil cap.	Applicable, technically feasible for site conditions. Meets RAOs for preventing ingestion of site soils by human receptors.
		Synthetic Membrane Cap	Substitute a synthetic membrane material such as High Density Polyethylene (HDPE) or similar material for the clay.	Applicable, technically feasible for site conditions. Meets RAOs for preventing ingestion of site soils by human receptors.

Note: Shaded alternatives have been screened out; non-shaded alternatives have been retained for further evaluation.

TABLE 2-5
SEAD-16 AND 17 FEASIBILITY STUDY
SENECA ARMY DEPOT

SEAD-16 AND SEAD-17
TECHNOLOGY SCREENING

GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPERATIONS	DESCRIPTION	SCREENING COMMENTS
Containment (cont.)	Capping (cont.)	Asphalt Cap	Highway-grade base and asphalt pavement over entire site area.	Not applicable. Not as reliable as clay or soil cap, high maintenance.
	Horizontal Barriers	Grout Injection	Pressure injection of grout into closely spaced boreholes.	Not applicable. Technically infeasible due to the thin layer of soils above the bedrock surface.
		Block Displacement	Low permeability soils pumped as a slurry through injection holes under low pressure.	Not applicable. Technically infeasible due to the thin layer of soils above the bedrock surface.
	Vertical Barriers	Sheet Pile	Steel barrier wall driven into soil in sections using a drop-hammer or vibrating hammer.	Not applicable. Technically feasible but not effective due to high leakage rates through the sheet piles. Impracticle, area of concern too small to justify sheet piles.
		Slurry Wall	Trench around affected area and fill trench with cement/bentonite or soil/bentonite slurry.	Not applicable. Impractical, area of concern too small to justify slurry wall.
		Grout Curtain	Pressure injection of grout in a regular pattern of drill holes.	Not applicable. Technically feasible but not for reducing human to surface soils. Typically used if other treatment alternatives cannot be used.
In-Situ Treatment	Solidification/ Stabilization	Grout/Portland Cement or Other Admixtures	Grout/cement/additive mixed, in-situ, with soil/sediment, under pressure, using auger type mechanism.	Applicable. Technically feasible and effective in controlling migration of contaminants of concern. Meets RAOs for preventing ingestions by human receptors.
		Vitrification	Electrodes placed in ground and electrical energy applied to electrodes. Soil vitrified to form molten glass that cools to a stable non-crystalline solid.	Not applicable. Technically infeasible due to the nature of the thin layers of on-site soil. Innovative technology with some successful applications but not widely used.

Note: Shaded alternatives have been screened out; non-shaded alternatives have been retained for further evaluation.

TABLE 2-5
SEAD-16 AND 17 FEASIBILITY STUDY
SENECA ARMY DEPOT

SEAD-16 AND SEAD-17
TECHNOLOGY SCREENING

GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPERATIONS	DESCRIPTION	SCREENING COMMENTS
In-Situ Treatment (cont.)	Solidification/ Stabilization (cont.)	Micro-encapsulation	A compatible, dried waste is dispersed within a matrix of hot asphalt, polypropylene or polyethylene, then extruded into a mold to form an encapsulated asphaltic or plastic mass.	Not Applicable. Technically unfeasible due to the high water content of site sediments. Most applications have involved specialized industrial wastes or nuclear wastes, not soils/sediments. Not practical for small volume of soil and sediment.
	Electrical Extraction	Electrokinetics	Ionic metal species migrate in the saturated soil system through the influence of a charged electrical field.	Not applicable. Technically infeasible since the soil to be treated is above the groundwater table.
	Chemical Extraction	Soil Flushing	Constituents are extracted using solvent (polar or n non polar). Solvent treated and re-introduced into soil.	Not applicable. Technically infeasible in low permeable soils. Not effective in removing inorganics from soil or sediments. Treatment is more effective and controllable ex-situ. Requires wastewater treatment plant and/or solvent recovery process.
	Biological Removal/Extraction	Biodegradation/ Bioventing	Landtreatment utilizing in-situ microbial population to degrade constituents. Bioventing involves introduction of air under low flow to create aerobic conditions.	Not applicable. Technically infeasible or effective in removing inorganics from soil or sediment.
		Vegetative Uptake	Area is planted with coniferous and deciduous trees that uptake constituents through root systems and incorporate them into wood mass.	Not applicable. Technically infeasible and not effective in removing inorganics from soil or sediment. Degree of removal depends on solubility of constituents; inorganics are not soluble. Unproven technology.
	Vapor Removal/Extraction	Vacuum Extraction	Apply negative pressure to vadose zone well system and treat soil vapor off-gas (via carbon filter, biofilter, catalytic incinerator, chemical oxidation or plasma reactor).	Not applicable. Technically feasible but not effective in removing inorganics from soil or sediment.
		Radiowave Enhanced Volatilization	Apply radio frequency to soil, extract soil vapor and treat	Not applicable. Technically feasible but not effective in removing inorganics from soil or sediment.

Note: Shaded alternatives have been screened out; non-shaded alternatives have been retained for further evaluation.

TABLE 2-5
SEAD-16 AND 17 FEASIBILITY STUDY
SENECA ARMY DEPOT

SEAD-16 AND SEAD-17
TECHNOLOGY SCREENING

GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPERATIONS	DESCRIPTION	SCREENING COMMENTS
Removal	Mechanical Excavation	Soil, Sediment and Buildling Materials/Debris Removed using Heavy Equipment	Track or tire-mounted equipment such as an excavator or front-end loader as appropriate to physically remove soils, sediment, and building materials/debris.	Applicable. Technically feasible and effective. To be used in conjunction with other response actions. Meets RAOs for restricting human exposure once soil/sediment is removed.
	Slurrying	Mix Soil or Sediment as a Slurry and Remove using Pumps	Mix soil/sediment and water using propeller mixers and water jets. Pump slurry to receiving tank.	Not applicable. Technically unfeasible and ineffective for site conditions. Used for relatively large quantitites of material that have high moisture content or where wet processing is to follow.
Ex-Situ Treatment	Biological	Aerobic	Microbes cultivated to degrade constituents under aerobic conditions. Includes composting and farming.	Not applicable. Technically infeasible and ineffective for site conditions. Not applicable to heavy metals and will not acheive RAOs for reducing exposure to lead by human receptors.
		Anaerobic	Microbes cultivated to degrade constituents under anaerobic conditions, typically an in-vessel process.	Not applicable. Technically unfeasible and ineffective for site conditions. Not applicable to heavy metals and will not acheive RAOs for reducing exposure to lead by human receptors.
	Stabilization/ Solidification	Pozzolon/portland cement	Pozzolon/cement mixed with soil/sediment using auger type mechanism, which bind metals into a monolithic, non-leaching matrix.	Applicable. Technically feasible when used in conjunction with excavation. Effective in meeting RAOs for human exposure, and for controlling migration of soil contaminants.
		Pozzolon/lime/flyash	Pozzolon/lime/flyash mixed with soil/sediment using auger type mechanism, which bind metals into a monolithic, non-leaching matrix.	Applicable. Technically feasible when used in conjunction with excavation. Effective in meeting RAOs for human exposure, controlling migration of soil contaminants. Similar to pozzolon/portland cement stabilization.
		Micro-encapsulation	A compatible, dried waste is dispersed within a matrix of hot asphalt, polypropylene or polyethylene, then extruded into a mold to form an encapsulated asphaltic or plastic mass.	Not applicable. Technically infeasible due to the high water content of site sediments. Most applications have involved specialized industrial wastes or nuclear wastes, not soils/sediments.

Note: Shaded alternatives have been screened out; non-shaded alternatives have been retained for further evaluation.

TABLE 2-5
SEAD-16 AND 17 FEASIBILITY STUDY
SENECA ARMY DEPOT

SEAD-16 AND SEAD-17
TECHNOLOGY SCREENING

GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPERATIONS	DESCRIPTION	SCREENING COMMENTS
Ex-Situ Treatment (cont.)		Sorption	Dry, inert, solid such as flyash or kiln dust is mixed with waste to produce a solidified mass.	Not appacable. Technically feasible but not effective for soils. Used to improve handling characteristics of a waste by binding with water. Most applicable for use with sludges with a high oil or water content.
	Physical Separation/ Aqueous Extraction	Soil Washing (Wet Separation and Extraction using Aqueous Solution)	Mix soil/sediment with water and wet-classify soil particle by size and density. Includes dry screening (grizzly, vibratory, trommel), attrition scrub, hydrocyclones, flotation, water treatment/recycle. Constituents can be extracted using dilute acids or surfactant solutions. Rinsewater is treated to remove metals and recycled. Metals can be recovered using electrochemical processes such as the Bureau of Mines' sluosilicic acid system leaching process.	Applicable. Technically feasible and effective when used in conjunction with excavation. Volume reductions acheived. Coarse materials and large fragments separated from fines. Metals consolidated in the fines fraction. Metals reductions can be achieved via extraction to meet RAOs. Used primarily in mining industry. Innovative technology: treatibility study required. Vendors are available that have acheived some success.
		Magnetic Classification	Soils subject to magnetic field to remove ferrous metals.	Not applicable. Technically feasible but ineffective for removal of lead.
	Thermal Oxidation/ Vitrification	High Temperature Transformations	Soils are converted to an inert slag in a molten metal bath. Involves heating in a specialized furnace/smelting reactor. Reactors include electric arc, fluid bed, molten salt, cement kiln and plasma arc.	Not applicable. Technically feasible but ineffective for inorganics. Technology is normally used for organics.
	Other Oxidation Technologies	Wet Air Oxidation	Soil mixed with water and excess air under supercritical pressure and temperature.	Not applicable. Technically infeasible and ineffective for meeting RAOs. Used primarily for destruction of organics compounds and not applicable to heavy metals.

Note: Shaded alternatives have been screened out; non-shaded alternatives have been retained for further evaluation.

SEAD-16 AND SEAD-17
TECHNOLOGY SCREENING

GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPERATIONS	DESCRIPTION	SCREENING COMMENTS
Ex-Situ Treatment (cont.)	Chemical Extraction	Soil Extraction using Supercrticial Fluids	Constituents extracteed in countercurrent process using carbon dioxide, propane or other highly volatile solvent under supercritical temperature, pressure conditions. Solvent is separated from extracted constituents (flashed or distilled) and recycled.	Not applicable. Unfeasible and ineffective for meeting RAOs for lead. Used primarily for destruction of organics compounds and not applicable to heavy metals.
Disposal	On-Site	Backfill On-Site	Reuse of treated soil that meet the RAOs as backfill in excavated areas.	Applicable. Technically feasible and effective when used in conjunction with excavation and ex-situ treatment. Treated soil must demonstrate compliance with RAOs prior to backfilling.
		Non-Hazardous Waste Landfill	Soil, treated to remove the RCRA characteristics of toxicity, is disposed of in an on-site Subtitle D landfill, permitted to accept industrial solid waste in accordance with the requirements of 6 NYCCR Part 360.	Applicable. Technically feasible and effective when used in conjunction with excavation or an appropriate treatment option. Must comply with EPA Land Disposal Restrictions (LDR), Subtitle D and 6 NYCCR Part 360 requirements.
		RCRA Hazardous Waste Landfill	A listed hazardous waste, treated to meet the requirements of LDRs, is disposed of in an on-site Subtitle C landfill, permitted to accept hazardous waste in accordance with the requirments of 6 NYCCR Part 373.	Not applicable, since no waste is a listed hazardous waste, therefore the soil does not need to be disposed of in a permitted RCRA, Subtitle C landfill in accordance with the requirements of 6 NYCCR Part 373.
	Off-Site	Non-Hazardous Waste Landfill	Soil, treated to remove the RCRA characteristics of toxicity, is disposed of in an on-site Subtitle D landfill, permitted to accept industrial solid waste in accordance with the requirements of 6 NYCCR Part 360.	Applicable. Technically feasible and effective when used in conjunction with excavation or an appropriate treatment option. Must comply with EPA Land Disposal Restrictions (LDR), Subtitle D and 6 NYCCR Part 360 requirements.
		RCRA Hazardous Waste Landfill	A listed hazardous waste, treated to meet the requirements of LDRs, is disposed of in an on-site Subtitle C landfill, permitted to accept hazardous waste in accordance with the requirments of 6 NYCCR Part 373.	Not applicable, since no waste is a listed hazardous waste, therefore the soil does not need to be disposed of in a permitted RCRA, Subtitle C landfill in accordance with the requirements of 6 NYCCR Part 373.

Note: Shaded alternatives have been screened out; non-shaded alternatives have been retained for further evaluation.

- The technology must be reliable, based either on successful implementation at other hazardous waste sites or in comparable bench- or lab-scale applications.

- The technology must be technically applicable to site conditions and waste characteristics at SEAD-16 and SEAD-17.

General response actions, technology types, and process options that did not meet all of the foregoing criteria were excluded from further consideration.

For SEAD-16 and 17 the following remedial technologies were retained for further evaluation:

- No Action
- Containment
- Solidification/Stabilization
- Excavation/Disposal
- Soil Washing

The following sections summarize all the technologies considered and the rationale for retaining or screening out each response.

2.5.2.1 No Action

The No Action response will result in leaving waste on-site and the soil source areas intact. This remedial action will not meet the RAOs for the site however, this alternative provides a baseline against which other alternatives can be compared. Access and direct contact with soil and sediment will continue. A No Action response for the soil allows for the continued release of suspended and dissolved materials into surface water. Since surface water and groundwater are not significantly impacted by contaminated materials, the No Action response is appropriate for these media, particularly since the site groundwater is not used as a drinking water source. However, protection against future impacts to these resources is also appropriate. This response does not address the potential future releases of materials to groundwater or surface water.

2.5.2.2 Institutional Control Technologies

Institutional control technologies that have been considered include:

- Access Controls, such as fencing,
- Land use restrictions, such as modifications to the deed,
- Monitoring of soil and/or groundwater or

- Alternative water supply.

Institutional control technologies are only applicable to the receptor and do not involve reductions in the volume, toxicity or control of wastes at the site and do not meet the RAOs. Physical barriers that restrict access to the site are feasible and effective in preventing humans from becoming exposed to on-site impacts. However, since there is a potential for contaminants to migrate off-site via surface water and sediment loading, this technology has been retained but incorporated for use with other responses. Further, wildlife, such as migrating birds, will still have access to the site and will not be protected.

Land use restrictions, such as deed modifications, are also feasible and effective in restricting exposure to humans, particularly due to residential development. However, as with access controls, deed modifications do not protect the ecological community nor is the groundwater protected. In addition, the BRAC process has already designated SEAD-16 and 17 for industrial uses, therefore deed restrictions are not applicable. As a result, this technology has been eliminated from further consideration.

Providing an alternative water supply to affected populations is also technically feasible and effective when implemented but in this instance this technology is unnecessary since the on-site groundwater is not a source of potable water. This technology was considered for competeness, since off-site residences adjacent to SEAD-16 and SEAD-17 do obtain water from private wells. However, there is no concern regarding the impacts to the off-site wells.

Some technologies by themselves such as access control will not meet the RAOs for the site, however, these technologies may be appropriate as part of other alternatives. Monitoring is another example of such a technology that will not meet the RAOs but can be used in conjunction with almost any other technology to form a viable alternative, and therefore monitoring has been retained.

2.5.2.3 Containment Technologies

Containment technologies entail securing existing soil source areas and include: capping, horizontal barriers and vertical barriers. Caps are shells that cover buried waste materials to prevent their contact with the land surface and groundwater. Caps can be impermeable to restrict mixing of infiltration with buried waste, eliminating leachate generation. Vertical barriers, such as slurry walls, are used to surround the waste to limit flow to or from the waste horizontally. Horizontal barriers, such as block displacement, are installed below the waste to stop flow vertically through the waste. On-site technologies, such as containment, pose less of a risk to onsite workers than technologies requiring excavation because there is less opportunity for the spread of the constituents of concern and exposure.

Long-term maintenance of any containment technology will be necessary to ensure its effectiveness. For example, capping technologies include surface water run-on/runoff controls, cap inspection and repair, and collection and treatment of any gases. This response is aimed at preventing exposure to soils via direct contact and precluding migration of by dust generation, surface runoff, and leaching. It does not totally prevent migration into underlying groundwater, but it does reduce this migration because of the decrease in precipitation infiltration or flow through of groundwater. This response is generally preferred when removal of source areas are not advisable or feasible. Containment does not satisfy the preference for permanent solutions and alternative treatment technologies as set forth in SARA.

<u>Capping</u>

Capping is a feasible technology that involves placing a barrier over the impacted soils. The area considered for capping would likely be the total site area at either SEAD-16 or SEAD-17, since it would be impractical to cap only the localized areas that are of interest. However, consolidation of some disperse areas would be advantageous by minimizing the size and area to be capped. This option would likely require regrading of the site for proper runoff/run-on control. Clean fill borrow materials would be required in order to achieve the proper grade for capping and provide a cushion for the placement of the cap. The regraded and borrow materials would also be compacted to obtain the proper density, thereby avoiding irregularities in the cap due to uneven settlement. Sediments from the drainage swales would likely be removed and consolidated under the capped area.

Three types of caps were considered in this evaluation. These include caps comprised of :

- Soil,
- Clay and,
- Synthetic Membranes,

A soil cap would involve covering the previously prepared and graded areas to be remediated with soil of sufficient thickness and quality in order to promote a grass cover. The cap would control the exposure from inhalation of soil dust, prevent runoff of impacted particles and prevent exposure to humans and ecological receptors due to ingestion of metals in soil. However, the use of the cap alone would not be effective in reducing potential leaching to groundwater, although the cap would prevent infiltration.

The second option for capping would involve placing an impermeable cap below a soil cover. The impermeable material could be either clay, a bentonite admixture or a synthetic material such as High Density Polyethylene (HDPE). Caps that include the use of synthetics are referred to as multimedia caps since they involve combining the use of natural soil materials, such as sand and loam, for use as base materials, drainage layers and protective covers with impermeable synthetic membranes. Slope stability is a factor that must be considered when planning a cap, especially if membranes are being considered. This is due to the low friction factors that occur between the natural soils and the membrane surface. However, recent developments in the manufacturing of membranes have allowed vendors to provide membranes that have rough membrane surfaces, allowing for the use of membranes on steeper slopes. Impermeable caps are preferred over a soil cap because impermeable caps more effective in eliminating infiltration of precipitation. As a result, the soil cap option was eliminated from consideration. However, the remaining two caps, clay and synthetic membranes, were retained for combination as alternatives.

Vertical Barriers

Vertical barriers involve preventing interaction between groundwater and buried wastes by placing surrounding the waste materials with an impermeable vertical wall. Three process operations for vertical walls were considered and include:

- Steel Sheet Pilings,
- Slurry Walls and
- Grout Curtains.

Steel sheet piling are commonly used in construction projects to support a soil slope during excavation. The steel sheets are typically driven into the subsurface using specialized heavy equipment. The steel sheets are interlocking allowing for a continuous barrier around an area. At the proper depth the soil within the steel sheeted area is excavated. For excavations below the water table, pumps are required to remove any infiltrating groundwater as the interlocking sheets are not water-tight joints.

Slurry walls involves installing a trench filled with low permeable materials, such as cement and bentonite, below the water table and around the area to be isolated. Like steel sheet piling, slurry walls are commonly used in construction projects to provide lateral support during deep excavations but unlike sheet piling, slurry walls can be constructed in such a way that the wall provides an impermeable seal against the inflow of water. The installation of the wall involves specialized equipment that involves proper mixing and injection of the slurry as the soil is removed and is normally "keyed" into an impermeable soil or bedrock zone. Leakage occurs due to flow through these zones into the isolated areas. Slurry walls can be used to capture of contain the groundwater that has mixed with buried wastes and prevent continued mixing with clean groundwater, providing the bottom of the wall is anchored in an impermeable zone.

Soil-bentonite walls are composed of soil materials mixed with bentonite and generally provides a lower permeability and compatibility to a wider range of wastes that other containment barrier types. Although soil-bentonite slurry wall construction requires a large work area for mixing and is restricted to relatively flat topography, the OB Grounds is amenable to these stipulations.

Cement-bentonite slurry walls are constructed in a manner similar to soil-bentonite slurry walls, except portland cement is mixed with the bentonite instead of soil. These walls are adaptable to more extreme topography and do not require an extensive mixing work area. Cement-bentonite walls provide more structural strength than soil-bentonite wall, however, they are typically more permeable and less chemical resistant.

Grouting is the practice of injecting, under pressure, a fluid, such as cement, cement-bentonite or a chemical grout, into soil or rock to decrease the soil/rock permeability and/or strengthen the formation. Grout curtains have been used in the construction industry for several decades, but their application to source isolation form groundwater has not been practiced as frequently as slurry walls. An inherent drawback of grouting is the indefinite extent and integrity of the final grout curtain that is created.

Vertical barriers involve preventing interaction between groundwater and buried wastes by placing surrounding the waste materials with an impermeable vertical wall. Three process operations for vertical walls were considered and include:

- Steel Sheet Pilings,
- Slurry Walls and
- Grout Curtains.

Of the three vertical technologies considered, none were retained for combination as a remedial alternative since vertical barriers will not meet RAOs for protecting human health and the environment from lead in surface soils.

Horizontal Barriers

In instances where it is not feasible to install a barrier such as a liner prior to placing the wastes requiring isolation it is possible to install a horizontal barrier in-situ under the wastes. This is usually required due to unacceptable leakage and mixing of groundwater with buried wastes and is most applicable where unweathered bedrock or some other impermeable strata are not sufficiently near the surface for a vertical barrier to sufficiently isolate and contain the waste. Horizontal barriers involve injecting impermeable materials below the buried materials. Two process operations were considered. These include :

- Grout Injection and
- Block Displacement.

Grout injection techniques involve pressure injecting cement, cement-bentonite or a chemical grout into soil or rock to strengthen and decrease the permeability of the formation. The grout is forced into the void spaces of the soil, forming a solidified zone of soil and grout in the area of injection. Through a sufficient number of overlapping injection points, an impermeable seal is created below the waste materials. This process works best if the grout is injected through permeable formations such as sands that will allow the grout to cover a larger area. Excessive injection pressures are required for dense strata, such as glacial till, that are not particularly permeable. Once injected over an area, the grout would act as a bottom seal preventing interactions between the waste that would be buried below the water table and groundwater.

The block displacement method is another technique for the in-situ horizontal isolation of waste. This technique involves placing a barrier around the sides as well as underneath the contaminated ground and vertically displacing the enclosed earth mass or block. The barrier is formed by pumping slurry into a series of notched injection holes. Continued pumping of the slurry under low pressures produces a large uplift force against the bottom of the block an results in vertical displacement proportional to the volume of the slurry pumped. This technique has not been used in full-scale application but has been demonstrated on a small scale. During the demonstrations, problems were encountered with maintaining adequate injection hole pressures and with perimeter separation (drill, notch and blast) technique. The technology is best suited to a site where a natural impermeable bottom barrier does not exist sufficiently near the surface for a vertical perimeter barrier to act alone as an isolation technique.

Horizontal barrier techniques were eliminated from further consideration since unweathered bedrock is sufficiently near to the surface that the bedrock would act as a horizontal barrier if combined with a vertical barrier to prevent mixing of groundwater with buried waste. In addition, the soil layers at SEAD-16 and SEAD-17 are thin and injection of grout would produce breakout of the grout along the thin soil zone. This would prevent the injected grout from forming a continuous barrier over the entire area.

2.5.2.4 In-Situ Treatment Technologies

The in-situ treatment technologies involve control of soil source areas to be treated in-place. In-situ treatment immobilizes, separates, degrades, detoxifies, or destroys contaminants without the added cost of excavation, materials handling or treatment equipment. In-situ treatment is advantageous as it does not involve construction of a treatment facility and limits the exposure of treatment operators to contaminated soils. Treatment of soils in-place is most appropriate when the nature and extent of the source areas are well defined, the sources are homogeneous, the surrounding hydrogeology is well defined, and soil permeability's are suitable for in-situ treatment. Treatment process operations generally entails soil modification via either the injection of air, water, or chemical reagents into the soil or application of an electric current causing either vitrification or migration of metal ions. In-situ treatments are classified generally as innovative or advanced technologies. This means they require more pilot testing prior to design and implementation, and more monitoring during implementation compared to conventional technologies. The primary difficulties associated with in-situ treatment applications are the inability to control the environment under which the process occurs; the inability to ensure contact between treatment reagents (i.e., heat, microorganisms, air, water, or chemical contaminants in the source areas); the difficulty of maintaining effectiveness with depth; and the possibility that toxic byproducts may be released. However, in-situ treatment applications are potentially preferable over on-site or off-site treatment because waste excavation and corresponding site restoration activities are not required, and minimal disruption of hazardous constituents occurs.

The following in-situ treatment technologies were considered as potential remedial alternatives :

- Solidification Technologies
  - Cement-based Immobilization/Fixation
- Vitrification,
- Electrical Extraction Technology
  - Electrokinetics,
- Chemical Extraction Technology
  - Soil Flushing,
- Biological Extraction Technologies
  - Bioventing/Biostimulation,

- Vegetative Uptake,
- Vapor Extraction Technologies
  - Vacuum Extraction and
  - Radiowave Enhanced Volatilization.

The applicability of each in-situ technology to this site is discussed below:

<u>Solidification/Stabilization</u>

Solidification is similar to process of installing vertical barriers except that the intent is to convert an area into a monolithic mass of soil and cementous material. The operation involves pressure injecting an appropriate cement-based admixture while soil is turned using large augers. This process is repeated until the area of interest has been completely mixed. As the soil/cement cure, the waste materials are incorporated into the cement matrix and prevented from further leaching or from exposure to receptors. Soil above and below the water table can be mixed in this manner. Limitations as to the depth of efficient mixing is a function of the type and power of equipment used. Large rocks/cobbles and dense soil conditions can provide difficulty in turning the soil due to binding of the augers and the large power requirements. To achieve successful mixing involves the use of large, highly specialized equipment capable of providing sufficient torque to turn the soil at depth. As the augers mix the soil, cement is injected through the center of the auger and into the subsurface through ports, located at the auger tip. This ensures adequate mixing of the cement and the soil. This technique was demonstrated by IWT Corp. and Geo-Con, Inc. at a Superfund site in Hialeah Florida in 1989 as part of the SITE program. IWT Corp developed the solidifying/stabilization agent and Geo-Con, Inc. provided the waste mixing technology. The operation successfully produced a stable, high strength, cementous mass in the soil that was shown to be low permeability and non-leaching for metals and PCBs. A similar process would be technically feasible at either SEAD-16 or SEAD-17. In this instance, the pads and berms would be mixed with the cementous admixture using augers until the appropriate level of treatment was achieved.

In-situ vitrification (ISV) involves applying a large voltage, as much as 4,160 V, between molybdenum or graphite electrodes installed and arranged in a grid pattern, usually square, into the soil. A conductive mixture of flaked graphite and glass frit is placed in an X pattern among the electrodes in 5 cm deep trenches to initiate electrical conductance. The application of the large voltage cause a current to develop in the soil matrix. As a result, the soil is heated due to the electrical resistance that occurs between the electrodes. As the soil melts the soil becomes electrically conductive causing the melting process to perpetuate down the soil column. During the soil temperature rise, soil moisture is boiled away and organic matter is destroyed, until temperatures of approximately 2000°F are reached. At these high temperatures, the soil begins to melt, essentially becoming a glass-like mass. As the vitrified melt is allowed to cool, the mass becomes solidified, entombing the waste materials. Due to the large amount of off-gassing that occurs in this process, many of which are toxic, a cover is typically placed over the soil as it is heated to collect and treat the gases. The process is considered innovative and has been identified as an appropriate technology for application at radioactive waste sites. Full scale, widespread, operation of this technology has not been performed, probably due to the excessive power requirements that this technology requires, although pilot testing has been conducted. Geosafe Corp. successfully demonstrated this process at a site in Region V.

Electrokinetics involves converting the saturated soil to an electrochemical cell through the application of sufficient voltage to the soil electrodes. Electrodes, one an anode and the other a cathode, are installed into the soil that allow an electric current to flow in the soil. Once sufficient voltage is applied, the soil is essentially transformed into an electrochemical cell. As in any cell, dissolved soil anions and cations migrate to the appropriate electrode. Metallic cations migrate to the negatively charged electrode, the anode, where the metals are removed as the cations plate out.

Electrokinetics is possible but is only capable of removing dissolved metals in the saturated soil. Since much of the metals at the site are located above the water table as solid particles, this technology was screened out from further consideration.

Soil Flushing

Soil flushing involves the in-situ application of water, hot water/steam, solvents, either polar or non-polar, acids or surfactants to buried waste materials with the intent of solubilizing the constituents of concern into the groundwater. This technology is typically used for extracting organic compounds from soils when excavation is not possible. The solubilizing agent along with the pollutants are then recovered from the groundwater using extraction wells. When possible, the solvent or surfactant is then separated and recovered for recycling back into the soil in order to extract additional waste material. The use of solvents to solubilize pollutants is of concern as this process has the potential to increase the pollutant loading to groundwater, if the solubilized materials are not completely recovered. In addition, as residual concentrations of this agent will permeate the subsurface, the extracting agent should be as non-toxic as possible. This restricts the number and types of flushing agents and limits the effectiveness of soil flushing process.

While this technology has promise at heavily contaminated sites where excavation is impractical it was eliminated from further consideration for application at SEAD-16 and 17 since this technology is most appropriate for use with sites impacts with organic compounds. The constituents of concern at SEAD-16 and 17 are inorganic compounds, lead in particular, and it is unlikely that any useable soil flushing agent would be successful at extracting the metals of interest. Further, the thin soil thicknesses and the low permeability of the groundwater suggests that the collection of the extracted materials would be slow and inefficient.

Bioventing Removal/Extraction

Bioventing/Biostimulation involves adding air (oxygen) to the subsurface in order to stimulate the natural microbiological community to degrade the waste materials. The air is typically added, under pressure, through properly spaced and screened injection wells. The wells are constructed so that air is added a rate greater than what is lost due to consumption by the microorganisms and movement beyond the area of remediation. The soil microorganisms are abundant in the subsurface, many species are of the type known to degrade organic molecules, such as hydrocarbons. With maintenance of proper conditions in the subsurface, it has been shown that these organisms will effectively degrade pollutants.

Bioventing/Biostimulation is not effective for inorganic components and therefore has been eliminated from further consideration.

Recent development regarding the extraction of metals via the vegetative uptake of plants has shown promise. Studies suggest that metals and in some instances organics can be removed through the transfer of these materials into the root system of selected plants. This technology is experimental and unreliable.

Extraction of metals via the vegetative uptake of plants is experimental and unreliable. The conditions of the pads and berms at the site would not promote vegetative growth and this technology was screened from further consideration.

Vapor Removal/Extraction

Vacuum or vapor extraction is one of the most widely applied in-situ technologies at hazardous waste sites. Several vendors are available that have successfully applied this technology. It is most applicable for recovery of volatile organics in soil. The process involves application of a vacuum to the subsurface through a well screened in the unsaturated zone. The applied vacuum is transferred to the soil pores causing increased volatilization of organics and the movement of air to the extraction well as a result of pressure differences. A continuous air stream laden with extracted organics are removed and treated, if necessary, prior to discharge. This process continues until the soil is free of the target compounds. The technology is cost effective to apply with the cost of a blower being the only major component of the extraction system. Treatment of the off-gas can range from thermal oxidizers, if the gas concentrations are sufficiently high, to carbon adsorption, if the concentrations are low.

Vacuum or vapor extraction was screened from further consideration since the constituents of concern at this site are inorganics, making this technology ineffective.

Radiowave enhanced volatilization is a variation of vacuum extraction and involves the application of radiowaves directly to the subsurface causing the soil temperatures to rise. As the temperature of the soil increases, the vapor pressures of constituents in the soil also increase. This allows compounds that normally would not have been removed, to be removed from the soil. This technology is considered innovative and experimental with only limited pilot scale applications. It is most appropriate for sites where excavation is impractical and semi-volatile organic compounds are the constituents of concern.

Radiowave enhanced volatilization is considered innovative and experimental with only limited pilot scale applications. It is most appropriate for sites where excavation is impractical and semi-volatile organic compounds are the constituents of concern. Since lead, an inorganic compound with a boiling point of 1300°F, this technology would not be effective in removing lead from soil and was screened out from further consideration.

2.5.2.5 Removal Technologies

Soil and Sediment

Complete or partial removal of source soils and sediments are an integral component of many remedial alternatives. This can be accomplished using standard mechanical excavation technologies or could involve methods that slurry the soil and then remove the slurry using slurry pumps. Typical heavy equipment such as backhoes, excavators, front-end loaders, scrapers, bulldozers and draglines are commonly used for the mechanical excavation of soil. For soil/sediment that is highly organic and contains a high water content, the soil/sediment is removed using a pump.

Since the soil at SEAD-16 and 17 can be easily removed using standard mechanical excavation techniques, only this technology was retained for further consideration. Excavation using slurry techniques was screened out of further consideration since it would not be as practical.

Building Materials at SEAD-16

Removal at SEAD-16 includes collection of debris and other materials from abandoned Buildings S-311 and 366.

Techniques exist for cleaning and removing contaminants from concrete surfaces, such as sand blasting, high pressure washing, concrete decontamination using microwaves, soda blasting, electro-hydaulic scabbling, electrokinetic decontamination, and dry ice pellet decontamination. However, these blasting and washing processes are complex and can be costly, and some may produce waste that must be treated before disposal and may increase the potential for migration of contaminants to outside the buildings. Because the samples collected inside the building were limited to debris and floors, the application of washing and blasting techniques is not warranted. Consequently, only removal of excess material and debris, including sweeping out dust and dirt, is retained as a remedial response, and is included with soils excavation when determining the volume of materials to be removed at SEAD-16.

2.5.2.6 Ex-situ Treatment Technologies

Ex-situ treatment technologies involves addressing source areas with aboveground process unit operations within the site boundaries or could involve transporting soil to an off-site facility for treatment. It will require removal, storage and consolidation of source material.

On-site treatment in aboveground reactors entails the construction of a temporary treatment facility. This facility can be one that is fixed, requiring the assembly of modular treatment units brought to the site on trailer trucks (which can be disassembled and moved off-site upon completion of treatment), or the use of mobile treatment trailers temporarily parked on-site. Fixed facilities are costly and difficult to build and become obsolete once treatment is complete unless wastes from other sites can be shipped on-site for treatment. The current trend is toward temporary on-site treatment units, mobile, modular, or transportable, that can be removed and transported to another site for reuse.

Several treatment processes are available in mobile or modular units. This type of treatment will generally require laboratory of pilot studies using site-specific source material to determine level of performance and optimal process operating parameters. The more complex a process and the more variable the waste composition and volume, the greater the possibility of operational upsets and delays. Because of the variability of physical and chemical characteristics of the waste at the SEAD-16 and 17, the most desirable treatment schemes will be those that are simpler, less susceptible to shock loading, able to operate in batch processing modes, and capable of handling a wide range of chemical and physical constituents.

On-site treatment also will entail further responses to handle treatment of residuals, byproducts, or sidestreams. The residuals must be disposed of, although some may be nonhazardous and the volume may be only a fraction of the initial waste volume.

On-site treatment of soil source material (ex-situ) has several advantages over in-situ treatment. On-site treatment allows for the treatment of contaminated material in aboveground reactors where the process environment can be easily monitored and controlled to provide greater reliability and effectiveness for any given treatment scheme. The state-of-the-art technology for aboveground technologies are generally considered to be more advanced than it is for in-situ treatments. Processes used for sanitary, industrial, or nuclear wastes can be more easily adapted for aboveground treatment. Where excavation and handling of source material is not feasible or appropriate (i.e., where risk of exposure during handling exceeds risk associated with other alternatives), on-site treatment may not be preferred.

On-site treatment of soils is preferred over off-site treatment when the volume of soils to be transported off-site is large, incurring expensive transportation fees that outweigh the benefits of off-site treatment. In addition, off-site hazardous waste treatment, storage and disposal facilities may not have the capacity to accept all the CERCLA waste if the volume is too large. However, at SEAD-16 and 17, the volume of soil to be treated is relatively small, so that the benefits of transporting the waste off-site may outweigh the cost (Specific costs are discussed in **Sections 3.0** and **5.0**). However, for small volumes, on-site mobile treatment units are likely to have the volumetric capacity to treat the amount of contaminated soil at SEAD-16 and 17 in a timely manner, which would eliminate the need for off-site transport of hazardous soil.

On-site treatment of soil source material is preferable over containment or on-site disposal responses because it can provide a permanent solution to the contamination problem. However, it would not be preferable when: (a) removal is inappropriate based on screening criteria, (b) available treatments increase the volume of the material to be handled to unacceptable levels, (c) available treatments result in other environmental releases (such as air emissions) when these releases result in greater risk than other response, or (d) no suitable treatment method is available.

Off-site treatment allows source area material to be removed completely from the site and treated at a full-scale fixed facility. Off-site treatment requires excavation, consolidation, and off-site transportation of source material. It entails identification of RCRA-permitted hazardous waste treatment, storage, and disposal (TSD) facilities with the capability and capacity to treat material removed from source areas. Off-site handling of source materials would require permits for transportation and disposal. This response eliminates both continued releases on-site and direct contact with source material by on-site receptors. However, given that handling of source materials occurs for this response, the potential for releases, worker exposure, or off-site exposure is possible.

Off-site treatment could be adopted for SEAD-16 and 17 by one of three approaches: (1) all contaminated source material found at the site would be transported off-site for treatment, (2) only the waste and source material that is not treatable by a selected on-site treatment technology would be transported off-site, or (3) only waste and source materials subject to the land ban would be transported off-site for treatment. The selected off-site TSD facility must be capable of treating wastes containing metals and semi-volatile organic compounds. Pretreatment may be required before shipping material off-site. This may include dewatering or removing any hazardous waste characteristics such as toxicity.

The following ex-situ treatment technology types and process options were determined to be applicable at SEAD-16 and 17 based on the screening criteria:

- Biological Technologies
  - Aerobic
  - Anaerobic
- Stabilization/Solidification Technologies
  - Pozzolan-portland cement
  - Pozzolan-lime-fly ash
  - Micro-encapsulation
  - Sorption
- Physical Separation Technologies
  - Soil Washing
  - Magnetic Classification
- Thermal Oxidation/Vitrification Technologies

  - High Temperature Processes
- Other Oxidation Technologies
  - Wet Air Oxidation

Biological Technologies

Ex-situ biological treatment of soil involves degradation of contaminants that are entrained in the soil pores through the actions of microorganisms. Land treatment has been successfully utilized by the petroleum industry for many years as a cost effective way of stabilizing oily wastes produced during the refining process. Land treatment facilities are normally found in areas, near the refineries, that have large tracts of available land and are in climates that have temperatures favorable for stimulating biological growth. The above ground biological treatment methods vary and include: landfarming (land treatment), slurry bioreactors, digestors and composting. The process involves providing the proper ratio of pH, nutrients, oxygen (if aerobic conditions are required) and temperature to stimulate the natural microorganisms to utilize the organic contaminants as a source of cellular energy. Several microorganisms have been identified that can utilize petroleum hydrocarbons and other hydrocarbons as sources of energy. In addition to maintaining control of previously mentioned factors, a key factor in achieving a successful clean-up using this technology is to assure that toxic concentrations of contaminants and/or byproducts are not produced to hamper the growth rates of the microorganisms. In additional it is important to provide adequate contact between the microorganisms and the contaminants. For recalcitrant hydrocarbons, such as the Polynuclear Aromatic Hydrocarbons (PAHs), slurry bioreators have been utilized to improve the contact between microorganisms and waste materials.

Ex-situ biological treatment of soil has been screened out since it is effective for soils that have been impacted with organic constituents and would not meet the objectives for reducing the concentration of lead in soil. Biological treatment would have little if any effect on the soils at SEAD-16 and 17 that are impacted with lead.

Solidification/Stabilization

Solidification refers to techniques that encapsulate waste materials in a solid matrix that is resistant to weathering due to its structural integrity. Stabilization involves technologies that convert constituents to a less soluble or less toxic form. In general, the technology is a combination of both processes and is usually referred to as solidification/stabilization (S/S). On a microscale, constituents such as metals in an ionic form and water, are either chemically bonded to the solidification materials or are converted into an insoluble form, such as a metal hydroxide, within the solid matrix. Particulates or solids are encapsulated in the solid matrix and prevented from migration or exposure to receptors. The most common agents that are used for S/S are cement, lime, pozzolans (siliceous) materials and fly ash. These materials are combined in various ratios to produce the most stable and non-leaching monolithic mass.

Any material or process that causes incomplete mixing or prevents the S/S matrix from forming a uniform slurry prior to properly curing will interfere with the success of the treatment effectiveness. Large materials are normally screened out prior to the mixing process to assure a uniform mixture. Materials that have a high moisture content, such as sediments, have a high oil content or are coated with oil can also contribute to ineffectiveness and poor performance of S/S during prove-out testing. The technology is not typically used for treatment of oily waste although some vendors claim the their proprietary solidification agents will treat such wastes up to 10%. Extremely dry wastes can also contribute to poor mixing and uniformity in the formation of the S/S slurry by causing lumps.

The S/S technology using a mixture of pozzolan/cement/lime/fly ash has been identified by EPA as effective and is feasible for treatment of the soils at SEAD-16 and 17. The EPA policy regarding the use of this technology indicates that it is appropriate for materials that contain inorganics and non-volatile organics. With the wide range of solidifying agents available, this technology usually requires the performance of a site-specific treatability study to determine the most effective solidifying agent and the optimal ratio of waste to admixture. Since the constituents of concern at the site are inorganics with some amounts of semi-volatile organics, such as PAHs, present, this technology meets the requirements for application at this site and was retained for further consideration.

Microencapsulation involves encapsulating a particle within a thermoplastic matrix of asphalt, polyethylene or polypropylene. This technique requires heating the plastic and mixing the waste as the plastic is extruded and cooled. The final mass incorporates the waste in a matrix that is inert to normal weathering and structurally stable.

Microencapsulation has been used primarily in the nuclear industry to encapsulate radioactive sludge's and is not considered feasible at either SEAD-16 or SEAD-17 due to the non-uniform nature of the soils and sediments that will require treatment.

Sorption is a technique that involves mixing semi-solid sludges with a dry solid adsorbent to improve the solids handling characteristics of the sludge. The sorbent material may interact chemically with the waste or may simply be wetted by the liquid, usually water or oil, as part of the waste, retaining the liquid within the matrix of the solid.

Sorption is most appropriate for use with semi-solid sludges and was eliminated from consideration a part of a remedial alternative since there are no sludges requiring treatment.

Physical Separation/Aqueous Extraction

Physical separation technologies include soil washing and magnetic classification. Soil washing involves physically separating the various fraction of soil using a series of unit operations such as grizzly bars, trommel screens, flotation units, flocculation tanks and clarifiers. The process removes contaminants from soils by either dissolving or suspending them in the wash solution or by concentrating the pollutants into a smaller volume through a series of particle size separation steps. In some instances, the washing fluid, which is normally water, can be supplemented with an aqueous surfactant for improved separation. The key concept associated with soil washing is to reduce the volume of soil that will require treatment allowing for the washed soil to be returned to the site as clean backfill. This process takes advantage of the fact that, in most instances, pollutants tend to distribute into the fine fraction of soil. The wash water is typically recycled back to the washing process once it has been treated.

Magnetic classification of soils is another volume reduction process that involves the use of electromagnets to separate magnetic materials such as iron from non-magnetic materials. This is a common process used in many recycling facilities.

Soil washing is considered to be effective and feasible remedial technology for both sites and has been retained for incorporation as a remedial alternative. Magnetic classification of soils would not be effective since most of the constituents of concern are non-magnetic.

Thermal Oxidation/Vitrification

Thermal oxidation/vitrification technologies involve heating soils/sludges in a high temperature reactor causing the solid fraction of the waste to become incorporated into either a molten metal bath or a slag. The technology has several variations depending upon the equipment and the vendor. The conditions within the bath are reducing and involve addition of hydrogen gas. Under these conditions, soils, that are comprised mostly of alumina and silica, partition into a slag phase above the molten bath and are removed as a vitrified mass when allowed to cool. The slag, now a vitrified mass is essentially an inert, non-leaching solid that can be placed into a landfill or returned to the site for disposal. Volatile metals in the waste feed, such as lead, are vaporized, oxidized in a secondary combustion chamber and recovered as a dust in a collection system. Several vendors are available to provide this treatment including Horsehead Resource Development Company, Inc., Molten Metals and ECO Logic Inc.

Thermal oxidation/vitrification technologies are feasible, providing a vendor can be found to accept this material at an off-site location and have been retained for future consideration as part of a remedial alternative.

Chemical Extraction

Chemical extraction of soils can be accomplished using materials, such as carbon dioxide or propane, that are normally gases at ambient temperatures and pressures. However, when these gases are pressurized to a liquefied state they have the capability to efficiently extract oil and other organic wastes. The process involves mixing a liquefied solvent with the solid waste material, extracting the contaminants, separating the solids from the liquefied solvent and releasing the pressure causing the liquefied solvent to vaporize back to a gas, leaving an oil. The oil is then treated further or disposed of in accordance with all pertinent regulations. Vendors, such as CF Systems, Inc. and The Institute of Gas Technology have systems that are available to provide this treatment.

Chemical extraction of soils can also involve mixing an appropriate non-aqueous chemical solvent with soil/sediments in order to remove contaminants by solubilizing the contaminants, separating the solvent from the soil/sediments and recycling the solvent. There are a variety of solvents available that can be used to extract materials and the choice of solvent is largely dependent upon the type of contaminant that is the focus of the extraction. Several vendors can provide this treatment technology with each vendor focusing on a specific extraction agent. Some of the more widely known solvents include: triethly amine (TEA), liquefied propane or liquefied carbon dioxide. The solvent TEA is used for the Basic Extraction Sludge Treatment (BEST), developed by Resources Conservation Company. In this process, soils/sludges are mixed with TEA at low temperatures. The essential feature of this technology is that it takes advantage of the large changes in the solubility of TEA and water and temperature. At temperatures less than 18^{o}C TEA is completely miscible with oil and water. When mixed with oily soils or sludge's at or below this temperature, TEA is able to remove, by dissolution, any oily materials and the contaminants associated with the oil. The TEA/water/oil mixture is centrifuged or filtered to separate the extracted soil/sludges from the extracting fluid. The recovered solids are then dried to remove any residual TEA, which is then recovered any recycled back for continued extraction. The extracting liquid, containing TEA/oil/water, is then heated causing the TEA to become insoluble with water producing a two-phased system. The top phase contains the TEA/oil phase and is decanted off, distilled to separate and recycle the volatile solvent TEA, leaving the extracted oil. The oil is either treated further of disposed of as a hazardous waste, recycled as a recyclable spent oil. The bottom portion of the heated liquid that was not decanted is primarily water is also distilled to remove any residual TEA and discharged.

Chemical extraction of soils are effective for extracting organics or oily waste materials but are not effective for removing inorganic constituents. Since the RAO for this project is inorganics, i.e. lead, and the soil and sediments at either SEAD-16 or SEAD-17 are not impacted with oily waste, this technology was not considered effective and was screened out.

2.5.2.7 Disposal

On-Site

SARA states that treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances, pollutants, and contaminants is to be preferred over remedial actions not involving treatment. On-site disposal will not address this preference unless used in an alternative that also included a technology that will reduce volume, toxicity, or mobility. On-site disposal, therefore, includes an assumption that such a treatment technology has been applied. Treated material is backfilled as clean. Therefore, the use of on-site disposal is not precluded by the preference set forth in SARA to reduce volume, mobility or toxicity. On-site disposal of clean fill has been retained as a response to be considered.

Disposal can be at either an on-site landfill or at an off-site landfill. On-site disposal will allow source material to be secured on-site. On-site disposal may be preferable to off-site disposal because it eliminates off-site transportation of source material, which eliminates the potential for off-site spills and off-site receptor impacts. On-site disposal responses require removal and consolidation of source material into an on-site disposal facility. Excavated areas are filled and regraded.

At the site, an on-site landfill may be applicable for the containment of soils, treated to remove any RCRA characteristic, and for untreated nonhazardous wastes. The following process operations have been considered for the on-site disposal technologies :

- Backfilling of clean soil,
- RCRA hazardous waste landfill and
- Solid waste landfill.

Construction of a new on-site landfill, designed to meet RCRA and/or state standards can be constructed within the present boundaries of the depot. Consolidation of on-site waste within a future landfill is feasible and appropriate for the SEAD-16 and 17 soils. Two types of landfills have been considered, one type is an industrial type landfill, i.e a solid waste management landfill regulated under Title 6 Part 360 of the New York Codes, Rules and Regulations (NYCRR), the other type is a RCRA, Subtitle C, hazardous waste type landfill regulated under Title 6 Part 373 of the NYCRR. Both facilities would require siting studies and permitting prior to construction however, the requirements for a new RCRA hazardous waste landfill are more extensive and exhaustive. The permitting, monitoring, design and construction required to comply with all the requirements of such a facility under RCRA is not necessary for this project. The need to construct a RCRA hazardous waste landfill is only required if the wastes to be disposed of are considered to be RCRA hazardous. Wastes are hazardous if they possess the characteristics of either ignitability, corrosivity, reactivity or toxicity or if the wastes are listed by EPA as hazardous from non-specific or specific sources. In the case of SEAD-16 and 17 there are no known listed hazardous wastes to be disposed of. However, a portion of the soils at the site may exhibit the characteristic of toxicity as a result of lead concentrations exceeding the limits of the EP Toxicity test, now called the Toxicity Characteristic Leaching Procedure (TCLP). If the characteristic of the waste is removed, i.e. the soil no longer exceeds the limits for toxicity due to treatment, then the waste is no longer a hazardous waste and can be landfilled in an on-site, non-hazardous, solid waste landfill.

Accordingly, the on-site solid waste landfill option and the backfilling clean treated soil have been retained for inclusion with other technologies as remedial alternatives.

Off-Site

Off-site disposal involves source area materials to be completely removed from a site. This entails removal of source material and consolidation into containers for off-site transportation. All excavated areas must be filled and graded with clean imported fill. This technology eliminates continued on-site exposure to source materials by humans or ecological receptors. It also allows unimpaired future use of the site. However, releases and impacts may occur that could affect public health and environment at off-site locations. Off-site disposal is preferable when on-site disposal is precluded or limited by site characteristics, when unimpaired future use of the site is a high priority, and when the volume for disposal is too small to warrant construction of a landfill. Two options were considered for off-site disposal. These included:

- State-permitted RCRA hazardous waste landfill and
- State-permitted solid waste landfill.

A permitted, off-site RCRA TSD facility with the capacity and capability to handle this source material must be identified. Due to the RCRA Land Ban Restrictions (LDR), waste, if hazardous, will need to be treated prior to disposal in the facility. If the waste is a listed waste then the treated waste will still be required to be disposed of in a TSD facility. If the waste is a characteristic waste the waste will not need to be disposed of in a TSD facility once the characteristic is removed due to treatment. For SEAD-16 or 17, this means that soil that exceeds the TCLP limit for lead would be a D008 hazardous waste. However, if the soil is treated and is shown to be below the limits for toxicity as defined by the TCLP test then the soil is no longer hazardous and does not need to be disposed of in a TSD facility.

At the site, off-site disposal of waste and soils from contaminated areas is a feasible option. Since there are no wastes at SEAD-16 or SEAD-17 that are listed wastes, the need to dispose of any soil in an off-site TSD facility does not apply and has been removed from further consideration. Soil that may be characteristic by toxicity would need to be treated to remove the characteristic prior to disposal in an off-site landfill. The landfill does not need to be a hazardous waste landfill, since the waste is no longer hazardous once the characteristic has been removed.

Remedial action technologies and processes are screened on **Table 2-5**, based on whether a process is technically feasible and effective for remediating soils/sediment and whether it meets the remedial action objectives. As shown on **Table 2-5**, processes that are shaded have been screened out based on screening comments listed.

3.0 DEVELOPMENT AND SCREENING OF ALTERNATIVES

3.1 INTRODUCTION

In this section the remaining general response actions and the various remaining remedial technologies are combined to form remedial alternatives. The rationale is presented for how and why the selected technologies were assembled into remedial action alternatives. Only source control alternatives and the technologies that comprise them are described. Alternatives for remediation of groundwater and surface water are not part of the RAOs for this site and are not considered, other than protecting these resources from any degradation.

Once the alternatives have been assembled, the alternatives are evaluated with respect to three broad remedial alternatives screening criteria: effectiveness, implementability and cost. A brief description of the screening criteria is provided:

- Effectiveness is a key aspect of the screening process as each alternative must be capable in meeting the requirements established as RAOs for this site. In this instance, the RAOs define the required degree of protectiveness for human health and the environment. A remedial action alternative is considered effective, and therefore protective, if the alternative can reduce the toxicity, mobility or volume to the level identified by the RAOs. Both short and long term components of protectiveness were considered. Short term protectiveness refers to the construction and implementation period. Long term protectiveness refers to changes that can be expected in the characteristics of the constituents of concern that have been treated.

- Implementability is a measure of both the technical and administrative feasibility of constructing, operating and maintaining a remedial action alternative. Technical feasibility refers to the ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete; it also includes maintenance, replacement, and monitoring the technical components of an alternative during and after the remedial action is complete. Administrative feasibility refers to the availability of treatment, storage, and disposal services and capacity; and the requirements for and availability of specific equipment and technical specialists.

- Cost estimations during screening is required as a comparative measure of the costs for a remedial action. The level of accuracy for cost estimates required at this point is similar to that required for the detailed analysis and is considered to be +50% to -30%. The only difference would be in the amount of alternative refinement and in the degree that the cost components are developed. Both capital and O&M costs were considered, where appropriate. The evaluation included O&M costs that would be incurred for up to 30 years. Present worth analyses were used during the alternative screening to evaluate expenditures over different time periods in order to provide a common basis to compare costs.

Six alternatives (five plus the no action alternative) were assembled and screened for soil and sediment based on these three criteria. The initial alternatives list of six were then reduced to four alternatives that were analyzed in detail in **Section 5.0.**

3.2 ASSEMBLY OF ALTERNATIVES

In this section the rationale is presented for assembling technologies and processes remaining from the technology screening into remedial action alternatives. These retained technologies and processes, summarized on **Table 2-5**, are representative of the general response actions that were retained. The general response actions and technologies associated with these actions have been combined as remedial alternatives and are listed in order of increasing complexity. An innovative technology has been included to comply with the SARA (1986) requirement that alternative solutions be used to the maximum extent possible. The alternatives that have been assembled from the remaining general response actions and associated technologies for soil and sediment at SEAD-16 and SEAD-17 are as follows:

- Alternative 1 - No Action,
- Alternative 2 - On-site Containment,
- Alternative 3 - In-situ Treatment,
- Alternative 4 - Off-Site Disposal,
- Alternative 5 - On-Site Disposal,

- Alternative 6 - Ex-Situ (Innovative) Treatment.

A brief description of the alternatives, the technologies and processes associated with these actions are assembled, summarized, and presented on **Table 3-1.**

3.3 DESCRIPTION OF TECHNOLOGIES, PROCESSES AND ALTERNATIVES

3.3.1 General

Up until this point remedial response actions, technologies and processes have been evaluated in general. The generality is necessary in order to consider the large number of possible remedial actions that may be appropriate; however, because the alternatives retained are relatively similar it is now necessary to define the project in more detail to better distinguish, evaluate and screen the assembled alternatives for a detailed alternatives evaluation that will be performed in **Section 5.0**.

The technologies and processes that make up the six assembled alternatives for soil, sediment, and the Buildings S-311 and 366 at SEAD-16 will be described in sufficiently greater detail to allow each assembled alternative to be screened. In addition to better defining technologies and processes, the quantity of material to be remediated has also been considered. Order of magnitude unit costs have been developed based on technology definitions and material quantities. These costs were then utilized as one of the alternatives screening criteria. It is important to note that the final decision regarding specific remedial technologies and processes to be utilized may be dependent on the results of treatability studies proposed in **Section 4.0**.

3.3.2 Remedial Alternatives

3.3.2.1 Alternative 1 - No Action

Alternative 1 is the No Action alternative. This alternative allows the site to remain as it currently is, with no further consideration given to any remedial actions.

3.3.2.2 Alternative 2 - On-site Containment

Alternative 2, the containment alternative, involves consolidating, via mechanical excavation, any sediments in site drainage swales and ditches exceeding the 31 mg/kg limit for lead in the containment area, followed by on-site containment of all soils exceeding the 500 mg/kg limit for lead using a cap as a horizontal barrier.

The cap would be placed over the consolidated area barrier. The intent of this alternative is to isolate the waste from receptors and to prevent migration to surface water via soil erosion. The volume or toxicity of waste materials will not reduced as part of this alternative and long term maintenance of the cap will be required.

Capping involves leveling and grading the as required, in order to place a protective soil cap over the area. Included in this alternative would be a provision to monitor the releases from the within the cap. A long term groundwater monitoring plan will be required to ensure that contaminants in the soil remain immobile and do not leach into groundwater.

At SEAD-16, in addition to capping, materials and debris in abandoned Buildings S-311 and 366 will be removed.

On-site hauling is estimated to be done at a rate of 100 cy/hr/dumper truck. Off-site hauling to a Subtitle D landfill is estimated to be done at a rate of 40 cy/day/truck (60 ton/day/truck).

3.3.2.3 Alternative 3 - In-Situ Treatment

Solidification/Stabilization is a process in which the waste material is mixed with a variety of solidifying agents including: 1) Portland cement, 2) pozzolanic materials , and 3) proprietary additives. Lime or fly ash are typical stabilization reagents that may also be added. In this case, the mixing process is performed in-situ. There are several solidification/stabilization mixtures that may be feasible for in-situ remediation, pending treatability testing (refer to **Section 4.0**). Once treated,

the waste material is allowed to solidify into a monolithic mass having significant unconfined compressive strength, physical stability and rigid, cement-like texture. This process decreases constituent mobility by binding constituents into a leach-resistant, concrete-like matrix while increasing the waste material volume as much as 20 to 50%.

Alternative 3, the in-situ treatment alternative involves in-place solidification of soil and sediments using large hollow stem augers and injecting a grout or cemetous slurry during the mechanical mixing process. Any sediments exceeding the 31 mg/kg limit for lead will be consolidated by excavation in the area that will be solidified. The remaining soils exceeding the 500 mg/kg limit for lead will be solidified and stabilized, in-situ, using a large specialized auger or equivalent mixing equipment. Following the in-place mixing, the soil and solidification mixture would cure to form a solidified mass of sufficient structural integrity to resist weathering. Monitoring would be required to assure that the treatment will continue to be effective.

At SEAD-16, in addition to in-situ treatment, material and debris from Building S-311 and 366 will be removed.

3.3.2.4 Alternative 4 - Off-Site Disposal

Alternative 4 is the off-site disposal alternative and involves excavation of soils that exceed the remedial action goals of 500 mg/kg for soil and 31 mg/kg for sediment. The material and debris from Buildings S-311 and 366 at SEAD-16 will also be removed and disposed of with the soil. Excavated soils and sediments that exceed the Toxicity Characteristic Leaching Procedure (TCLP) limits must be solidified prior to disposal in a Subtitle D Landfill that meets the NYSDEC and USEPA Subtitle D landfill construction specifications. Solidification involves processing soils through a mechanical mixing operation where a solidifying agent, either pozzolon/portland cement or pozzolon/lime/fly ash, is added in sufficient quantity to completely solidify the soils that exceed the TCLP limits. It should be noted that TCLP is not a clean up level, rather it determines whether the soils are characteristic waste and the type of disposal required. Solidified soils and the remainder of contaminated soils, i.e., those that exceed the remedial action goals for lead, will be disposed of in an off-site Subtitle D solid waste industrial landfill. Both on-site and off-site solidification have been considered. However, because of the small volume of soil to be treated at SEAD-16 and 17, it is expected that off-site treatment will be more cost effective. Therefore, this alternative assumes all excavated soil is transported off-site for both treatment and disposal.

Excavation of soils will be accomplished using a front-end loader or similar equipment. A bulldozer may be used if necessary, to loosen the shale fill prior to loading into dumper trucks for off-site hauling. Loading will use one or two 5 cubic yard (CY) bucket front-end loaders. Monitoring will be required to assure that the remedial action will continue to be effective.

3.3.2.5 Alternative 5 - On-Site Disposal

Alternative 5 is the On-Site Disposal Alternative, similar to Alternative 4. It involves excavation of soils that exceed the remedial action goals of 500 mg/kg for soil and 31 mg/kg for sediment. As with the other alternatives, the material and debris from Buildings S-311 and 366 at SEAD-16 will also be removed and disposed of with the soil. Soils expected to exceed TCLP limits are solidified as described for Alternative 4. Solidification will be performed on-site, and the solidified soils and remainder of contaminated soils will be disposed of in an on-site landfill, which will be constructed nearby SEAD-16 and 17. The landfill will be constructed to meet the requirements of a Subtitle D landfill for the USEPA and NYSDEC identified in 6 NYCCR Part 360 for landfill construction.

Excavation of soils will be accomplished using a front-end loader or similar equipment. A bulldozer may be used if necessary, to loosen the shale fill prior to loading into dumper trucks for on-site hauling. Loading will use one or two 5 cubic yard (CY) bucket front-end loaders. Monitoring will be required to assure that the remedial action will continue to be effective.

3.3.2.6 Alternative 6 - Innovative Treatment

Alternative 6 is the innovative treatment alternative, which involves soil washing. For this alternative, the sediments and soils will be excavated and washed using physical separation techniques to separate the coarse fraction of soil from the fine fraction. The coarse fraction will be backfilled as clean fill, providing this fraction meets RAOs. The fine fraction is expected to contain the majority of the target constituents of concern, e.g., lead, and can either be treated on-site or off-site for disposal in an off-site solid waste landfill. Building debris and material from SEAD-16 will also be removed and disposed of in an off-site landfill.

On-site treatment can include either solidification or acid leaching to remove any characteristic that the washed soil may exhibit for toxicity in order to allow off-site disposal in a solid waste landfill. If the fine fraction is acid extracted and successful at reducing the concentration of lead in soils to below 500 mg/kg, it may be possible to further minimize the volume of soil that will require off-site disposal. Some residuals, however, will required off-site disposal, as well as the material removed from the buildings at SEAD-16. On site treatment, however, is less cost effective for small amounts of soil such as for SEAD-16 and 17. Therefore, this alternative assumes all treatment is performed off-site.

Soil washing has been identified as an effective technology for soil treatment at SEAD-16 and 17 because soils that comprise the site areas are made-up of a large quantity of coarse particles, i.e. crushed shale imported from a SEDA borrow pit, and a small quantity of fine particles, i.e. the portion of the glacial till that is less than the 200 micron particle size for clay. From various particle size distribution curves generated during the RI, it has been determined that the fine fraction in the site soil varies from 24 to 67 percent with median of approximately 36%. The fine fraction in sediment varies from 5 to 95 percent with median of approximately 56%. The inorganic and organic constituents that are of interest for treatment tend to bind chemically or physically to the smaller quantity of fine-grained silt and clay particles. The silt and clay, in turn, are attached to sand and gravel particles by physical processes, primarily compaction and adhesion. Washing processes that separate the smaller fraction of fine clay and silt particles from the larger fraction of coarse sand and gravel soil particles can thus effectively separate and concentrate chemical constituents into a smaller volume of soil that can be further treated or disposed. The clean, larger fraction of coarse material can be returned to the site for continued use. Therefore, by employing a combination of physical separation techniques, the process of soil washing reduces the volume of waste material by causing constituents to be separated from the larger quantity of coarse particles and concentrated into the smaller quantity fine particles. Soil washing is expected to be completed at a rate of 25 tph or about 17 CY/hr.

Once the particles have been separated the fine fraction can either be transported off-site for treatment and disposal or can be treated further to remove the inorganic components using acids. A combination of flurosilcic acid (H_2SiF_6), nitric acid (H_2NO_3) and hydrochloric acid (HCL) have been utilized as effective agents for solubilizing metal contaminants in various soil washing processes. In general, acid is slowly added to a water and soil slurry to achieve and maintain a pH of 2. Precautions are taken to avoid lowering the pH below 2 and disrupting the soil matrix. When extraction is complete, the soil is rinsed, neutralized, and dewatered. The extraction solution and rinsewater are regenerated. The regeneration process removes entrained soil, organics, and heavy metals from the extraction fluid. Heavy metals are concentrated in a form potentially suitable for recovery. Recovered acid is recycled to the extraction unit. Other metal chelating agents such as EDTA have been attempted but generally have not produced effective results. Following treatment, soil may be re-used as daily cover in a Subtitle D landfill or backfilled on-site. The U.S. Bureau of Mines has developed an acid leaching process that recovers lead from the acid leaching solution using electrochemical techniques. The outcome is an ingot of lead that can be recycled as scrap lead. This is an option that can be implemented as part of the soil washing option but will require treatability testing to determine the proper acid type and quantities.

The technology of soil washing varies from vendor to vendor but will generally consist of many unit operations including the following:

Physical Separation Unit Operations

- dry screening (grizzly screen)
- dry screening (vibratory screen)
- dry trommel screen
- wet sieves
- attrition scrubber (wet)
- dense media separator (wet)
- hydrocyclone separators
- flotation separator
- gravity separators
- dewatering equipment
- clarifiers
- filter presses

Chemical Extraction Unit Operations

- washwater treatment/recycle
- residual treatment and disposal
- treated water discharge

3.4 SCREENING CRITERIA

3.4.1 General

Alternatives assembled in **Section 3.2** and defined in **Section 3.3** have been screened in this section. The six alternatives, listed on **Table 3-1**, have been evaluated against short-term and long-term aspects of three broad criteria: effectiveness, implementability and cost.

Table 3-1
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

ASSEMBLED REMEDIAL ALTERNATIVES

Alternative		Technologies and Processes
1	No-Action	No-Action
2	Containment	Institutional Controls/Consolidate/Cap
3	In-Situ Treatment	Solidify/Stabilize Soils In Place/Soil Cover
4	Off-Site Disposal	Excavate/Off-Site Solidification/Off-Site Subtitle D Landfill
5	On-Site Disposal	Excavate/Solidification/On-Site Subtitle D Landfill
6	Innovative Treatment	Excavate/Wash/Backfill Coarse Fraction/Off-Site Treatment and Disposal Fine Fraction Subtitle D Landfill

The purpose of screening is to reduce the number of alternatives that will undergo detailed analysis. The screening conducted in this section is of a general nature. Although this is necessarily a qualitative screening, care has been taken to ensure that screening criteria are applied consistently to each alternative and that comparisons have been made on an equal basis, at approximately the same level of detail. These criteria consist of several elements shown as follows.

3.4.2 Effectiveness

A key aspect of the screening evaluation is the effectiveness of each alternative in protecting human health and the environment. This screening criterion includes the evaluation of each alternative as to the protectiveness it provides and the reductions in toxicity, mobility, or volume it achieves.

- Short-term protectiveness of human health - Rating the potential for the remedial action to affect human health during remedial action. Both on- and off-site exposures are considered under this criterion. Exposure routes include inhalation, ingestion, and dermal absorption.

- Long-term protectiveness of human health - Rating the effectiveness of the remedial action to alleviate adverse human health effects after the remedial action is complete. The ability of an alternative to minimize future exposures is considered under this criterion. Exposure routes include inhalation, ingestion, and dermal absorption.

- Short-term protectiveness of the environment - Rating the effectiveness of the remedial action to prevent environmental receptors from being affected by constituents during remedial action.

- Long-term protectiveness of the environment - Rating the effectiveness of the remedial action to prevent environmental receptors from being affected by constituents after remedial action is completed.

- Reduction of mobility, toxicity, or volume of waste - Rating of effectiveness in changing one or more characteristics of the medium by treatment to decrease risks associated with chemical constituents present.

3.4.3 Implementability

Implementability is a measure of both the technical and administrative feasibility of constructing and operating a remedial action alternative.

- Technical feasibility - Rating of the ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete. That also includes monitoring of the alternative, if required, after the remedial action is complete.

- Administrative feasibility - Rating of the ability to obtain approvals from regulatory agencies and the Army; the availability of treatment, storage, and disposal services; and the requirements for, and availability of, specific equipment and technical specialists.

3.4.4 Costs

Both capital and operation and maintenance have been considered during the screening of alternatives.

- Capital costs - these were estimated based on order-of-magnitude vendor unit costs.

- Operating and maintenance (O&M) costs - O&M costs were estimated based on the long term monitoring and maintenance requirements.

3.4.5 Numeric Rating System

The alternatives were evaluated by applying a simple numeric rating system. Each alternative was assigned a value ranging between 1 and 6 for a particular criteria. The value assignments were based on both experience and the overall characteristics of the alternatives. If a specific alternative was considered very unfavorable for a given criteria a value of 1 was assigned relative to the other alternatives within the criteria. Likewise, if a particular alternative was considered very favorable, a rating value of 6 was assigned to it relative to the other alternatives within that criteria. Rating scores of 2 through 4 were given to distinguish varying degrees of unfavorable and favorable alternatives. The individual criteria values were summed for each alternative and the totals used to screen alternatives.

3.5 ALTERNATIVES SCREENING

3.5.1 Method of Scoring

The screening results are presented in **Table 3-2** for the six alternatives listed in rows and screening criteria listed in columns. Screening was conducted by considering one column (one criteria) at a time, independent of the other columns and relative to the other alternatives, particularly the no action alternative. The first step was to review each alternative and identify the alternatives that represent the two extreme values (1 and 6), with 6 representing the most favorable score and 1 representing the worst score, for a particular evaluation factor. The values were applied consistently and unbiasedly to each alternative on this column-by-column basis. The total score for each alternative was then summed and used as the basis for proceeding to the detailed evaluation. The following sections present the qualitative rationale for each factor that were utilized to assign values to each alternative.

3.5.2 Effectiveness

3.5.2.1 Short-Term Human Health Protectiveness

All alternatives provide short term human health protectiveness. This assessment ranks the relative merits that each may provide over another one. The assessment of short-term human health protectiveness was based upon any factor that would increase exposure or increase physical hazards and the quickness and completeness that an alternative could be implemented to protect human health.

Activities that contribute to increased exposure are excavation, which is the first step in many alternatives. Excavation is considered to lower short-term worker protectiveness relative to no action, even with dust controls applied and personal protection equipment used by remediation workers. Other factors that increase short term risks are activities that increase off-site exposure such as: fugitive dust emissions due to on-site movement of construction vehicles, runoff during excavation and physical and/or noise hazards such as increased truck traffic through local streets. Alternatives identified as limiting these exposure scenarios were ranked higher than those that did not. Alternatives that involved excavation followed by off-site transportation were perceived as increasing the risk the most and was consequently ranked the lowest.

TABLE 3-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY
SCREENING OF SOIL REMEDIATION ALTERNATIVES

ALT.	TECHNOL. AND PROCESS	EFFECTIVENESS									IMPLEMENTIBILITY				COST		SCORE
		PROTECTIVENESS				REDUCTION			PERM-ANENCE	ARAR COMPLIANC	TECH. FEASIB.		ADMIN. FEAS.				
		Human Health		Environment													
		short-term	long-term	short-term	long-term	Tox.	Mob	Vol.			CON-STRUC.	LONG-TERM MONIT.	AGENCY APPROV.	AVAIL.	CAPIT.	O&M	
1	No Action Alternative	6	1	1	1	1	1	1	1	1	6	6	1	6	6	6	45
2	Containment Alternative Consolidate/Cap	5	2	6	2	2	2	5	4	6	4	1	4	3	5	1	52
3	In-situ Treatment Alternative Solidify soils in-place/soil cover	4	3	5	3	5	5	2	5	6	2	2	5	2	1	3	53
4	Off-site Disposal Alternative Excavation/Off-site transport/ Off-site solidification/ Subtitle D disposal	1	4	4	4	3	3	3	2	6	5	5	2	5	4	5	56
5	On-site Disposal Alternative Excavation/solidification/ On-site Subtitle D landfill	3	5	2	5	4	4	4	3	6	3	3	3	4	3	2	54
6	Innovative Treatment Alternative Excavation/wash/backfill coarse frac./fine fract. to Off-Site Treatment and Disposal	2	6	3	6	6	6	6	6	6	1	4	6	1	2	4	65

Alternative 1, the no-action alternative, was ranked the highest for this screening criterion with a 6 since no excavation is conducted. Alternative 2, the containment alternative, was ranked the next highest with a 5 since this alternative does not involve a large amount of excavation, has limited off-site traffic and can be implemented quickly as it does not require specialized equipment or vendors. The only excavation of contaminated materials is from the drainage ditches, except at SEAD-16 when removal of debris and materials form the buildings will be conducted. However, there is a risk for fugitive dust emissions during compaction. The construction of the impermeable cap can involve off-site hauling of clay and possibly clean fill for the protective cover, thereby increasing truck traffic in the area, which was identified as a negative factor. However, this factor can be limited through the use of a geosynthetic membrane in place of clay and obtaining clean fill from other areas of the depot, instead of off-depot, thereby limiting off-depot traffic.

Alternative 3, the in-situ alternative, was ranked the next highest with a 4. It involves the same amount of excavation as Alternative 2, since for both alternatives only sediment in the drainage ditches will require excavation to an area where in-situ mixing will be performed, and building materials and debris at SEAD-16 will be removed. Alternative 3 was ranked lower than Alternative 2, even though both are low excavation alternatives, because this alternative will involve hauling a large amount of solidification materials, which will thereby increase off-depot traffic. Further, due to the specialized nature of the solidification process, the time to implement this alternative is greater than for Alternative 2.

Alternative 5, the on-site disposal alternative, was ranked the next highest with a 3 since, in addition to the excavation of sediment in the drainage ditches and removal of building materials and debris at SEAD-16, the remaining soil will be excavated. However, this material will not be transported off-site, therefore this alternative was ranked moderately.

Alternative 6, the innovative treatment alternative, was ranked lower than Alternative 5 even though both alternatives involve a similar amount of excavation. This alternative will require a specialized vendor which will increase the time to implement. This alternative may involve storage of acids or other materials that can cause spills, thereby increasing exposure. Further, off-site disposal of any residuals, and materials from the building at SEAD-16 will be required therefore this alternative was considered only moderately protective.

Alternative 4, the off-site disposal alternative, was ranked with a 1 since this alternative involves the off-site transport of contaminated soil in addition to excavation.

3.5.2.2 Long-Term Human Health Protectiveness

All alternatives, other than the no action alternative, protect human health in the long term. This assessment ranks the relative merits that each may provide over another one. The assessment of long-term human health protectiveness is based upon factors that could cause risk due to a increase in exposure from releases of treated materials. Alternatives identified as having the least potential for causing releases over the life of an alternative were ranked higher than those that did not. Alternatives that involve treatment, either from entrainment or metals removal and recovery, were considered more favorable than alternatives that did not involve a treatment process, since treatment will be one additional step to assure reduced potential for long term releases.

Alternative 6, the innovative treatment alternative, was ranked the highest for this screening criterion with a 6, since this alternative will provide the highest amount of treatment. This alternative accomplishes both volume reduction, and may also accomplish treatment from acid estraction or solidification of the washed soil, if these activities are performed on-site. Even though a portion of residuals and material from the building at SEAD-16 will be disposed of off-site in a landfill, this alternative was considered the most protective as it provides the most treatment.

Alternative 5, the on-site disposal alternative, was ranked the next highest with a 5 since this alternative also involves treatment, though not as much as for alternative 6. This alternative includes on-site stabilization/solidification and construction of a new on-site landfill which is designed and constructed to hold soil contaminated with heavy metals and material and debris removed from the buildings at SEAD-16. Since this landfill will be on-site, it will be easy to monitor and maintain to assure long term effectiveness. In addition, the landfill will not be subjected to other chemical wastes or be subjected to physical hazards such as increased vehicle traffic that may adversely affect the physical integrity of the liner or cap. The long term liabilities associated with off-site disposal, both financial and legal, due to releases at an off-site landfill would be eliminated.

Alternative 4, the off-site disposal alternative, was ranked moderately with a 4 since this alternative involves some treatment and no contaminated soil or materials will remain on-site. However, due to the uncertainties associated with off-site disposal and long term liabilities at an off-site facility, it was not ranked as high as the on-site alternative.

Alternative 3, the in-situ alternative, was ranked the next highest with a 3 since it involves treatment, albeit in-situ. This alternative was only ranked moderately since all treatment would be performed in-situ, which can lead to uncertainties due to the variable effectiveness and completeness of a mixing process that cannot be fully observed.

Alternative 2, the containment alternative, was ranked the next to lowest with a 2 since this alternative does not involve any treatment and includes some uncertainty associated with the long term effectiveness of the protective cover/cap.

Alternative 1, the no action alternative, was ranked with a 1 since lead in soil and sediment and , materials and debris in the buildings at SEAD-16 will continue to contribute to the potential long term human health impacts.

3.5.2.3 Short-Term Environmental Protectiveness

All alternatives other than the no action alternative provide short term environmental protectiveness. This assessment ranks the merits that one alternative may provide over another. The evaluation of short-term environmental protectiveness has been based upon factors that could cause exposure to environmental receptors. As with short term human health protectiveness, excavation is considered to lower short-term protectiveness as this process would increase the potential to expose contaminants to the environment and environmental receptors. Other activities that disturb the natural conditions are perceived as factors that would contribute to increased environmental risk. These activities include any other construction process such as: setup of field offices, staging areas or other support facilities, movement of heavy equipment, sediment removal in the drainage ditches and noise hazards. These activities contribute to increase short term environmental risk by either increasing fugitive dust emissions, decreasing available wildlife habitat or causing noise that will disturb environmental receptors. Alternatives that involve constructing landfills were considered as contributing to environmental risk by decreasing habitat for wildlife.

Alternative 2, the containment alternative, was ranked the highest with a 6 since this alternative involved only a small amount of excavation in the drainage ditches removal of material and debris from the buildings at SEAD-16 and no permanent elimination of wildlife habitat. This alternative can be implemented in a short period of time thereby limiting the time that environmental receptors will be impacted.

Alternative 3, the in-situ alternative, was ranked the next highest with a 5. Since although it involved the same, limited, amount of excavation and removal as Alternative 2, it was ranked higher due to the large soil mixing equipment that would be on-site for longer than that required for Alternative 2, thereby causing greater disturbance to wildlife.

Alternative 4, the off-site disposal alternative, was ranked with a 4 since, even though this alternative involves a large amount of excavation and removal, off-site hauling is not perceived as having a significant effect on environmental receptors as truck traffic would be limited to existing roadways. The effect time to implement this alternative and the ability of this alternative to eliminate continued environmental exposure to pollutants was considered a positive factor. These factors, in addition to the fact that no wildlife habitat or resources would be lost, were grounds for rating this alternative moderately high.

Alternative 6, the innovative treatment alternative, was ranked with a 3 since it will involve a large amount of excavation and removal.

Alternative 5, the on-site disposal alternative, was ranked slightly lower than Alternative 6 with a 2, since this alternative will also involve a large amount excavation, thereby causing disturbance to environmental receptors and eliminating a large amount of habitat by construction of an on-site landfill.

Alternative 1, the no action alternative, was ranked the lowest with a 1. Although no excavation would be performed, the existing conditions have been identified as currently adversely impacting human and environmental receptors, and there are no provisions to restrict exposure.

3.5.2.4 Long-Term Environmental Protectiveness

All alternatives, other than the no action alternative, provide long term protection of the environment. This assessment ranks the relative merits that each may provide over another. The assessment of long-term environmental protectiveness is based upon factors that could cause risks due to a increase in exposure for environmental receptors from releases of treated materials. Alternatives identified as having the least potential for causing releases over the life of an alternative were ranked higher over those that did not. Alternatives that involved treatment, either from entrainment or metals removal and recovery, were considered more favorable than alternatives that did not involve a treatment process, since treatment would be an additional step to assure reduced potential for long term releases.

Alternative 6, the innovative treatment alternative, was ranked the highest with a 6 since this alternative would provide the highest amount of treatment, from both volume reduction and treatment by either acid extraction or by solidification of the remaining soil volumes.

Alternative 5, the on-site disposal alternative, was ranked the next highest with a 5 since this alternative involves treatment using stabilization/solidification in addition to the construction of an on-site landfill, which will be designed and constructed to hold the contaminated materials long term. This alternative was deemed superior to an in-situ treatment or containment alternative because it will provide a greater degree of assurance that materials will remain contained, since the landfill will be aboveground, newly designed, and monitored and maintained by the federal government. Further, because the landfill will be designed and operated for remediation of these sites which are within SEDA, other chemical wastes or physical hazards such as daily vehicle traffic associated with a commercial off-site landfill will be controlled and restricted. A higher ranking is thus merited due to the decrease in potential adverse effects of these factors on long term integrity of the landfill.

Alternative 4, the off-site disposal alternative, was ranked with a 4 since this alternative involves some treatment and eliminates the long term impacts to the environment by physically removing the risk producing constituents from the site. Although the risks are removed and will not affect the environment at SEAD-16 or 17, the pollutants could affect the environment if released daily transport or at another landfill. Due to the long term liabilities and uncertainties associated with off-site disposal, this alternative was ranked lower than the on-site alternative.

Alternative 3, the in-situ alternative, was ranked the next highest with a 3 since it involves treatment, albeit in-situ. This alternative was only ranked moderately since there are uncertainties in the effectiveness of the mixing process that cannot be fully evaluated. These uncertainties arise as a result of the variability of the layers of till at the site. The non-uniform nature of the matrix that will require solidification will contribute to mixing difficulties and decrease effectiveness of treatment.

Alternative 2, the containment alternative, was ranked the next to lowest with a 2 since this alternative does not involve any treatment of soils and includes some uncertainty associated with the long term effectiveness of the protective cover/cap.

Alternative 1, the no action alternative, was ranked with a 1 since lead in soil and sediment and constituents in the building at SEAD-16 will continue to contribute to long term human and environmental impacts.

3.5.2.5 Reductions In Toxicity

The assessment of toxicity reduction is based upon factors that would decrease the toxicity of the constituents of concern. Alternatives or processes that chemically or physically bind with the inorganics constituents provide the greatest reduction of toxicity as these constituents are no longer in a form that would be biologically available for uptake. The alternatives that provided the greatest reduction in toxicity through solidification or treatment were subsequently ranked higher than those that did not. Entrainment within a solidified matrix of cement or metals removal and recovery are examples of treatment alternatives that were considered more favorable than alternatives that did not involve treatment.

Alternative 6, the innovative treatment alternative, was ranked the highest with a 6 since this alternative will provide the highest amount of treatment, from both volume reduction and treatment by either acid extraction or by solidification of the remaining soil volumes. Since all alternatives except Alternative 1, remove materials from the buildings at SEAD-16, reductions in toxicity of building materials is equal for all and does not affect ranking for this criteria.

Alternative 3, the in-situ alternative, was ranked the next highest with a 5 since it involves treatment that would reduce the toxicity by binding metals in a cementous matrix. Alternative 6 was ranked higher than Alternative 3, even though both involve a large amount of treatment, because Alternative 3 has more potential for incomplete mixing since it will be performed in-situ. Therefore Alternative 3 has more uncertainty for reducing toxicity than Alternative 6.

Alternatives 5 and 4, the on-site and off-site disposal alternatives, are similar in nature and were ranked the next highest with a 4 and a 3, respectively. These alternatives are very similar and involve some treatment using stabilization/solidification, but only for the soils that exceed the toxicity characteristic. Although only a portion of the soils will be treated to reduce the toxicity of the soils, some toxicity reduction will be achieved. The only difference between these two alternatives is the location of the treatment facility and the landfill. Landfilling, by itself, will not reduce toxicity since there is no treatment associated with the landfilling process other than what would be expected in isolating the waste in a landfill. Alternative 5, the on-site landfill alternative, was ranked slightly higher than Alternative 4 because the types of other wastes that would be placed in an on-site landfill and mixed with the soils from SEAD-16 and 17 would be limited and controlled. An off-site landfill would potentially accept other wastes that, when mixed with the soils from SEAD-16 and 17, could adversely affect the treated waste and possibly increase toxicity.

Alternative 2, the containment alternative, was ranked the next to lowest with a 2 since this alternative does not involve any treatment of soils or reduction in toxicity.

Alternative 1, the no action alternative, was ranked with a 1 since there is no reduction in the toxicity of lead in soil and sediment or in constituents in the buildings at SEAD-16.

3.5.2.6 Reduction In Mobility

Mobility reduction factors are closely related to those that involve reductions in toxicity and the rankings were identical to that determined previously for toxicity. As the focus of this effort is to reduce the concentration of inorganic compounds, specifically lead, this assessment ranked alternatives that involved a chemical or physical reaction resulting in the formation of a less mobile state of the metals, as preferable over alternatives that did not involve a beneficial reaction. A beneficial reaction is a reaction that results in the formation of insoluble compounds like hydroxides. Such compounds will be produced during the stabilization/solidification process. Other beneficial reactions include the formation of the base metal that would be produced during the electrochemical process of reducing and recovering metallic ions following soil washing and acid extraction. In general, alternatives that involve treatment, either from entrainment or metals removal, reduction and/or recovery, were considered favorable in reducing mobility. Alternatives that involve containment also provide mobility reduction, but these alternatives were viewed as less desirable since the mobility reduction is dependent on maintaining the integrity of the containment system. Uncertainties associated with containment systems, i.e. formation of leaks, were considered as factors that would decrease the ability of an alternative to reduce mobility and were ranked slightly below treatment alternatives.

Alternative 6, the innovative treatment alternative, was ranked the highest with a 6 since this alternative will provide the highest amount of treatment.

Alternative 3, the in-situ alternative, was ranked the next highest with a 5 since it involves a large amount of treatment that will reduce the mobility by binding metals in a cementous matrix. Alternative 6 was ranked higher than Alternative 3 because of the uncertainties associated with achieving a completely mixed system in-situ.

Alternatives 5 and 4, the on-site and off-site disposal alternatives, are similar in nature and were ranked the next highest with a 4 and a 3, respectively. These alternatives involve a limited amount of treatment by stabilization/solidification for soils that exceed the toxicity characteristic. This process will achieve mobility reduction as a result. However, landfilling the remaining soils will not reduce mobility other than what would be expected by physically isolating the waste in a landfill. These alternatives were ranked moderately due to the uncertainties associated with potential leaks that occasionally occur in landfills. Alternative 5 was ranked slightly higher than Alternative 4 since the uncertainties associated with mixing other types of wastes with the soils from the SEAD-16 and 17 would be more restricted, limited and controlled in an on-site landfill than an off-site landfill. An off-site landfill could potentially accept other wastes that may mix with the soils from SEAD-16 and 17 and increase mobility through processes such as chelation with organic acids produced during decomposition of organic materials.

Alternative 2, the containment alternative, was ranked the next to lowest with a 2 since this alternative does not involve any treatment of soils or reduction in mobility other than the physical restrictions of migration resulting from the cap.

Alternative 1, the no action alternative, was ranked the lowest with a 1 since there is no reduction in the mobility of lead.

3.5.2.7 Reduction in Volume

The rankings for volume reduction are different than for other reduction factors. Any alternative that will cause an increase in volume was ranked lower than those alternatives that will not cause an increase. Although some volume increase is expected during excavation, Alternative 6, the soil washing alternative is a volume reduction alternative and is intended to reduce the volume of soil the most (by up to approximately 50%), using wet separation techniques. Once the volume has been reduced, the remaining fraction can be reduced further if physical separation is followed by acid extraction. The metallic ions can also be reduced electrochemically and recovered as the base metal. If solidification is chosen, it will cause an increase in the volume due to the addition of cement or another material that is used to incorporate the soil material. This volume increase varies depending upon the mixture used and the ratio of soil to admixture, but can be as much as 50%. However, this volume increase is often approximately 20% and a net volume reduction is expected for this alternative.

Alternative 2, the containment alternative, was ranked next to highest with a 5 because this alternative will involve only a minimal amount of volume increase due to excavation of the sediments. It was not ranked higher than Alternative 6 because there is no volume reduction associated with this alternative.

Alternatives 5 and 4, the on-site and off-site disposal alternatives, are similar in nature and were ranked with a 4 and a 3, respectively. Both alternatives involve an identical, yet limited, amount volume increase due to the treatment by stabilization/solidification and excavation. However, Alternative 5 was ranked slightly higher than Alternative 4 because the uncertainties associated with the compaction process (which is considered a volume reduction process), that is used prior to placing the soils in a landfill are more controlled in an on-site landfill than an off-site landfill.

Alternative 3, the in-situ alternative, was ranked with a 2 since it involves a large volume increase as a result of solidification.

Alternative 1, the no action alternative, was ranked the lowest with a 1 since there is no reduction in the volume of lead.

3.5.2.8 Permanence

All alternatives, with the exception of the no action alternative, will achieve a permanent solution. Alternatives that have the longest lifespan, preferably permanent, with the least amount of continued attention would be considered attractive and were ranked high. Factors that were deemed favorable in evaluating the permanence of an alternative included those that would permanently remove lead from soil. Those alternatives that involved containment were not ranked as high as those alternatives that completely removed metals from soil. This is because containment alternatives require long term care and maintenance to assure that the constructed containment structure will remain intact and permanent, whereas alternatives that involve a treatment process that will remove metals from the soil do not require continued attention because the constituents of concern are eliminated. These alternatives are therefore more permanent and preferred.

Alternative 6, the innovative treatment alternative, was ranked the highest with a 6 since this alternative involves removing lead from soil.

Alternative 3, the in-situ alternative, was ranked the next highest with a 5 since it involves treatment that would permanently bind the metals into a cementous matrix.

Alternative 2, the containment alternative, was ranked with a 4 since this alternative involves construction of a permanent aboveground cap. However, the cap will require some attention to assure permanence of this alternative. This alternative was ranked higher than the landfill alternatives because the cap will require less maintenance.

Alternatives 5 and 4, the on-site and off-site disposal alternatives, are similar in nature and were ranked the next highest with a 3 and a 2, respectively. These alternatives involve a limited amount of treatment by stabilization/solidification for soils that exceed the toxicity characteristic. Since landfills are not considered permanent, these alternatives were ranked low.

Alternative 5 was ranked slightly higher than Alternative 4 since maintaining a landfill on-site will be more controlled and certain than an off-site landfill.

Alternative 1, the no action alternative, was ranked the lowest with a 1 since site conditions are subject to climatic change and is considered to be the least permanent alternative.

3.5.2.9 ARAR Compliance

There are currently no chemical specific ARARs for lead in soil. Any off-site disposal will fall under RCRA requirements, which must be complied with in the final remedial action plan. Other federal ARARs include but are not limited to the National Environmental Policy Act (NEPA), CERCLA, the Clean Water Act (CWA) and the Emergency Planning and Right to Know Act (EPCRA). Promulgated state regulations must also be complied with. After an alternative is chosen, the final design must incorporate compliance with ARARs, however, the concepts of each alternative consider ARARs and do not preclude compliance. Each alternative has an equal potential to fully comply with ARARs, with the exception of the No-Action alternative. Therefore, all alternatives were ranked with a 6, except the No-Action alternative, which was ranked with a 1.

3.5.3 Implementability

Implementability is a measure of both the technical and administrative ease and likelihood that an alternative could be implemented. Site factors, such as the need to construct a long road around a wetland in order to protect it, restrictions on the time of year that construction activities could be performed due to flooding or wildlife nesting activities, are examples of construction difficulties that reduce the implementability of an alternative. Long term monitoring requirements and continued attention are also considered as negative factors in implementing an alternative. The ability of an alternative to obtain any necessary regulatory permits and the availability of vendors to implement an alternative are additional factors that could affect the ease of an alternative to be implemented.

3.5.3.1 Constructability

There are no current restrictions at either SEAD-16 or 17 that would prevent construction for an alternative. The site is located in a remote section of the depot and has easy access from several directions. Since the facility is a military reservation there are security restrictions that will need to be adhered, including restrictions on the use of open flames and spark producing devices, but these restrictions are not considered significant to affect the ability of an alternative to be constructed. The drainage ditches are adjacent to the site but are not considered to be large enough to cause difficulties in implementing an alternative. Winter conditions can occasionally be severe at times but are temporary and should not cause prolonged delays. In general, all the alternatives are constructible and therefore the rankings will focus on rating those alternatives from the easiest to construct to most difficult.

Alternative 1, the no action alternative, was ranked the highest with a 6 since this alternative would be the easiest to implement.

Alternative 4, the off-site disposal alternative, was ranked the next highest with a 5. This alternative is considered the easiest, other than doing nothing, to implement since it involves simple excavation and hauling operations. In addition, solidification of soils that exceed the TCLP limit will be performed off-site at the off-site disposal facility.

Alternative 2, the containment alternative, was ranked the next highest with a 4 since this alternative involves leaving soils in place and constructing a cap. The construction of the cap would involve some specialized equipment but is considered to be relatively standard and will not require very deep excavating equipment.

Alternative 5, on-site disposal alternative, was ranked with a 3 because of the need to construct an on-site landfill. Although technically feasible to construct, the presence of shallow bedrock would limit the depth and lateral extent of the landfill. This, along with the presence of wetlands within a 1 mile radius of the site, would provide some construction complications that cause this alternative to be ranked lower.

Alternative 3, the in-situ alternative, was ranked the next to lowest with a 2 since it involves specialized in-situ mixing equipment and is more complicated than simple excavating.

Alternative 6, the innovative treatment alternative, was ranked the lowest with a 1 since this alternative would involve construction of the most sophisticated and complicated unit operations, which are associated with soil washing and treatment.

3.5.3.2 Long-Term Monitoring

It is technically feasible to implement a long term monitoring program for each of the alternatives. Such a plan would be most appropriate and required for alternatives that involved containment or landfilling. For these alternatives, monitoring would be used to assure that the waste isolation system has remained secure. Typically, monitoring involves a network of monitoring wells that are strategically placed to intercept any release. A statistical procedure is used to compare data sets from downgradient and upgradient wells in order to determine changes that would suggest a release has occurred. If a release has been detected then an assessment and a remediation plan can be implemented to control the release. Long term monitoring would also include monitoring the condition of the cap to assure that the integrity of the cap has been maintained. If the cap monitoring detects a breach then reconstruction of the cap can be implemented to minimize the effects of the breach. For this evaluation, alternatives that involve containment or landfilling would require a similar monitoring plan for groundwater and other media and were considered to be equivalent. In this instance the ranking based upon the degree of necessity of a monitoring plan in order to detect a release. The alternatives that require the most monitoring were ranked less favorably than those that require little or no monitoring.

Alternative 1, the no action alternative, was ranked the highest with a 6 since this alternative will not involve any monitoring.

Alternative 4, the off-site disposal alternative, was ranked the next highest with a 5 since this alternative will not involve monitoring because all soils will be removed and placed in an off-site landfill. The off-site landfill will be monitored by the landfill operator, but not by the federal government.

Alternative 6, the innovative treatment alternative, was ranked the next highest with a 4 since this alternative will involve only monitoring of the treated soils to assure compliance with the RAOS, but will not require any long term monitoring because no contaminated materials will remain on-site.

Alternative 5, the on-site disposal alternative, was ranked with a 3 because of the need for long term monitoring of the on-site landfill. Although there is the potential for this landfill to leak, it was ranked higher than Alternative 2 because it included removal of all soils, followed by the construction of a new engineered landfill that would have less likelihood to leak than soils left in place.

Alternative 3, the in-situ alternative, was ranked with a 2 since it will involve a monitoring network to monitor groundwater. Although there is little evidence to suggest significant leaching of metals to groundwater, and heavy metals are relatively immobile, a long term monitoring plan to ensure continued immobility of the site contaminants is merited. A portion of the soils would remain in contact with the groundwater, therefore there is a possibility that leakage could occur.

Alternative 2, the containment alternative, was ranked the lowest with a 1 since this alternative involves leaving soils in place and in contact with groundwater and would require long term monitoring for both the groundwater and the cap. It was ranked the lowest since it was perceived as the most likely alternative for a monitoring program to detect a release as the in place soils were not treated.

3.5.3.3 Agency Approval

In general, when a remedial action is required, alternatives that meet remedial objectives, comply with ARARs, minimize off-site disposal, are permanent and reduce the toxicity, mobility and volume of pollutants will meet the goals of the NCP and are considered to be the agency preferred alternatives.

All alternatives will meet the remedial action objectives for the site with the exception of the no action alternative. Alternative 6, the innovative treatment alternative, was ranked the highest with a 6 since this alternative will minimize off-site disposal, is permanent, and reduces the toxicity of the pollutants.

Alternative 3, the in-situ alternative, was ranked the next highest with a 5 since it involves treatment that will permanently bind the metals in an on-site cementous matrix.

Alternative 2, the containment alternative, was ranked with a 4 since this alternative involves construction of a permanent cap that will require some maintenance but will not reduce the toxicity, mobility or volume of the metals.

Alternatives 5 and 4, the on-site and off-site disposal alternatives, are similar in nature and were ranked with a 3 and a 2, respectively. These alternatives involve a limited amount of treatment by stabilization/solidification followed by landfilling the remaining soils. Since landfills are not considered permanent, these alternatives were ranked low. Alternative 5 was ranked slightly higher than Alternative 4 since an on-site landfill will minimize off-site disposal and does not involve transportation of un-solidified soils.

Alternative 1, the no action alternative, was ranked the lowest with a 1 since it does not meet the remedial action objectives for the site and is considered to be the least permanent alternative.

3.5.3.4 Availability

The evaluation of availability involves consideration of the availability of vendors, equipment and space for implementing an alternative. Alternatives that involve highly specialized equipment or vendors that are limited are factors that contribute to long term delays associated with implementing an alternative and are negative factors.

Alternative 1, the no action alternative, was ranked the highest with a 6 since it readily available.

Alternatives 5 and 4, the on-site and off-site disposal alternatives, are similar in nature and were ranked with a 4 and a 5, respectively. These alternatives are easily implemented and readily available since they involve excavation using standard earth moving equipment. Alternative 4 was ranked slightly higher than Alternative 5 since off-site landfills are readily available in the area to dispose of the soil. In addition, Alternative 5 was ranked lower because the installation of an impermeable cap was considered somewhat specialized and limited to a few vendors or suppliers of clay. There is sufficient land available on-site to construct an on-site landfill which, other than the construction of the cap, will not require specialized equipment.

Alternative 2, the containment alternative, was ranked with a 3 since this alternative involves construction of a permanent cap that will require specialized material that is less available and limited to a few vendors.

Alternative 3, the in-situ alternative, was ranked the next to lowest with a 2 since it requires specialized in-situ mixing equipment, which is less available than standard equipment used for previous alternatives.

Alternative 6, the innovative treatment alternative, was ranked the next to lowest with a 1 since this alternative would require specialized equipment and vendors. The equipment for this alternative is more specialized than that required for Alternative 3, therefore it merits a lower ranking. Although this alternative is specialized and limited to a few vendors, there is an adequate soil washing capacity provided by several US vendors who have licensed European technologies.

3.5.4 Costs

The costs are evaluated for both capital and operation and maintenance (O&M) costs and are based upon vendor quotes, quantity estimates, experience at other remedial action sites and engineering judgement. The costs are provided for feasibility analyses and are considered to be order of magnitude estimates for screening purposes only, and accurate to within +50% and -30%. Capital costs are costs for materials, labor and other direct costs, such as equipment and facilities rentals, that are required to implement an alternative. Operation and maintenance costs are those required to maintain an alternative, and include labor and analytical costs associated with groundwater monitoring or costs required to maintain and repair a cap. The total cost for each alternative is the sum of the capital cost and the O&M cost.

3.5.4.1 Capital Cost

Capital costs for remedial alternatives have been estimated, whenever possible, using vendor supplied information for the unit operations associated with each of the six alternatives. These unit costs are as follows :

- Off-site transport, treatment and disposal in a Subtitle D landfill $68/CY
  (based on a per cubic yard (CY) unit disposal cost from Earthwatch Landfill)

- On-site In-situ solidification $400/CY
  (based on costs provided in SITE report for in-situ stabilization performed by Silicate Technologies)

- On-site Subtitle D landfill (Parsons ES project files) $180/cy

- Soil Washing, wet separation (Parsons ES project files) $300/cy

- Containment (Parsons ES project files) $66/cy

These are the most significant unit costs. Other costs such as excavation, material handling, on-site hauling and backfilling are not significant and are within the rounding error of the listed unit costs.

Capital costs for each alternative have been estimated based on 2700 c.y. of material and these unit costs and are presented as follows (refer to Appendix D for cost estimate details):

Alternative	Estimated Capital Cost (+50%, -30%)	Ranking
1	$0	6
2	$178,200	5
3	$1,080,000	1

4	$183,000	4
5	$486,000	3
6	$810,000	2

3.5.4.2 Operation and Maintenance (O&M) Cost

Long-term operation and maintenance (O&M) costs are costs that are incurred after remedial action is completed. The estimated O&M costs estimated from previous experience and cost estimates I Appendix C are provided below:

Alternative	Estimated Annual O&M Cost (+50%, -30%)	Ranking
1	$0	6
2	$81,688	1
3	$41,688	3
4	$41,688	5
5	$81,688	2
6	$41,688	4

Alternative 1, the no action alternative, was ranked the highest because there would be no O&M costs.

Alternatives 3, the in-situ alternative, Alternative 4, the off-site disposal alternative and Alternative 6, the innovative treatment alternative all have identical O&M costs as the costs assume an identical groundwater monitoring system. Alternative 4, the off-site disposal alternative, was ranked the highest of these three because all the contaminated soils would be removed from the site and the likelihood of future activities associated with a release will be the least. Therefore, this alternative was ranked with a 5. Alternative 6 was ranked the next highest with a 4 since only treated soil will remain on-site, which will have a low possibility for a release and a minimum maintenance of the site will be required. Alternative 3 was ranked the lowest of the three since it will involve monitoring and maintaining a landfill that contained contaminated materials and has the most requirements for a future maintenance activities of these three alternatives.

Alternatives 2 and 5, the containment alternative and the on-site disposal alternative, have the most long-term O&M costs because they include both groundwater sampling and cap maintenance. They ranked the lowest with a 1 and a 2, respectively. Alternative 5 was ranked above Alternative 2, the containment alternative, because the O&M cost for an on-site landfill for alternative 5 could be spread out amount sites that contribute waste.

3.5.6 Screening

The results of the screening of soil remediation alternatives are provided on **Table 3-2**. The no action alternative scored the lowest with a total score of 45 The containment alternative, Alternative 2, and the in-situ alternative, Alternative 3 also scored low with a score of 52 and 53, respectively. The on-site disposal alternative, Alternative 5, scored the next highest with a score of 54. Alternative 4, the off-site disposal alternative, scored the next to highest with a total score of 56 and Alternative 6, the innovative treatment alternative, scored the highest with a total score of 65. Alternatives 4, 5 and 6 were retained for detailed evaluation. Alternative 1 was also retained for comparitory purposes. Alternatives 2 and 3 were screened out from further consideration because they scored low. In addition, Alternative 3 is the costliest alternative.

4.0 TREATABILITY INVESTIGATIONS

4.1 INTRODUCTION

One of the important parts of most remedial actions is the treatability investigation. In general, there are two primary objectives for treatability studies:

- Provide sufficient data to allow treatment alternatives to be fully developed and evaluated and to support the remedial design of a selected alternative
- Reduce cost and performance uncertainties for treatment alternatives so that a remedy can be selected.

There are three stages in the CERCLA process in which treatability studies may be used, remedy screening, remedy selection, and remedy design. In the remedy screening phase treatability studies are designed to establish whether or not a technology can effectively treat a given waste. These studies generally provide little cost or design data. In the next stage, remedy selection, treatability studies are used to evaluate the site-specific performance of each technology in order to support selection of an alternative. Treatability studies in the remedy selection stage may yield information on 7 of the 9 technology evaluation criteria, including: (EPA, 1991b)

- Overall protection of human health and the environment
- Compliance with ARARs
- Reduction of toxicity, mobility, or volume
- Short-term effectiveness
- Implementability
- Long-term effectiveness and permanence
- Cost.

This mid-stage of the CERCLA process is implemented prior to the Record of Decision (ROD) and would be referred to as a pre-ROD treatability study.

The last stage of the CERCLA process is the remedy design stage. This stage is implemented after the ROD has been signed, and these treatability studies are often referred to as post-ROD treatability studies. Post-ROD treatability studies provide quantitative performance, cost, and design information (EPA, 1991b). This information is then used to design the remedial treatment process, refine the remedial action cost estimate, and make accurate predictions of the time required for remediation.

At either SEAD-16 or SEAD-17 there is no need for remedy screening treatability studies. Both technologies being considered for treatment, solidification/stabilization and soil washing are demonstrated. This means that substantial treatability and remedial work has been done with these technologies on sites with similar wastes. Therefore, the only treatability work proposed for this remedial action is pre-ROD testing, since the treatability results can then be used to finalize the remedial selection, design and to develop a detailed cost estimate. Section 4.2 provides a brief overview of the pre-ROD treatability study process. Sections 4.3 and 4.4 describe the detailed treatability procedures for solidification/stabilization and soil washing, respectively.

4.2 GENERAL TREATABILITY STUDIES

As described above, this discussion will focus on those treatability studies conducted prior to the ROD. The primary goals of a pre-ROD treatability study are:

- Facilitate the alternative selection process
- To select among multiple vendors and/or processes within a given technology
- To support the detailed design and the development of specifications
- To provide information supporting a detailed cost estimate.

These studies can be conducted either in the laboratory or the field, at bench or pilot scale. For these remedial actions, the treatability studies will likely be conducted in the laboratory, by either the Army, or the various vendors interested in performing the remedial activities.

Bench-scale testing is usually conducted in the laboratory, and is best used to establish treatment parameters. Bench-scale testing is useful for established technologies, such as solidification and soil washing, since it can be used to pinpoint site-specific operating parameters. Pilot-scale testing can be done either at the site or in the laboratory. In pilot-scale testing, smaller versions of the actual treatment equipment, or the actual treatment equipment may be used. Since solidification/stabilization and soil washing are demonstrated technologies, bench-scale treatability work will be appropriate.

The first step in any treatability study is establishing the treatment goals. These goals include, but are not limited to the attainment of ARARs. For example, an ARAR for the solidification/stabilization of the soils is that the treated soils are not Toxicity Characteristic (TC) hazardous waste. An additional treatment criteria which is not an ARAR, but would be important if an on-site landfill is used, will likely be that the solidified waste have sufficient structural strength to support the cap placed over the landfill. The treatability study workplan will clearly delineate all treatment criteria for this remedial action.

The next step is identifying the Data Quality Objectives (DQOs) and preparing the study workplans. DQOs are qualitative and quantitative statements that specify the requirements for the data collected during the study. The final DQOs will be incorporated into the treatability study design, workplan, sampling and analysis plan, and chemical data acquisition plan will ensure that the data collected are of sufficient quality to support the objectives of the treatability study. For pre-ROD treatability studies, fairly rigorous Quality Assurance/Quality Control (QA/QC) will be required. Since the QA/QC required will be similar to that required for the remedial investigation, the chemical data acquisition plan developed in support of the Remedial Investigation/Feasibility Study (RI/FS) (MAIN, 1991) will be modified for use in the treatability testing.

The subsections generally included in a treatability study workplan are:

- Project description
- Remedial technology description
- Test objectives
- Experimental design and procedures
- Equipment and materials
- Sampling and analysis
- Data management
- Data analysis and interpretation
- Health and safety

- Residuals management
- Community relations
- Reports
- Schedule
- Management and staffing
- Budget

Not every one of these items will be described in detail in each workplan, but it is important to at least consider each item. Most of the section titles are self-explanatory, and will not be described in detail, but there are several points which should be highlighted. First, health and safety merits its own section in the workplan. Health and safety is very important because the soil to be treated is likely a hazardous waste prior to treatment. The party implementing the work plan will not only be required to follow the health and safety plan, they must also be in full compliance with all Occupational Safety and Health Administration (OSHA) and EPA regulations that pertain to working with hazardous wastes.

Residuals management is another important issue. Any soil or sediment which is not successfully treated is still a hazardous waste. In addition, any residuals generated during the testing may be hazardous wastes, and must be handled and disposed of accordingly.

Once the workplan has been completed, the next step in the process is to identify the party that will perform the study. For both solidification/stabilization and soil washing the technologies used by the various vendors are similar. The only major differences between vendors are related to proprietary materials. Therefore, it is likely that the treatability studies will be carried out by vendors so that the appropriate proprietary materials can be used. It will be important to clearly specify the goals of the study so that results from different vendors can be accurately compared and evaluated.

Once the work plans have been finalized and the vendors have been selected, the next step will be to collect a representative sample. In order to better compare the results of each vendor's testing, it best to collect sufficient volume of sample for all the studies to be conducted. A set volume of soil could be collected from each area designated for remediation at SEAD-16 and SEAD-17 in proportion to the volume of soil to be remediated. All the soil collected would be composited and apportioned to each vendor. This assures that each vendor will be testing similar material.

Once the vendors have completed their studies, the data must be reviewed and assessed prior to contractor selection and completion of detailed designs and specifications. The study results will be reviewed to ensure that each technology meets the specified treatment criteria. All technologies that meet the treatment criteria will then be reviewed for other items, such as cost-effectiveness and ease of implementation. Once a vendor is selected, detailed design and specifications will be developed.

4.3 SOLIDIFICATION/STABILIZATION TREATABILITY STUDIES

The first step in a treatability study for solidification/stabilization at SEAD-16 and 17 is to determine whether the soils and sediments to be remediated are already suitable for disposal in a Subtitle D landfill. If they are, then treatment, and a treatability study, are unnecessary. The primary criteria for disposal in a Subtitle D landfill are that the waste cannot be a RCRA hazardous waste, and characteristic wastes must be treated so they no longer exhibit hazardous characteristics. Soils at SEAD-16 and 17 will be tested for hazardous characteristics prior to implementing the treatability study.

Once the necessity for treatment has been determined, the next step is to establish the treatment objectives, which is related to the desired final compostion of the treated soils. In addition to meeting the criteria for disposal in a Subtitle D lanfill, the treatment objectives may include high structural strength. Typically, the design bearing strength is that which is required to support construction equipment during installation of the final landfill cover. Another objective to consider is the amount of volume increase. A S/S process that minimizes the volume increase of the treated soil is desirable because disposal costs are dependent on the volume of material to be disposed of. Other objectives may include one of more of the following:

- Determine the most economical mix design;
- Identify handling problems such as oversize material;
- Identify whether volatile emissions are a concern;
- Assess physical and chemical uniformity of the waste;

Once the treatment objectives are established, the next step is to determine the DQOs and prepare the workplan, which should include the treatment objectives and DQOs, in addition to the specific tests to be performed, a procedure for collecting a representative sample, and a procedure for arriving at the desired treatment objectives. A detailed discussion of treatability studies for S/S is contained in the USACE Technical Letter No. 1110-1-158, dated 28 February 1995, which should be consulted during preparation of the work plan.

Baseline conditions of the soil should be determined prior to treatability testing. A number of preliminary tests can be run on the soil to establish baseline conditions. These tests can include but are not limited to metals analysis, moisture content, percent solids, and density. In addition, because the primary objective of S/S is to immobilize contaminants in waste, leachability testing is necessary to predict how well contaminants will immoblize after S/S.

Toxicity Characteristic Leaching Procedure (TCLP) is a common leachability test procedure, which involves mixing a portion of the solids with acetic acid to determine how much of the contaminants have leached into the acid over time (the complete procedure is described in EPA Test Methods SW-846, Method 1311). The TCLP is designed to simulate the leaching potential of a waste within an unmanaged landfill designed for municipal wastes, which can generate organic acids during decomposition of waste materials over time. However, the test does not simulate the conditions of most present-day hazardous waste landfills becuase these contain very little organic matter. Therefore, TCLP may not yield maximum concentrations of leached contaminants under all circumstances, and other leaching procedures should be considered. A partial summary of leaching procedures can be found in EPA/625/6-89/022.

After the workplan is completed, a representative sample must be collected. In order to adequately compare the results of each vendor's testing, it is best to collect a sufficient volume of sample for all the studies to be conducted. This volume should be based on the number of tests to be completed and the volume of soil required for each test. Homoginization and removal of oversize material by sieving are recommended to create uniform samples prior completing the treatability study.

The next step is the treatability work itself. Often, the primary admixtures used are cement, lime (or lime kiln dust), and fly ash. These are used either individually or in varying mixtures of two or three. Most vendors also use proprietary admixtures. Therefore, the admixtures to be used in this treatability study will not be specified by the Army.

The admixtures will be added to the soil in varying ratios based on the dry weight of the soil. Water will be added as necessary, and the final volume of water added will be recorded. The mixtures will then be allowed to cure. At different times in the curing process, usually at 1 day, 3 days, 1 week, 2 weeks, and 1 month, the mixtures will tested to determine if the treatment criteria are met. These tests may include TCLP metals, bearing strength, volume increase, and moisture content. The actual testing schedule and parameter list will vary, depending on the vendor and the final disposition of the treated soil. Each vendor will then prepare a final report which documents all the results of the testing. The report will demonstrate which admixtures and curing times meet the treatment criteria. The Army will then evaluate the results to determine the most cost-effective of the admixtures which meet all the treatment criteria.

The results of the treatability study will then be used to prepare the final design and specifications. It is anticipated that the design will involve performance specifications geared towards meeting the treatment criteria, as opposed to design criteria which specify he admixtures to be used and the different ratios.

4.4 SOIL WASHING TREATABILITY STUDIES

The mechanics of the soil washing treatability study are very similar to those of the solidification/stabilization treatability study. Again, a DQOs and a work plan will be developed to describe the goals of the study. Representative samples will be collected. The pre-study testing will vary slightly for the soil washing treatability study. Preliminary data will include a full TCLP metals analysis to establish baseline conditions, and a number of physical chemical properties to aid in developing the treatment process. At a minimum, the soils will be analyzed for particle size distribution (sieve and hydrometer), dry bulk density, moisture content, total organic carbon, pH, and soil mineralogy.

One important test which is run for the soil washing treatability study is a chemical analysis on each of several soil fractions separated with sieves. Often, most of the chemical constituents are associated with the fine fraction in the soil. When this is the case, wet separation unit operations can significantly reduce the quantity of soil which needs to be treated. By analyzing the different fractions prior to treatment, the distribution of the potentially hazardous constituents with respect to particle size can be determined.

The first step in the treatability study is usually a series of jar tests. Soil samples are placed in a series of jars, and an equal volume of liquid is added to each jar. Usually plain water (hot and cold) are the first liquids tested. Other liquids to test include aqueous solutions of surfactants, chelating agents, or other dispersing agents. The pH of the test water may also be varied. After the liquids are placed in the jars, the jars are shaken. Next, the soil/water mixture is poured into a 2mm sieve. The water is allowed to drain, and the remaining soil is rinsed with clean water. After the soil drys, it is analyzed to determine the percent reduction. The solutions which yield satisfactory results are carried over to the next stage of the study.

The bench-scale testing is more involved than the jar tests. The first step is often to determine the optimal wash times, washwater to soil ratios, and rinsewater to washwater ratios (EPA, 1991b). Once these values are determined with plain water, the optimal additives determined in the jar testing stage can be used. Each of the other additives can be evaluated to determine the solution which best removes hazardous constituents from the coarse fraction. If the acid leaching process is used to treat the fine fraction to remove inorganic components, these agents will also be analyzed to determine whether they are effective for solubilizing metal contaminants and to determine if the process meets the remediation requirements established for the site. The wash water and rinse water will also be analyzed for mass balance purposes, and for determining the best treatment and disposal option for the washwater. If necessary, treatability testing will be conducted on the washwater.

The last step is evaluating the results of the treatability study. Analytical data taken before and after the washing are used to determine the removal efficiency. The particle size distributions can be used to estimate the volume reduction of the process. The effectiveness of the washwater treatment and fine soil separation must also be considered. These results will then be used to size the final unit, specify the reagents and reagent ratios, and prepare a detailed cost estimate for the process.

5.0 DETAILED ANALYSIS OF ALTERNATIVES

5.1 GENERAL

The four retained remedial action alternatives for soil/sediment represent a range of waste management strategies which address the human health and environmental concerns associated with SEAD-16 and 17. Although the selected alternative(s) will be further refined as necessary during the predesign phase, the description of the alternatives and the analysis with respect to the criteria discussed below present the fundamental components of the various alternatives being considered for this site.

A technical description of each alternative is presented. After the technical description, a discussion of the alternative is presented with respect to overall protection of human health and the environment; short-term effectiveness; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; implementability; and cost.

The analysis of each alternative with respect to overall protection of human health and the environment provides an evaluation of how the alternative reduces the risk from potential exposure pathways and meets the site-specific cleanup goals established between NYSDEC, the USEPA, and the Army through treatment, engineering, or institutional controls. These goals, presented in **Table 2-2** were developed for on-site soils and sediments.

Long-term effectiveness and permanence are evaluated with respect to the magnitude of residual risk remaining from untreated waste or treated residuals after the remedial action is complete, and the adequacy and reliability of controls used to manage remaining waste (untreated waste and treatment residuals) over the long-term. One requirement of CERCLA is that a remedial action should involve solutions with the highest degrees of long-term effectiveness and permanence. That is, little or no waste would remain at the site such that long-term maintenance and monitoring are unnecessary and reliance on institutional controls is minimized.

The discussion of the reduction of toxicity, mobility, or volume through treatment addresses the anticipated performance of the treatment technologies involved with an alternative. This evaluation relates to one of the requirements by CERCLA that a selected remedial action employ treatment to reduce the toxicity, mobility, or volume of hazardous substances. The evaluation will determine the amount of waste treated or destroyed, the reduction in toxicity, mobility, or volume, and the type and quantity of treatment residuals that will remain.

Evaluation of alternatives with respect to short-term effectiveness takes into account protection of workers and the community during the remedial action, environmental impacts from implementing the action, and the time required to achieve cleanup goals.

The analysis of implementability deals with the technical and administrative feasibility of implementing the alternatives and the availability of necessary materials and services. This criteria includes the ability to construct and operate components of the alternatives; the availability of adequate off-site treatment, storage, and disposal services; the availability of services, equipment, and specialists; the ability to monitor the effectiveness of remedial actions; and the ability to obtain necessary approvals from agencies.

Detailed the cost estimates presented in this report for the retained alternatives. These costs are based on information from the R.S. means Environmental Cost Handling Options and Solutions (ECHOS) estimating library. Quotes from suppliers in the area of the site, generic unit costs, vendor information, conventional cost estimating guides, and prior experience are used to supplement this information. The cost estimates presented in this feasibility report have been prepared for guidance in project evaluation. The actual costs of the project will depend on true labor and materials costs at the time of construction, actual site conditions, competitive market condition, final project scope, and other variables.

Construction costs include those expenditures required to implement a remedial action. Both direct and indirect costs are considered in the development of construction cost estimates. Direct costs include construction costs or expenditures for equipment, labor, and materials required to implement a remedial action. Indirect costs include those associated with engineering, permitting, construction management, and other services necessary to carry out a remedial action.

Quarterly O&M costs, which include labor, maintenance materials, and purchased services have also been determined.

The detailed analysis of alternatives considers all the receptors identified in Section 2.0 for each exposure scenario: current and future on-site industrial worker, future construction worker, and future potential trespasser. SEDA has been placed on the base closure list for BRAC95 and the intended future use is industrial/commercial. Therefore, the purpose of the remedial action objectives established in Section 2.0 is to protect human health as appropriate to the intended future use of SEAD-16 and 17. Alternatives 4, 5, and 6 have therefore been retained for detailed analysis in this section because they have the best potential for fulfilling the remedial action objectives. Alternative 1 (No Action) has also been retained for comparison purposes. The primary components of each alternative are shown in **Table 5-1**.

Table 5-1
SENECA ARMY DEPOT ACTIVITY
SEAD-16 AND 17 FEASIBILITY STUDY

REMEDIAL ALTERNATIVES RETAINED FOR DETAILED ANALYSIS

ALTERNATIVE	TECHNOLOGIES AND PROCESSES
1	**No Action**
4	**Excavation/Solidification/Stabilization(Off-Site or On-Site)/Off-site landfill** - Excavation soils above 500 mg/kg - Excavation of sediments in drainage ditches that exceed NYSDEC sediment criteria for lead of 31 mg/kg - Removal of material/debris from abandoned buildings at SEAD-16 - Transport all soils failing TCLP criteria to on-site or off-site location for stabilization/solidification - Stabilization/solidification of soils exceeding TCLP criteria (on-site or off-site facility - Transport/Place all excavated and treated materials in off-site Subtitle D landfill - Long-term groundwater monitoring - Soil erosion will be controlled through proper site grading - Site Covering and Revegetation
5	**Excavation/Solidification/stabilization of soils failing TCLP/On-site landfill** - Excavation of soils above 500 mg/kg - Excavation of sediments in drainage ditches that exceed NYSDEC sediment criteria for lead of 31 mg/kg - Removal of material/debris from abandoned buildings at SEAD-16 - Transport soils to on-site treatment staging area - Stabilization/solidification of soils exceeding TCLP criteria - Place all excavated and treated soils in on-site Subtitle D landfill - Long-term groundwater monitoring - Soil erosion will be controlled through proper site grading - Site Covering and Revegetation
6	**Excavation/Soil Washing** - Excavation of all soils with lead concentrations above 500 mg/kg - Excavation of sediments in drainage ditches that exceed NYSDEC sediment criteria for lead of 31 mg/kg - Removal of material/debris from abandoned buildings at SEAD-16 - Transport soils to on-site treatment staging area - Soil washing; Physical separation of fine fraction from coarse fraction - Clean coarse fraction backfilled - Fine Fraction to off-site stabilization/disposal in Subtitle D landfill - Long-term groundwater monitoring - Soil erosion will be controlled through proper site grading - Site Covering and Revegetation

5.2 ANALYSIS OF SOIL/SEDIMENT ALTERNATIVE 1: NO ACTION

5.2.1 Definition of Alternative 1

The no action alternative means that no remedial activities will be undertaken at SEAD-16 and 17. No monitoring or security measures will be undertaken. Any attenuation of the threats posed by the site to human health and the environment will be the result of natural processes. Current security measures, which include the SEDA-wide security activities that effectively eliminate public access to the area, will be eliminated or modified depending upon whether the property is transferred or leased. Access to the site can be limited depending upon how the Army determines the property will be used.

This alternative will be used as a baseline for comparison with the other alternatives developed as part of this feasibility study.

5.2.2 Protection of Human Health and the Environment

An evaluation of the protectiveness of human health and the environment includes an assessment of the short-term and long-term effectiveness as well as permanence. Assessment of the short-term effectiveness addresses the effects of an alternative during construction and implementation of a remedial action. Since Alternative 1 is a no action alternative, which does not require construction or disturbances to the site, analysis of short term effectiveness is not applicable.

5.2.2.1 Long-Term Effectiveness and Permanence

The Baseline Risk Assessment (BRA) indicates that the no action alternative is currently within the EPA target range for carcinogenic risk for both SEAD-16 and SEAD-17. However, the total site non-carcinogenic risk, or hazard index HI, for the future industrial worker scenario was determined to be 19.6 at SEAD-16, which is above the EPA target value of 1.0. In addition, the HI for the future on-site construction worker scenario was determined to be 2.22, which is also above the EPA target value. The hazard indices for all scenarios at SEAD-17 are below the EPA target value of 1.0 (refer to **Table 1-2**). Therefore, the no action alternative is only protective of human health at SEAD-17.

However, this alternative does not protect against ingestion of and direct contact with soils having concentrations of lead above 500 mg/kg, or prevent potential leaching of lead from the soil into the groundwater above the federal action level. All of the constituents of concern remain in-place. Since the SEDA security measures prevent public access to the site, there is currently little or no risk to the public because there is not exposure. Access by site workers is infrequent and limited to demilitarization activities. SEDA personnel working at SEAD-16 or SEAD-17 have also received training which will allow them to operate safely in the areas near the site. However, since the depot is a facility scheduled to be closed under BRAC95, these security measures will eventually be eliminated. The future land use of the site is designated as industrial/commercial.

Furthermore, this alternative does not provide long-term protection to ecological receptors in Kendaia Creek because the sediments in the drainage ditches with concentrations of lead above the NYSDEC criteria would remain. While no adverse affects were observed during the RI, there is a potential for long-term chronic affects. Contamination of the creek by runoff from the site would not be prevented.

The no action alternative does not provide a permanent solution since no treatment, engineering or institutional controls are provided to prevent exposure to constituents of concern in on-site soils and sediments.

5.2.3 Reduction of Toxicity, Mobility, and Volume

There would be no reduction in the toxicity, mobility, or volume of the impacted soil at the sites. Some natural attenuation is expected, through dispersal of the affected soil and through chemical and physical changes which may reduce the mobility of the heavy metals. However, these decreases will be minimal, since no reduction from treatment will occur.

5.2.4 Implementability

The criteria of implementability is not applicable to the no action alternative since there are no activities occurring. There will still be monitoring and security activities, as described above, as well as some administrative requirements, but these activities which are already occurring are and will continue to be performed as part of compliance with RCRA. Formal RCRA closure activities may require additional remedial measures if necessary.

5.2.5 Cost

There are no costs associated with the no action alternative. The costs associated with the monitoring and security described above are covered through other mechanisms, and will not be directly attributable to this remedial action.

5.3 SOIL/SEDIMENT ALTERNATIVES 4 THROUGH 6: COMMON COMPONENTS

All of the remaining alternatives have five components in common. These components, which are in addition to the remediation criteria for soils and sediments required by NYSDEC and the USEPA, include groundwater monitoring, runoff prevention, site revegetation, periodic monitoring of the sediments in Kendaia Creek, and UXO clearance. A detailed description of each component is provided below.

- Site groundwater will be monitored on a quarterly basis. There are a number of wells already installed at the site, and these may be sufficient for the continued monitoring. New wells will be installed as necessary to ensure that the monitoring program is sufficient to detect any migration from the area.

- Sediment sampling in Kendaia Creek will be conducted on an annual basis at four location within the reach affected by the drainage ditches at SEAD-16 and 17. The purpose of the sampling is to ensure that Kendaia Creek is not being contaminated by lead left in the soil at the site.

5.4 ANALYSIS OF SOIL/SEDIMENT ALTERNATIVE 4: EXCAVATION, TREATMENT, AND OFF-SITE LANDFILL

5.4.1 <u>Definition of Alternative 4</u>

5.4.1.1 Description

This alternative includes excavation of soils, treatment of soils exceeding the TCLP limit to remove the characteristic of toxicity, and disposal of all the excavated soils, sediments, and treated soils in an off-site, non-hazardous, solid waste, Subtitle D, industrial landfill. For this alternative, the soils and sediment with concentrations of lead exceeding TCLP limit will be treated by a solidification/stabilization process prior to disposal in a Subtitle D landfill. This treatment will be conducted either on site or off site at a TSD facility. All the soils will be transported off-site to a Subtitle D solid waste landfill for disposal. Each of the processes involved with this alternative will be described briefly in this section. A detailed analysis of how this option meets the selection criteria, and a budgetary cost estimate are provided below.

The first step in this alternative is excavation. An excavation plan will be developed using previous RI data to delineate the extent of removal.

These volumes includes approximately 10 cy of debris and materials from the abandoned building at SEAD-16, surface and subsurface soils with lead concentrations that exceed 500 mg/kg, and sediments that exceed the NYSDEC sediment criteria for lead of 31 mg/kg. The excavation will be accomplished with standard construction equipment, such as a front end loader or bulldozer.

The data indicate that the soils to be removed at SEAD-16 (case 2) are limited to soils on the northeast, east, south, and southeast sides of Building S-311, as shown on **Figure 2-1** in **Section 2.0.** At SEAD-17, the soils to be removed (case 1) include surface soils on the north, northwest, and west side of Building 367 **(Figure 2-2)**. These soils will be removed to a depth of 6 inches below ground surface, comprising 675 cubic yards (CY) to be excavated at SEAD-16 and 842 CY to be excavated at SEAD-17, for a combined total of 1,517 CY for both sites. The cumulative total is 1,617 CY. The excavated soil will be loaded into trucks for transport to an off-site treatment, storage and disposal facility (TSDF), which will be responsible for the necessary treatment (solidification/stabilization) for disposal in an off-site solid waste landfill. Alternatively the soil can be treated on-site, in which case the excavated soil will be brought to an on-site pug mill.

The next case of soils to be excavated (case 3 for SEAD-16 case 2 for SEAD-17) are sediments in the drainage ditches that exceed the NYSDEC sediment criteria of 31 mg/kg for lead. Since lead was detected above this level in all sediment samples, six inches of sediment will be excavated from all drainage ditches at each site, according to the areas delineated on **Figures 2-l and 2-2**. The volume of sediment to be excavated at SEAD-16 and 17 is 371 CY and 81 CY, respectively. The combined total is 452 CY for a cumulative total excavated and removed at both sites of 2,069 CY.

At isolated locations, subsurface sample results showed elevated lead concentrations exceeding the 500 mg/kg criteria. Soil at these isolated locations will be further excavated to a depth of 24 inches. The volume of soil involved with this case (Case 4 at SEAD-16 and Case 3 at SEAD-17) is 76 CY and 35 CY, respectively, for a combined total of 165 CY. The cumulative volume of soils to be excavated for all cases at SEAD-16 and 17 is 1,222 CY and 958 CY, respectively, or a combined total of 2,180 CY.

Each site will be regraded with a bulldozer in a manner which approximates the original grade. If necessary, clean fill will be brought in to make up for the excavated soils. The topsoil will be vegetated with indigenous grasses as an erosion control measure.

The next step in this alternative is the solidification/stabilization treatment step, which can be accomplished either on or off site. Because the small volume of soils that require remediation at SEAD-16 and 17, it is expected that off-site treatment is more cost effective. However, both options will be considered. Solidification/stabilization is a process in which a setting agent is added to the soil to form a mixture which entraps the constituents. Solidification refers to the techniques use to encapsulate hazardous waste into a solid material, and stabilization generally refers to the techniques that treat hazardous wastes by converting them into a less soluble, mobile, or toxic state. The different setting agents used are described below. The primary goals of solidification are to:

·Improve the handling and physical characteristics of the waste
·Decrease constituent solubility and mobility
·Decrease the surface area across which the migration of constituents may occur.

The reason for stabilizing the soil is to immobilize the lead and other heavy metals in the soils that have concentrations of constituents in excess of the TCLP regulatory limits. Excavated soil must be tested for TCLP to determine the necessity for solidification/stabilization prior to disposal. Once this is accomplished the stabilized material can be disposed of as a solid waste in an on-site landfill.

Solidification/stabilization is a process in which the contaminants are converted to less toxic, mobile, and/or in soluble forms. The physical properties of the soil or waste are not necessarily changed by this process (EPA 1990).

Solidification/stabilization has been used primarily for the treatment of soils containing inorganic contaminants and has been shown to be effective for heavy metals, the primary contaminant of concern at SEAD-16 and 17. Some organics may interfere with the setting process, and others may not be bound up in the finished product. There are few organics in the soils to be stabilized at SEAD-16 and 17, and interference by organics is not considered to be a problem. Bench scale treatability tests will be conducted to assess the adequacy of a given additive to a specific soil-waste mixture.

Four types of mixtures are generally used for solidification/stabilization. Inorganic solidification/stabilization is often achieved with cement or pozzolanic additives. Organic solidification/stabilization is often accomplished with thermo-plastic or organic polymerization additives (EPA, 1989). A combination of these processes may be used for a soil containing both organic and inorganic contaminants.

In cement-based solidification/stabilization, the soil is mixed with Portland cement. Water is added to the mixture. Inorganic materials then become bound up in the cement matrix. Pozzolanic solidification/stabilization involves mixing the waste with a siliceous material, such as fly ash, pumice, or lime kiln dust. The mixture is often combined with lime or cement and water to form a cement-like final product. The end result of inorganic solidification/stabilization can be a granular material or a cohesive solid (EPA, 1989). Cement-based stabilization is the likely choice for SEAD-16 and 17. The site soils are primarily fill material, much of which consists of crushed shale. This material will be readily bound up in a cement base, and will act like the aggregate used in making concrete. Treatability testing will be conducted to determine the quantities and types of admixtures which best satisfy the treatment criteria for this site.

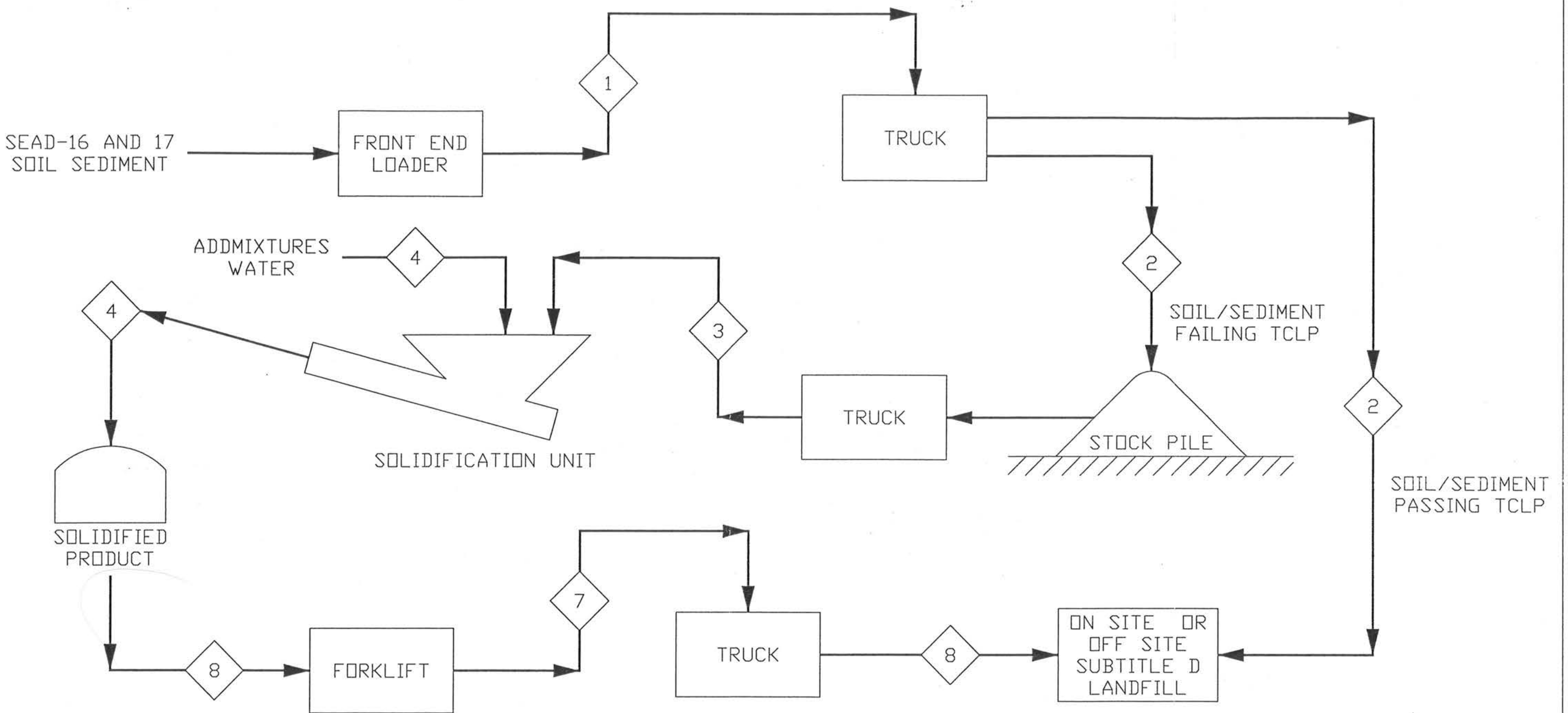
Solidification/stabilization can be conducted either in-situ or in a batch mode. For in-situ solidification/stabilization, the mixtures are injected into the soil and then mixed. Farm equipment such as tillers can be used in this process. In batch operations, the material is removed from the ground with standard earthmoving equipment and mixed in units such as standard cement trucks. The solidified material is then replaced in the ground. Batch processes require more area than in situ processes because space is necessary to store the untreated soil when it is removed from the ground. For on-site treatment at SEAD-16 and 17, a batch operation will be used. The contaminated soil is shallow, and is easily removed. In addition, there is plenty of space available to set up a stockpile area and cement plant. The treated soil could be placed directly into trucks for removal to the off-site landfill.

The final step in this remedial action is disposal of all the soils and sediments including the treated material. The treated soils and remaining excavated soils and sediments will not be considered a characteristic RCRA hazardous waste. It will be a solid waste, and therefore disposal will be subject to RCRA Subtitle D and New York State solid waste regulations. In New York, all sanitary landfills are authorized to accept industrial wastes, and therefore would be able to accept the stabilized soil. These landfills cannot accept hazardous waste, and require extensive testing to assure that the waste is no a hazardous waste. The actual testing requirements vary from landfill to landfill, and the exact requirements for this remedial action will be specified once a landfill is selected.

Two landfills, which may be used for this remedial action, have been identified. The first is EQ located in Michigan. This facility has the capacity and capability to treat and dispose hazardous material. The second is the Seneca Meadows landfill located in Waterloo, New York, approximately 10 to 15 miles from the site. This facility however, cannot treat the soil and can only be used if the soil is treated on-site.

5.4.1.2 Process Flow and Site Layout

Figure 5-1 is a process flow diagram for Alternative 4 (and 5). The process flow for this alternative consists of three steps. First, the soil is excavated and TCLP tested as described above. Soils exceeding the TCLP criteria are placed in trucks and hauled to the TSDF. If on-site treatment is used, soils are brought to an on-site pug mill where it is stockpiled prior to stabilization. If the material is sent off-site for treatment, the soil will be treated and then disposed of in an appropriate landfill. If treatment will



TYPICAL FLOW RATES								
MATERIAL	STEAM NO.							
	1	2	3	4	5	6	7	8
SOIL/SEDIMENT (CY/HR)	50	50	40	50				
SOLIDIFIED PRODUCT (CY/HR)						60	60	60
ADMIXTURES/WATER (CY/HR)					20			

R:\SENECA\16-17RIF\FIG5-1.DWG (CLD)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
SEAD 16-17

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 729895-01002

FIGURE 5-1
ALTERNATIVE 4 AND 5
GENERALIZED PROCESS FLOW SCHEMATIC

SCALE N/A | DATE NOVEMBER 1997 | REV A

take place on-site, the soil will be placed in the pug mill and mixed with water and the various admixtures. The soil likely will be placed in the pug mill using a conveyor belt with a scale system in order to record the weight of the soil to be treated. Another option is a front end loader, with the volume of the treated soil recorded. the admixtures may be added in several ways, depending on the final technology selected. Dry admixtures will either be stockpiled and added via a conveyor or a front end loader, or added with a hopper system. If water is necessary to the process, either a temporary tank will be used, or depending on the location, a hook up to the Depot water supply may be possible.

The treated soil is then discharged either directly to the trucks for transport to the landfill, or to a treated soil stockpile for testing. In general, a volume increase of 50% is expected for the solidified soil. The treated soil will be analyzed by the TCLP at the rate required by the landfill accepting the waste. For the Seneca Meadows Landfill, the rate required is one TCLP analysis per 1,500 tons of treated soil.
In the final step, all the soils are transported to the off-site solid waste landfill.

This alternative does not require much area, only sufficient area for the pug mill and two small stockpile areas if treatment is conducted on site. Once the system is operational, there will only need to be room in each stockpile for 1,000 to 2,000 tons. The pug mill and stockpile area will be located adjacent to Unnamed Road between SEAD-16 and 17, as shown on **Figure 5-2**. This will provide for easy access for the excavation equipment to bring the untreated soil to the pug mill, and for the trucks which will haul the treated material to the landfill.

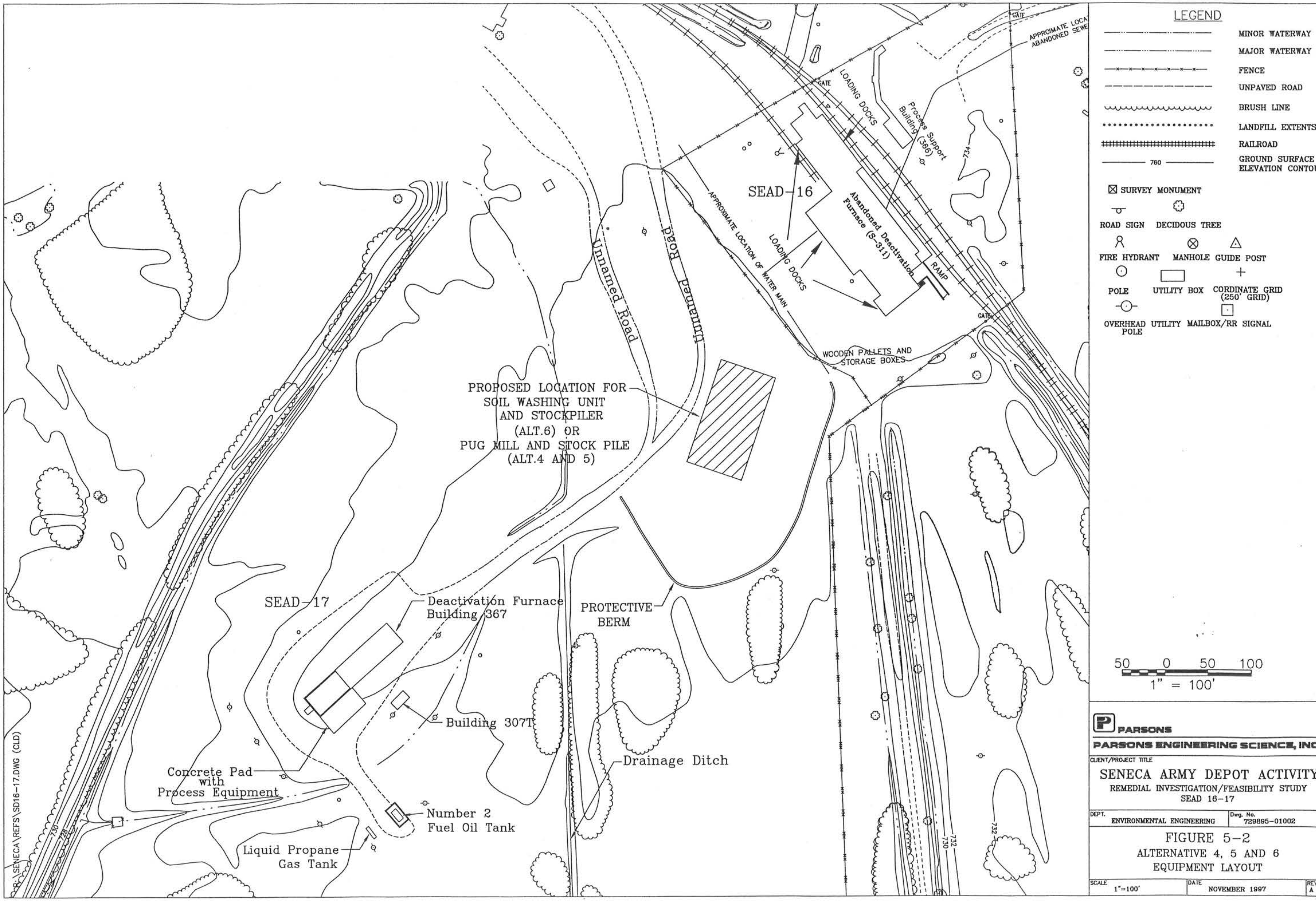
If treatment is conducted off-site, each truck will be loaded directly from the excavations. A small staging area and equipment decontamination area will be set up as necessary.

5.4.2 Protection of Human Health and the Environment

An evaluation of the protectiveness of human health and the environment includes the assessment of short- and long-term effectiveness as well as permanence. The following discussion will show how this alternative meets these criteria.

5.4.2.1 Short-term Protectiveness

This alternative will be evaluated with respect to the effect on human health and the environment during the implementation of the remedial action. Four items are included in an assessment of the short-term protectiveness of Alternative 4. The first issue is protection of the community during the remedial action. If no treatment will be accomplished on site, there will be transport of hazardous material. Care will be taken to assure that the trucks are not overloaded. The soils will be covered with a tarp during


LEGEND
MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760
GROUND SURFACE ELEVATION CONTOUR
SURVEY MONUMENT
ROAD SIGN
DECIDOUS TREE
FIRE HYDRANT
MANHOLE
GUIDE POST
POLE
UTILITY BOX
CORDINATE GRID (250' GRID)
OVERHEAD UTILITY POLE
MAILBOX/RR SIGNAL
SEAD-16
SEAD-17
LOADING DOCKS
Process Support Building (366)
Abandoned Deactivation Furnace (S-311)
RAMP
GATE
APPROXIMATE LOCATION OF WATER MAIN
WOODEN PALLETS AND STORAGE BOXES
Unnamed Road
Unnamed Road
PROPOSED LOCATION FOR SOIL WASHING UNIT AND STOCKPILER (ALT.6) OR PUG MILL AND STOCK PILE (ALT.4 AND 5)
PROTECTIVE BERM
Deactivation Furnace Building 367
Building 307T
Concrete Pad with Process Equipment
Number 2 Fuel Oil Tank
Liquid Propane Gas Tank
Drainage Ditch
734
732
730
728
R:\SENECA\REFS\SD16-17.DWG (CLD)
50 0 50 100
1" = 100'
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
SEAD 16-17
DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 729895-01002
FIGURE 5-2
ALTERNATIVE 4, 5 AND 6
EQUIPMENT LAYOUT
SCALE 1"=100'
DATE NOVEMBER 1997
REV A

transport to ensure that no dust is released from the trucks. If all treatment will be accomplished on site, this alternative is very protective of the community. There will be transport of no hazardous materials. All waste which is sent to the off-site landfill will no longer be considered hazardous waste.

There is also a minor threat from dust released during the excavation. The site is located far from the SEDA boundary, so the likelihood of any hazardous dust migrating off-site is negligible. As discussed in Section 5 of the RI report, fugitive dust migration is not a major migration pathway. Fugitive dust is further minimized by the makeup of the soil to be excavated, which are primarily shale fill, a material which has a fairly large particle size, and is less subject to dust formation.

The short-term protectiveness to site workers must also be considered. The major routes of exposure during treatment are direct contact with the contaminated soil and inhalation of vapors or particulates. Protection from exposure can be minimized through site access controls and the use of proper protective equipment for site workers, such as dust masks and Tyvek protective clothing. Air monitoring may be used to determine if there is a significant threat from the inhalation of vapors or particulate. Dust generation at the excavation can be minimized by using water or other dust control chemicals. During on-site treatment, dust generation can be minimized at the pug mill by containing all admixtures which tend to from dust (ie., cement and lime), and by containing the mixing process. The solidification/ stabilization process is very similar to normal cement construction procedures, and is therefore fairly straightforward. It should also be noted that all the site workers will be required to meet all the OSHA training and medical monitoring requirements prior to working on site.

Another part of the short-term protectiveness criterion is assessing the environmental impacts during the remedial action. For Alternative 4, there will be little or no environmental impacts. This alternative calls for construction type activities in an active portion of the Depot. These activities will not be substantially different from what is currently occurring. In addition, since the hazardous material is primarily in the soil, there is little or no risk of a spill or release during the remedial action.

The last item to be considered is the time until treatment is accomplished. Alternative 4 should be completed in a brief period of time. If treatment is conducted on site, the initial treatability testing and vendor selection should take two to three months. Once the treatability testing is completed and a vendor is selected, the mobilization time should be less than one month, since no specialized equipment is required. All of the equipment used is standard construction equipment. Little permitting will be required, and operations should begin quickly. The remedial action would take one to two months, depending primarily on the time needed for the solidified soil to cure. Once the solidification was finished, and the treated soil landfilled off-site, the remedial action would be complete.

If treatment is conducted at an off site TSDF, this alternative will take one to two months to complete, depending on the weather, because it would be a "dig and haul" operation. There is little mobilization, since only a loader, and maybe a scraper are necessary to accomplish the excavation. It would only take one to two days to set up a staging area and construct an equipment decontamination pad. Once the soil is removed, the remedial action would be complete.

5.4.2.2 Long-term Effectiveness and Permanence

The assessment of the long-term effectiveness of can be divided into two major categories, an assessment of the magnitude of the residual risk, and an evaluation of the adequacy and reliability of the controls used for the waste residuals and untreated soil.

The magnitude of the residual risk is easy to quantify. The removal plan for the soils will be designed such that the remaining soils demonstrate a concentration of lead below 500 mg/kg and sediments demonstrate lead concentrations below 31 mg/kg. There will be no treatment residuals left at the site, so the treatment residuals will not be included in the risk evaluation. All of the excavated soils will be hauled off-site, treated, and disposed of in an off-site Subtitle D landfill.

The controls to be used for long-term management are also easy to assess. No residuals will remain on site. The long-term management will be left to the landfill selected for receiving the treated and remaining excavated soils. It will be important to select a well run landfill in order to assure that the landfill will be managed and closed in accordance with State and Federal requirements. The treated material is not a RCRA hazardous waste, so there should be little risk associated with offsite disposal. The landfills considered for this remedial action do not accept hazardous wastes.

As described above, there will be no long-term maintenance required at the site. Any exposed areas will be regraded to minimize erosion potential. Any areas in which soil was removed below grade will be backfilled with clean soil. A cover of native vegetation will be established as an additional erosion control measure, but once the cover is established, maintenance activities will no longer be required.

The permanence of the alternative must also be assessed. Once the treated and remaining excavated soils are removed from the site, the remedial action would be considered permanent. There will no longer be soil on the site that poses an unacceptable threat to human health. There is some question about the permanence of the solidification/stabilization treatment technology. In general, the solidified soil, as with all concrete, is subject to weathering from freeze-thaw and wet-dry cycles. If the material is safely placed in a secure landfill, the material will be protected from weathering, and there would be no degradation of the concrete, which indicates that the treatment will be permanent.

Permanence is further enhanced by the use of stabilizing agents, such as lime. The lime reacts with the heavy metals to form insoluble carbonates and hydroxides. These products are far less soluble than the free metals, and are very resistant to weathering.

5.4.2.3 Conclusion

Alternative 4 would protect human health and the environment. This alternative protects against ingestion of and direct contact with surface soils having concentrations of lead above 500 mg/kg and sediment with lead concentrations above 31 mg/kg.

The results of the baseline risk assessment show that conditions at SEAD-16 require a remedial action (see **Section 2.0**). Removal of Case 2 and Case 4 soils at SEAD-16 will reduce risk from soils to acceptable levels. At SEAD-17, though the risk assessment shows that conditions at the site do not require remedial action, removal of Case 1 and Case 3 soils will reduce the HI and carcinogenic risk to lower levels. Therefore, this alternative meets the RAOs by reducing risk, thus protecting human health.

This alternative also meets the NYSDEC sediment criteria established for lead in site sediments not to exceed 31 mg/kg. The sediments with concentrations of lead above the sediment criteria will be removed, which will meet the RAO for sediment and prevent contamination downgradient in Kendaia Creek.

5.4.3 Reduction in Toxicity, Mobility, and Volume

Overall, Alternative 4 would be effective in reducing the toxicity and mobility of the hazardous constituents present in the soil at the site. Assessing the volume reduction is somewhat more difficult. The treated soil will have a larger volume than the untreated soil, but the treated soil will no longer be a hazardous waste. In general, a volume increase of 50% for the treated soil can be expected. Furthermore, excavation of the remaining soils and sediments would increase the volume by approximately 20% from a total of 2,180 cy to 2,586 cy for both sites.

The decrease in toxicity and mobility can be assessed on both a small scale and site-wide basis. On the small scale, both the toxicity and mobility of the hazardous constituents in the soil are assessed with the TCLP test. The larger the leaching fraction, the greater the mobility and the greater the toxicity. Since the primary treatment criteria for solidification/stabilization is that the waste no longer be TC hazardous, the treated waste will exhibit lower toxicity and mobility than the untreated waste. The mass of the potentially hazardous constituents in the soil will remain unchanged.

In addition, by treating the soil which contains the highest concentrations of hazardous constituents, the overall site risk (toxicity) will be reduced to acceptable levels. By solidifying the soil, and then transferring all the soils and sediments to a landfill, the mobility of the hazardous constituents will be effectively reduced. A properly managed Subtitle D landfill does not allow for uncontrolled releases from the landfill. The treated soil will be the only treatment residual.

5.4.4 Implementability

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

5.4.4.1 Technical Feasibility

The overall technical feasibility of Alternative 4 is very good. Solidification/stabilization is a technology which has been frequently used to treat similar soils, and it is not anticipated that problems will be encountered during construction, as long as the proper treatability work has been completed to establish the optimal admixture ratios. Since the materials and equipment used are all standard construction equipment, the process can be operated in almost all weather conditions. If treatment is conducted off site, the TSD facilities in the region have accepted similar wastes for a number of years. These facilities are fully capable of treating and disposing of the site soils.

The excavation process is also well defined. The areas demonstrating elevated concentrations of heavy metals have been delineated, and it will be straightforward to develop an excavation plan that assures all areas with high concentrations are removed. It is possible that some minor weather delays may be encountered, but most of the soil to be removed is located above grade, and should not be adversely affected by wet conditions.

Another aspect of technical feasibility is the ease with which additional work may be conducted. At this time, it is anticipated that this remedial action will preclude the necessity of any additional remedial efforts for soil at SEAD-16 and 17. However, if additional work is required in the future, this remedial action will not interfere in any way. Once the remedial action is complete, the sites will be revegetated, and will essentially remain as they are now with the possible exception of the abandoned buildings at SEAD-16, which are discussed separately in this report.

Several monitoring requirements govern the solidification/stabilization process. The additives must be properly metered into the soil to assure proper treatment. The soil which has been treated must be tested to ensure that the contaminants have been stabilized. Air monitoring will likely be necessary to determine if movement of the soil is releasing constituents to the air.

5.4.4.2 Administrative Feasibility

The administrative feasibility of this alternative is also very good. Since there will only be a temporary treatment facility on site if treatment is conducted on-site, no hazardous waste permitting will be required. Construction permits necessary for the activities are readily attainable. In addition, there will be no transport of hazardous waste, greatly simplifying the manifest requirements. Since the wastes will be sent to a permitted disposal facility, no disposal permits will be necessary.

If treatment is conducted off site, the TSDFs which may be used for offsite treatment, are fully permitted. There will be some transport of hazardous waste, and proper manifests will be required. All of the contractors used for excavation and hauling will be experienced in preparing manifests.

Coordination with the various regulatory agencies is also important. As described above, the Army has coordinated the entire remedial program with both EPA and NYSDEC, and will consider input from both these agencies in the final remedy selection. It is anticipated that any issues arising with the regulatory agencies will be addressed prior to remedy selection.

5.4.4.3 Availability of Services and Materials

This technology relies primarily on standard equipment, which is readily available in the Romulus area, since the equipment consists primarily of farm and construction equipment. The excavation would be accomplished with backhoes and scrapers, and the material would be transported in standard size dumptrucks. For on-site treatment, the stabilization unit would consist of a temporary pug mill.

Startup time to implement solidification/stabilization is one to two months, depending on the level of effort necessary for treatability testing. Bench-scale tests will likely be necessary to determine the proper additives and ratios of additives to contaminated soil. These must be brought to the site along with the earth moving and mixing equipment. Total treatment time for sites such as SEAD-16 and 17 is approximately two to four months, including the treatability studies.

The availability of permitted hazardous waste TSD facilities which could accept the soils from this site should be considered. One facility, EQ located in Michigan, has sufficient capacity to accept the soils from this site for both treatment and disposal.

The last issue to consider is if the soils are treated on-site, the availability of Subtitle D landfills to accept the excavated and solidified soils. The Seneca Meadows landfill indicate that they had sufficient capacity to accept the waste, and would be willing to accept the waste if the proper analytical results were provided.

5.4.5 Cost

5.4.5.1 Capital Costs

The total capital cost for this alternative is estimated to be $410,600 if treatment is conducted off site and $612,900 if treatment is conducted on-site. There is some uncertainty associated with there estimates. The cost backup for this alternative is presented in Appendix D, which includes the general assumed scope and all assumptions made.

5.4.5.2 O & M Costs

O & M costs associated with Alternative 4 include costs for quarterly groundwater sampling. The annual O & M cost is estimated to be $41,688. Once the remedial action is completed, there will be no residuals remaining at either site that require management. Initially, there will be some minor costs associated with the establishment of the vegetative cover, but the cost estimate for these items have been included in the capital costs.

5.4.5.3 Present Worth Costs

The present worth costs for Alternative 4 are estimated to be $773,110 for on-site stabilization and $570,784 for offsite stabilization.

5.5 ANALYSIS OF ALTERNATIVE 5: EXCAVATION, SOLIDIFICATION/ STABILIZATION OF SOILS FAILING TCLP CRITERIA, AND ON-SITE LANDFILLING

5.5.1 Definition of Alternative 5

5.5.1.1 Description

This alternative includes excavation and removal of Case 1 through Case 4 soils, and materials ate SEAD-16 and Case 1 through Case 3 soils at SEAD-17 (see **Tables 2-1 and 2-2**), treatment of soils with TCLP exceedences, and disposal of both the treated and untreated soils in an on-site solid waste (Subtitle D) landfill. For this alternative, soils with concentrations of lead exceeding the TCLP limit will be treated by a solidification/stabilization process prior to disposal. TCLP testing and treatment will be conducted on-site. Each of the processes involved with this alternative will be described briefly in this section. A detailed analysis of how this option meets the selection criteria and a budgetary cost estimate are also provided below.

The first step in this option is excavation. An excavation plan will be developed using previous RI data to delineate the extent of removal. In general, the materials to be excavated are soils and sediments as described in **Section 2.0** and presented in **Table 2-1 and Table 2-2**. The soil and material volumes to be excavated are the same as described in **Section 5.4.1.1** for Alternative 4. The excavation will be accomplished with standard construction equipment, such as a front end loader or bulldozer.

The combined total volume of material be excavated at SEAD-16 and 17 is 2,700 CY. The locations of the areas to be excavated are shown on **Figures 2-1** and **2-2**. The excavated soil will be brought to the pug mill where it will be stockpiled prior to stabilization. The solidification/stabilization process is described in detail in the description of Alternative 4, **Section 5.4.1.1**.

After the excavation, the sites will be regraded with a bulldozer in a manner which approximates the original grade. If necessary, clean fill will be brought in to make up for the soils excavated. The topsoil cover will be vegetated with indigenous grasses as an erosion control measure.

After the solidification/stabilization process, the final step in the remedial action is disposal of the remaining soils and sediments. This remaining material will not be considered a characteristic RCRA hazardous waste after solidification/stabilization. It will be a solid waste subject to RCRA Subtitle D and New York State solid waste regulations. There are no landfills on SEDA property which meet the current New York State Subtitle D requirements. Therefore, a landfill meeting these requirements will need to be constructed for this remedial action.

The requirements for the construction of a Subtitle D landfill are summarized below. The following discussion will focus on several of the key design issues which are useful in evaluating the feasibility of this alternative, and which are necessary in developing a budgetary cost estimate.

The NYSDEC requirements for Subtitle D landfills are described in 6 NYCRR Part 360. These landfills are required to be constructed such that the bottom of the lowest liner is a minimum of five feet above the seasonal high water table and 10 feet above bedrock. Since the seasonal high water table at the SEAD-16 and 17 is only three to four feet below the ground surface, it would be necessary to build the landfill completely above grade, if the landfill is located close to the sites. Approximately two feet of fill would be required below the base of the landfill.

In general NYSDEC requires a double composite liner system with a leak detection layer in between the two liners. As defined in 6 NYCRR 360-2.13, a composite liner consists of "two components, an upper geomembrane liner placed directly above a low permeability soil layer." The soil component of the upper liner must have a minimum compacted thickness of 18 inches. The soil component of the lower liner must have a minimum compacted thickness of 24 inches, and a maximum permeability of 1×10^{-7} centimeters per second (cm/s). There are also a number of compaction, construction, and slope requirements.

In 6 NYCRR 360-2.14, there are separate provisions for industrial landfills. In particular, this section specifies that the above requirements may be modified on a case by case basis. Specifically, the requirements for a double composite liner may be waived. One example given is the case of an ash monofill, in which only a single composite liner is required. A landfill constructed with solidified waste from SEAD-16 and 17 would be similar to an ash monofill, therefore it is likely that the double liner requirement could be waived for this remedial action. As stated in 6 NYCRR 360-2.14, this alternative liner system must demonstrate its ability to adequately present a negative impact on groundwater quality and must address all the factors specified in Section 360-214(a)(1). The following discussion and cost estimate assumes that only a single composite liner will be required at the site. A full discussion of the cost impacts of the different liner requirements is provided below.

Typically, the next layer up from the liner system is the leachate collection system. The leachate collection system generally consists of one foot of high permeability soil, such as sand, with a network of pipes. The sand and pipe system may be replaced with a geosynthetic drainage layer, providing that the geosynthetic layer has a hydraulic transmissivity equivalent to one foot of sand. The leachate collection system is sloped such that any accumulated liquid collects in a sump from which it can be pumped out. Once the landfill is full and properly closed, there should be no leachate generation. At SEAD-16 and 17, depending on the final location of the landfill, a geosynthetic layer would likely be used in order to minimize the height of the above grade landfill.

After the leachate collection system, clean fill is placed in order to protect the leachate collection system. The waste is then placed on top of the protective soil. Once the filling is complete the landfill is ready for closure. The final cover consists of a low permeability soil layer overlain by a protective soil layer. Typical thicknesses for these layers are 18 and 24 inches. The cover is sloped to allow for drainage. It is also necessary to establish vegetation on the cover to minimize erosion. The final configuration will be determined during the remedial design stage is this alternative is chosen.

There are additional requirements for gas venting systems and groundwater monitoring. Gas venting systems may not be required for SEAD-16 and 17 soils since there are no putrescible wastes, which would generate gas. If gas venting systems are required, they are expected to be simple. Groundwater monitoring is accomplished by placing a number of wells around the landfill into the uppermost water bearing zone. There are wells already installed at both sites as part of the RI, so it should be necessary to install only a few wells.

The regulations require that post-closure care and monitoring be conducted for a minimum of thirty years. In general, the maintenance required is for erosion control, pest control, and maintenance of the vegetative cover. The wells must also be sampled on a regular basis. Any releases from the landfill must be addressed accordingly.

5.5.1.2 Process Flow

The process flow for this alternative consists of three steps, excavation, stabilization, and on-site landfilling. **Figure 5-1** is a process flow diagram for the solidification/stabilization process for this alternative (and for Alternative 4). The process is fairly simple. The soil to be treated is excavated, and brought to the pug mill where it is stockpiled prior to stabilization. Soils which have been previously determined to bypass the treatment step one excavated separately. The soil to be treated is then placed in the pug mill and mixed with water and the various admixtures. The soil likely will be placed in the pug mill using a conveyor belt with a scale system in order to record the weight of the soil to be treated. Another option is a front end loader, with the volume of the treated soil recorded. The admixtures may be added in several ways, depending on the final technology selected. Dry admixtures will either be stockpiled and added via a conveyor or a front end loader, or added with a hopper system. If water is necessary to the process, either a temporary tank will be used, or depending on the location, a hook up to the Depot water supply may be possible.

The treated soil is discharged either directly to the trucks for transport to the landfill, or to a treated soil stockpile for testing. In general, a volume increase of 50% is expected for the solidified soil. The treated soil will be analyzed by the TCLP at the rate required by NYSDEC. For existing offsite Subtitle landfills, the rate required is one TCLP analysis per 150 tons of treated soil.

In the final step, the treated soils and excavated soils that did not require treatment are placed in an on-site landfill.

5.5.1.3 Site Layout

This alternative requires approximately 6 acres for the on-site landfill in addition to sufficient area for the pug mill and two small stockpile areas. Once the system is operational, there will only need to be room in each stockpile for 1,000 to 2,000 tons. The pug mill and stockpile area will be located near the sites as shown on **Figure 5-2**. This will provide for easy access for the excavation equipment to bring the untreated soil to the pug mill, and for the trucks that will haul the treated material to the landfill.

This alternative requires approximately 1 acre of land at each site, or a combined total of approximately 2 acres if soils from both sites are combined into one landfill. A landfill can be constructed for both sites at a location convenient to the pug mill and the sites. The exact location will be determined during pre-design activities. However, the landfill (or landfills) must be located so that the base is at least 5 feet above the seasonal high water table and 10 feet above bedrock.

5.5.2 <u>Protection of Human Health and the Environment</u>

An evaluation of the protectiveness of human health and the environment includes the assessment of the short- and long-term effectiveness as well as permanence. The following discussion will show how this alternative meets these criteria.

5.5.2.1 Short-term Protectiveness

Several items are included in an assessment of the short-term protectiveness of Alternative 5. The first issue is protection of the community during the remedial action. This alternative is protective of the community. All treatment and disposal will be accomplished on site, so that there will be no transport of hazardous materials. There is also little threat from dust released during the excavation. The site is located far from the SEDA boundary, so the likelihood of any hazardous dust migrating offsite is negligible. As discussed in Sections 6 and 7 of the RI report, fugitive dust migration is not a major migration pathway.

The short-term protectiveness to site workers must also be considered. The major routes of exposure during treatment are direct contact with the contaminated soil and inhalation of vapors or particulates. Protection from exposure can be minimized through site access controls and the use of proper protective equipment for site workers, such as dust masks and Tyvek protective clothing. Air monitoring may be used to determine if there is a significant threat from the inhalation of vapors or particulate. Dust generation at the excavation can be minimized by using water or other dust control chemicals. Dust generation can be minimized at the pug mill by containing all admixtures which tend to from dust (i.e., cement and lime), and by containing the mixing process. The solidification/stabilization process is very similar to normal cement construction procedures, and is therefore fairly straightforward. It should also be noted that all the site workers will be required to meet all the OSHA training and medical monitoring requirements prior to working on site.

Another part of the short-term protectiveness criterion is assessing the environmental impacts during the remedial action. For Alternative 5, there will be little or no environmental impacts. This alternative calls for construction type activities in an active portion of the Depot. These activities will not be substantially different from what is currently occurring. In addition, since the hazardous material is primarily in the soil, there is little or no risk of a spill or release during the remedial action.

The last item to be considered is the time until treatment is accomplished. Initially, there will be a substantial period of time required to obtain the necessary permits and approvals for construction of the landfill. The actual remedial action (excavation and stabilization) should be completed in a brief period of time. The initial treatability testing and vendor selection should take two to three months. Once the treatability testing is completed and a vendor is selected, the mobilization time should be less than one month, since no specialized equipment is required. All of the equipment used is standard construction equipment. Little permitting will be required, and operations should begin quickly. The remedial action would take one to three months, depending primarily on the time needed for the solidified soil to cure.

There will also be time required to properly close the landfill, probably two to three months. By this time, the waste will have been treated and will no longer be hazardous, so the threats to human health and the environment will be negligible.

5.5.2.2 Long-term Protectiveness

The assessment of the long-term protectiveness of Alternative 5 can be divided into two major categories, an assessment of the magnitude of the residual risk, and an evaluation of the adequacy and reliability of the controls used for the waste residuals and untreated soil.

The magnitude of the residual risk is easy to quantify. The removal plan for the soils/sediments will be designed such that the remaining soils demonstrate a lead concentration less than 500 mg/kg and sediments demonstrated a lead concentration of less than 31 mg/kg. There will be no treatment residuals left at the site, so the treatment residuals will not be included in the risk evaluation.

The controls to be used for long-term management are more involved. The material disposed in the landfill will not be hazardous, and there will be no long term threat to human health and the environment. However, there will be a landfill on site which will require maintenance.

The permanence of the alternative must also be assessed. Once the soil is encased in the Subtitle D landfill, the remedial action would be considered permanent. There will no longer be soil on the site that poses an unacceptable threat to human health and the environment.

There is some question about the permanence of the solidification/stabilization treatment technology. In general, the solidified soil, as with all concrete, is subject to weathering from freeze-thaw and wet-dry cycles. If the material is safely placed in a secure landfill, the material will be protected from weathering, and there would be no degradation of the concrete, which indicates that the treatment will be permanent.

Permanence is further enhanced by the use of stabilizing agents, such as lime. The lime reacts with the heavy metals to form insoluble carbonates and hydroxides. These products are far less soluble than the free metals, and are very resistant to weathering.

5.5.2.3 <u>Conclusion</u>

Alternative 5 would protect human health and the environment. This alternative protects against ingestion of and direct contact with surface soils having concentrations of lead above 500 mg/kg and prevents potential leaching of lead into the groundwater by removing subsurface soils with concentrations of lead above 500 mg/kg and sediments with lead concentrations above 31 mg/kg.

The results of the baseline risk assessment show that conditions at SEAD-16 require a remedial action (see **Section 2.0**). Removal of Case 2 and Case 4 soils at SEAD-16 will reduce risk from soils to acceptable levels. Removal of Case 1 material from the buildings at SEAD-16 must also be conducted. At SEAD-17, though the risk assessment shows that conditions at the site do not require remedial action, removal of Case 1 and Case 3 soils will reduce the HI and carcinogenic risk to lower levels. Therefore, this alternative meets the RAOs by reducing risk.

This alternative also meets the NYSDEC sediment criteria established for lead in site sediments not to exceed 31 mg/kg. The sediments with concentrations of lead above the sediment criteria will be removed, which will meet the RAO for sediment and prevent contamination downgradient in Kendaia Creek.

5.5.3 Reduction of Toxicity, Mobility, and Volume

Overall, Alternative 5 would be effective in reducing the toxicity and mobility of the hazardous constituents present in the soil at the site. The treated soil will have a larger volume but will no longer be considered a hazardous waste or capable of leaching metals. In general, a volume increase of 50% for the treated soil can be expected. In addition, excavation of the remaining soils would increase the volume by approximately 20%.

The decrease in toxicity and mobility can be assessed on both a small scale and site-wide basis. On the small scale, both the toxicity and mobility of the hazardous constituents in the soil are assessed with the TCLP test. The larger the leaching fraction, the greater the mobility and the greater the toxicity. Since the primary treatment criteria for solidification/stabilization is that the waste no longer be TC hazardous, the treated waste will exhibit lower toxicity and mobility than the untreated waste. The mass of the potentially hazardous constituents in the soil will remain unchanged.

There are also major decreases on a site-wide basis. By treating the soil at the site which contains the highest concentrations of hazardous constituents, the overall site risk (toxicity) will be reduced. By transferring the treated soil and remaining excavated soils and sediments to a properly constructed Subtitle D landfill, the mobility of the hazardous constituents will be effectively reduced.

5.5.4 Implementability

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

5.5.4.1 Technical Feasibility

The overall technical feasibility of Alternative 5 is good, but the issues involved with the construction of an onsite landfill are somewhat complicated, as described below. Solidification/stabilization is a technology which has been frequently used to treat similar soils, and it is not anticipated that problems will be encountered during construction, as long as the proper treatability work has been completed to establish the optimal admixture ratios. Since the materials and equipment used are all standard construction equipment, the process can be operated in almost all weather conditions.

The excavation process is also well defined. The areas demonstrating elevated concentrations of heavy metals have been delineated, and it will be straightforward to develop an excavation plan that assures all of the hot spots are removed. It is possible that some minor weather delays may be encountered, but most of the soil to be removed is located above grade, and should not be adversely affected by wet conditions.

There are a number of technical issues which must be addressed in order to properly construct an onsite landfill. Landfill construction is a common practice, and the issues are not especially complicated, but the overall technical complexity of Alternative 5 is much greater than Alternative 4.

The first issue is landfill siting. In order to meet the NYSDEC requirement that the landfill be at least five feet above the seasonal high water table, the landfill will need to be located on high ground, and most likely, on several feet of clean fill. The landfill will have to be designed to allow access during construction and filling. Also, since the landfill will be completely above grade, more stringent erosion control measures will be required. The weather is an important factor. Heavy rains or other adverse weather conditions could severely impact the construction schedule.

Another aspect of technical feasibility is the ease with which additional work may be conducted. At this time, it is anticipated that this remedial action will preclude the necessity of any additional remedial efforts at SEAD-16 and 17. However, if additional work is required in the future, this remedial action will not interfere in any way.

Several monitoring requirements govern the solidification/stabilization process. The monitoring requirements of the solidification/stabilization process are essentially the same as for Alternative 4. The additives must be properly metered into the soil to assure proper treatment. The soil which has been treated must be tested to ensure that the contaminants have been stabilized. Air monitoring will likely be necessary to determine if movement of the soil is releasing contaminants to the air.

There are a number of monitoring requirements for the landfill. The landfill construction requires continual supervision and testing, since there are a number of requirements for each layer. A Construction Quality Assurance (CQA) plan will be developed which describes the specific requirements for the landfill. Some of the major items to be addressed are described below.

The initial fill layer must be compacted to ensure that it will have sufficient structural strength to support the landfill. Next, the low permeability soil layer is installed in lifts, with each lift monitored for compaction and permeability. The geomembrane must be tested for holes and permeability, and the installed seams must be carefully inspected. Next, the geosynthetic drainage layer is installed, and finally the protective soil layer. There are similar monitoring requirements for the cap installation. Each layer must be carefully surveyed to ensure that the proper slopes are obtained. Problems at any point in the process may necessitate removal and reinstallation of a given layer.

5.5.4.2 Administrative Feasibility

The administrative feasibility of this alternative is described in the New York code of regulations. The unit to be constructed is a Subtitle D landfill, and a NYSDEC permit would be required. The permit application requirements, described in 6 NYCRR Part 360 are broad, and include issues such as siting, design, closure, post closure, and monitoring. It would be necessary to obtain NYSDEC concurrence on the acceptability of a single composite liner system. Obtaining the necessary permit and concurrence could take six months to a year, or more, and would require a great deal of engineering and money.

The administrative feasibility of the solidification unit would be good, as with Alternative 4. Since there will only be a temporary treatment facility on site, no hazardous waste permitting will be required. Construction permits necessary for the activities are readily attainable. In addition, there will be no transport of waste offsite.

Coordination with the various regulatory agencies is also important. As described above, the Army has coordinated the entire remedial program with both EPA and NYSDEC, and will consider input from both these agencies in the final remedy selection. It is anticipated that any issues arising with the regulatory agencies will be addressed prior to remedy selection.

5.5.4.3 Availability of Services and Materials

This technologies used for this alternative rely primarily on standard equipment, which is readily available in the Romulus area. The excavation would be accomplished with backhoes and scrapers, and the material would be transported in standard size dumptrucks. The stabilization unit would consist of a temporary pug mill, or if the volume is fairly small, the stabilization could be conducted in a cement truck.

Startup time to implement solidification/stabilization is one to two months, depending on the level of effort necessary for treatability testing. Bench-scale tests will likely be necessary to determine the proper additives and ratios of additives to contaminated soil. These must be brought to the site along with the earth moving and mixing equipment. Total treatment time for sites such as SEAD-16 and 17 is approximately 2 to 4 months, including the treatability studies.

Obtaining the construction materials for the landfill would require a clay source to be identified, tested for quality and quantity and brought to the site. It is anticipated that a local source would be available, since the base soils in the Finger Lakes region are clays. Clean fill could be obtained on the Depot. The geomembrane and geosynthetic drainage layer are available from a number of vendors.

5.5.5 Cost

5.5.5.1 Capital Costs

There are two separate capital costs to consider, the cost of the soil treatment, and the cost of the landfill construction. The costs for solidification/stabilization vary depending on quantities and types of additives and the field mixing techniques used. Design treatability study costs are $86,118 total treatment costs, including site preparation and excavation are approximately $100 per ton. Additional items, including engineering, oversight, and site restoration would bring the total cost for remediation of 2,180 cubic yards to $802,523. Again, there is some uncertainty in this cost. A breakdown of the costs for this alternative and all assumptions used are presented in Appendix C.

5.5.5.2 O & M Costs

There are a number of O & M costs associated with the onsite landfill. The first of these is quarterly groundwater monitoring, which will depend on the number of parameters and wells required by NYSDEC. There are also general maintenance costs for the vegetative cover, erosion control, equipment upkeep, and annual sediment sampling in Kendaia Creek. The total O & M costs are estimated to be $81,688 per year (Appendix C).

5.5.5.3 Present Worth Costs

The present worth costs for Alternative 5 are estimated to be $1.1 million.

5.6 ANALYSIS OF ALTERNATIVE 6: EXCAVATION, SOIL WASHING, BACKFILLING COARSE FRACTION, OFFSITE LANDFILL FINE FRACTION

5.6.1 Definition of Alternative 6

5.6.1.1 Description

This alternative includes excavation of soils and sediments and materials in the abandoned building at SEAD-16, soil washing, offsite landfilling of the fine fraction, and backfilling of the coarse fraction. Each of these processes will be described briefly in this section. A detailed analysis of how this option meets the selection criteria, and a budgetary cost estimate are provided below.

The first step in this alternative, as with the other alternatives, is excavation. The volumes to be excavated are the same as for the other options, a combined total for both sites of 2,180 CY. The soil and sediment volumes include surface and subsurface soils with lead concentrations that exceed 500 mg/kg, and sediments that exceed the NYSDEC sediment criteria for lead of 31 mg/kg. Locations are shown on **Figures 2-1 and 2-2**.

The next step is the soil washing process. The primary purpose of soil washing is to separate soil into component parts, and in the process, do some scrubbing and washing of the components. Soil washing experiments have shown that a significant portion of the hazardous constituents present in the soil are concentrated generally in the fine fraction and that the coarse fraction can be cleaned by physically separating and concentrating the fines. The soil washing process separates the fractions, and the fine fraction is then subjected to additional treatment. The coarse fraction, which no longer contains excessive levels of the hazardous constituents, is no longer a waste and can be backfilled on site. It is estimated that the fine fraction will make up 30 percent of the overall volume. The actual quantity of the fine fraction would need to be determined with a treatability study.

The following is a general description of a soil washing process which would be applicable to this site. First, the waste material is fed into a hopper which screens the oversize material (more than 1/4 inch diameter) from the finer fractions. The oversize material then goes to a rotary drum where it is tumbled washed, tested, and backfilled to the site.

The remaining soil is passed into a device with hydroclones which turns the material into a slurry and pumps it through the hydroclones. The hydroclones mechanically separate the slurry into two streams, the coarse material (sand and gravel) and the fine material (silt and clay) and water.

The coarse material may then be directed to froth flotation cells which wash it with surfactants. The flotation cells, which aerate the material, and the surfactant washing generate a heavy froth. The organic and inorganic contaminants in the soil will move with the froth. The froth is then skimmed from the top of the material and is considered a hazardous waste. The soil passing through the froth flotation units, i.e., the coarse fraction, has been shown to pass the TCLP and can then be backfilled to the site.

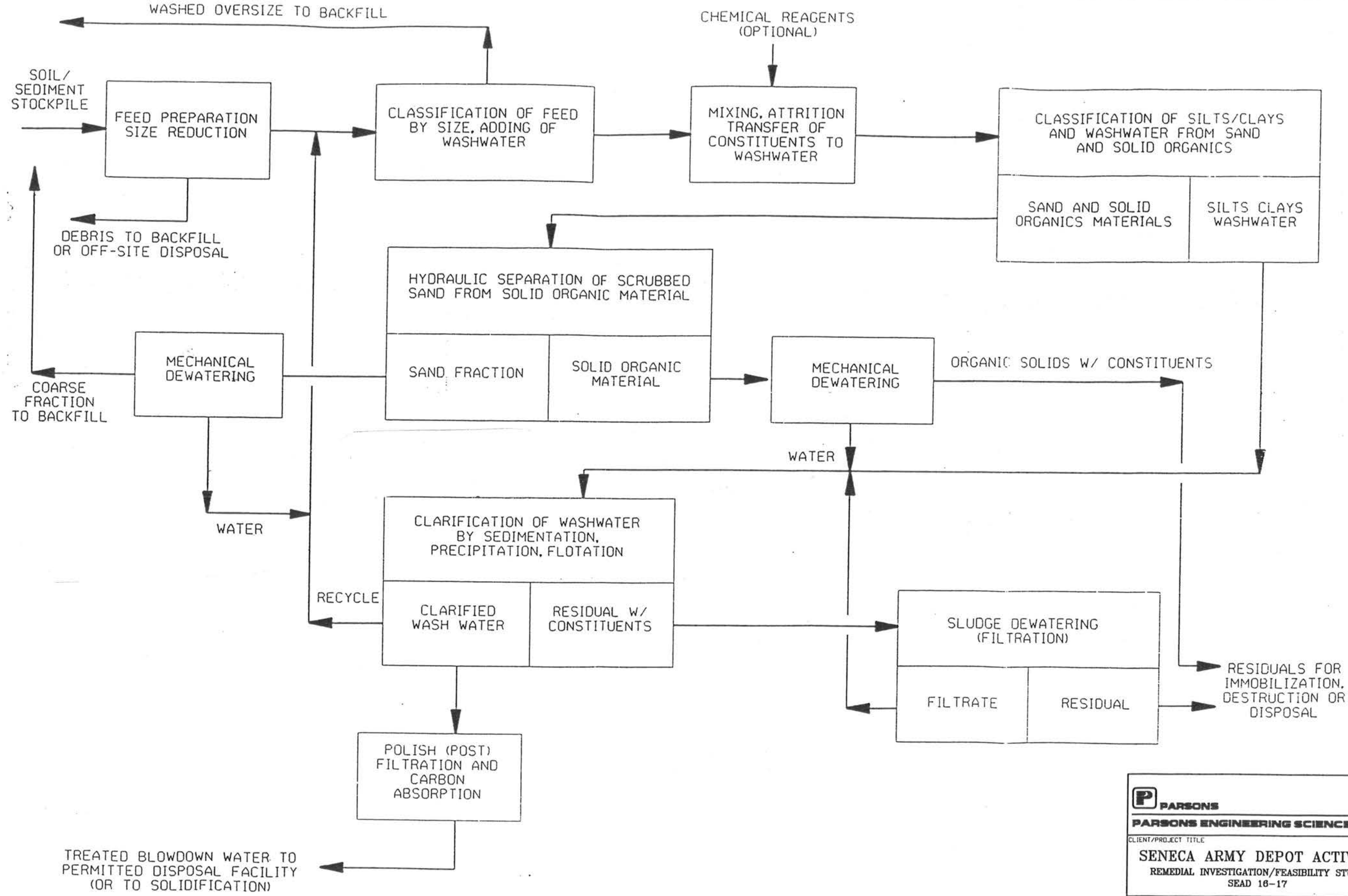
The fine material and water are sent to a sludge basin where the solids are settled out. The sludge is dewatered and then further treated or disposed. The water will be treated prior to discharge.

The process separates the soil into four streams: (1) oversize material, which is generally non-hazardous and can be backfilled to the site, (2) clean sand and gravel, which also can be backfilled, (3) sludge consisting of the fine fraction, which is a hazardous waste, and (4) concentrated froth from the flotation unit (if utilized) which is also considered a hazardous waste. For this alternative, the fine fraction and froth will be transported offsite to a TSDF. The TSDF will then be responsible for the solidification/stabilization, or whatever treatment is necessary for the soil prior to disposal in their landfill. Since the only criteria for landfilling is that RCRA land ban requirements be met, the TSDF may opt for an abbreviated treatment process.

The final step in the remedial action is site restoration. After the coarse fraction has been backfilled to the site, the sites will be regraded with a bulldozer in a manner which approximates the original grade. If necessary, clean fill will be brought in to make up for the soils excavated. The topsoil cover will be vegetated with indigenous grasses as an erosion control measure. Once the cover is established, there will be no continued maintenance requirements.

5.6.1.2 Process Flow and Site Layout

An example process flow schematic for soil washing is shown in **Figure 5-3** For the small volume of material at SEAD-16 and 17, physical separation only with no acid extraction is likely to be most cost effective. However, acid extraction is considered here for completeness. The equipment layout location



PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
SEAD 16-17

DEPT. ENVIRONMENTAL ENGINEERING	Dwg. No. 729895-01002

FIGURE 5-3
ALTERNATIVE 6 SOILS WASHING
GENREALIZED PROCESS FLOW SCHEMATIC

SCALE N/A	DATE NOVEMBER 1997	REV A

R:\SENECA\16-17RIF\FIG5-3.DWG (CLD)

is shown in **Figure 5-2**. A soil washing operation will consist of several or all of the following processes:

Vibratory screen - This unit separates the feed, and removes oversized (greater than 2-inch diameter) particles.

·Feeder module and conveyor - This unit carries and weighs material fed to the soil washer.

·Trommel screen - This unit breaks up clumped feed materials.

·Attrition scrubber - This unit adds the washwater to the broken up soil. The washwater mobilizes the fine fraction of the soil.

·Hydrocyclone separators - This unit is a solids/liquid flash separation device which separates the coarse (sand and gravel) soil from the fine (silt and clay) soil.

·Dense media separation column - This unit separates materials based on density, and would be used to separate pieces of munitions, elemental metals and other debris from the soil to be treated.

·Dewatering screen - This unit removes the fine material from the process train. The coarse fraction is rinsed, and removed from the soil washer.

·Washwater treatment system - The spent washwater is treated for reuse or disposal. The type of treatment used is site-specific.

·Belt filter press - This unit dewaters the fine fraction prior to solidification.

The stockpiled soil will be loaded into the soil washing unit with front-end loader. The conveyor will likely be equipped with a scale to keep track of the quantity of soil treated. For this site, a 25-tph unit will be used. This unit is delivered on fifteen 45-foot trailers. The total size of the soil washing operation is approximately 100 feet by 200 feet. The assembled unit has a height of 50 feet. The unit requires a 600-kW, 440-Volt AC power supply, and a 25 gallons per minute (gpm) water source.

The coarse fraction is removed from the unit, allowed to dry, and stockpiled in a clean soil area. The material can be tested to ensure that the hazardous constituents have been removed to acceptable levels. The material will then be re-used as clean fill.

After dewatering, the fine material will be solidified and disposed of in an offsite Subtitle D landfill. The solidification will be accomplished at an offsite TSDF as described for Alternatives 4 and 5. The water will be treated on-site or sent to the Depot Publicly Owned Treatment Works (POTW) for treatment. The cost estimate assumes that the water can be treated at the Depot POTW at minimal cost.

5.6.2 Protection of Human Health and the Environment

An evaluation of the protection of human health and the environment includes the assessment of the short- and long-term effectiveness as well as permanence. The following discussion will show how this alternative meets these criteria.

5.6.2.1 Short-term Protectiveness

This alternative will be evaluated with respect to the effect on human health and the environment during the implementation of the remediation action. Four items are included in an assessment of the short-term protectiveness of Alternative 6. The first issue is protection of the community during the remedial action. This alternative is protective of the community. Because the final treatment will be not be accomplished on site, there will be transport of hazardous materials. Care will be taken to assure that the trucks are not overloaded. The soils will be covered with a tarp during transport to ensure that no dust is released from the trucks.

There is also little threat from dust released during the excavation. The sites are located far from the SEDA boundary, so the likelihood of any hazardous dust migrating offsite is negligible. As discussed in Sections 6 and 7 of the RI report, fugitive dust migration is not a major migration pathway.

The short-term protectiveness to site workers must also be considered. The major routes of exposure during excavation are direct contact with the affected soil and inhalation of vapors or particulates. There is also potential for exposure to soils and other hazardous materials during the soil washing process. Protection from exposure can be minimized through site access controls and the use of proper protective equipment for site workers, such as dust masks and Tyvek protective clothing. Air monitoring may be used to determine if there is a significant threat from the inhalation of vapors or particulates. Dust generation at the excavation can be minimized by using water or other dust control chemicals. It should also be noted that all the site workers will be required to meet all the OSHA training and medical monitoring requirements prior to working on site. All of the contractor personnel working around the soil washing unit will be trained in the proper health and safety procedures to be used near the unit.

Another part of the short-term effectiveness criteria is assessing the environmental impacts during the remedial action. For Alternative 6, there will be few environmental impacts. There is the potential for spills during excavation, but the soil is a solid, and spills would readily be contained. There is also a potential for releases of washwater from the soil washing unit. This threat is minimized with proper controls and inspections of the units. The site workers will be trained in the proper operation of the unit operations.

The last item to be considered is the time until treatment is accomplished. Alternative 6 should take three to six months to complete. Mobilization would take two weeks. It would take an additional three weeks to fine tune the unit. Once the unit is fully operational at 25 tph, it would take one to three months to complete the soil washing step. Backfill, transport of the fines offsite, and demobilization would be expected to take another two to four weeks. Once the fines are removed and the coarse fraction is backfilled, the remedial action would be complete.

5.6.2.2 Long-term Effectiveness and Permanence

The assessment of the long-term effectiveness of Alternative 6 can be divided into two major categories, an assessment of the magnitude of the residual risk, and an evaluation of the adequacy and reliability of the controls used for the waste residuals and untreated soil.

The magnitude of the residual risk is easy to quantify. The removal plan for the soils and sediments will be designed such that the remaining soils demonstrate a concentration of lead below 500 mg/kg and sediments demonstrate a lead concentration below 31 mg/kg. The only treatment residuals remaining on site will be the coarse fraction of the soil, which will have been tested to ensure that there are no unacceptable levels of lead remaining. Initially, some maintenance will be required to reestablish a vegetative cover at the site. Once the cover is established, there will be no need for long-term maintenance.

The permanence of the alternative must also be assessed. Once the soil fines are removed from the site, the remedial action would be considered permanent. There will no longer be soil on the site that poses an unacceptable threat to human health and the environment.

5.6.2.3 Conclusion

This alternative would protect human health and the environment. This alternative protects against ingestion of and direct contact with surface soils having concentrations of lead above 500 mg/kg and sediments with lead concentrations above 31 mg/kg.

The results of the baseline risk assessment show that conditions at SEAD-16 require a remedial action (see **Section 2.0**). Removal of Case 2 and Case 4 soils at SEAD-16 will reduce risk from soils to acceptable levels. At SEAD-17, though the risk assessment shows that conditions at the site do not require remedial action, removal of Case 1 and Case 3 soils will reduce the HI and carcinogenic risk to lower levels. Therefore, this alternative meets the RAOs by reducing risk.

This alternative also meets the NYSDEC sediment criteria established for lead in site sediments (Case 3 at SEAD-16 and Case 2 at SEAD-17) not to exceed 31 mg/kg. The sediments with concentrations of lead above the sediment criteria will be removed, which will meet the RAO for sediment and prevent contamination downgradient in Kendaia Creek.

5.6.3 Reduction in Toxicity, Mobility, and Volume

Alternative 6 would be effective in reducing the toxicity, mobility, and volume of the hazardous constituents present at the site. The primary goal of soil washing is volume reduction, and the process is expected to reduce the volume of contaminated soil to approximately 30 percent of the original volume. The toxicity and mobility reductions are accomplished in the solidification process. The potentially hazardous constituents are stabilized in the process, which reduces the toxicity. The solidification and subsequent landfilling of the soil fines reduces the mobility. The final mobility of the hazardous constituents is negligible.

5.6.4 Implementability

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

5.6.4.1 Technical Feasibility

The technical feasibility of Alternative 6 is fairly good. Soil washing has been used for a number of years, and has been demonstrated to be effective at sites with similar contamination, but treatability studies will be necessary to confirm that the technology will be effective at SEAD-16 and 17. The solidification/stabilization process is known to be effective for treating the soil washing residuals. The technical advantages of soil washing is to decrease the quantity of material that will require solidification. The solidification process will also be more effective because the cement matrix will solidify easier with a matrix of fines.

The excavation portion of the remediation can also be readily implemented. The areas demonstrating elevated concentrations of heavy metals have been delineated, and the excavation plan will ensure that all of the hot spots are removed. It is possible that some minor weather delays may be encountered, but most of the soil to be removed is located above grade, and should not be adversely affected by wet conditions.

Another aspect of technical feasibility is the ease with which additional work may be conducted. At this time, it is anticipated that this remedial action will preclude the necessity of any additional remedial efforts at SEAD-16 and 17. However, if additional work is required in the future, this remedial action will not interfere in any way. Once the remedial action is complete, the site will be revegetated, and will essentially remain as it is now.

5.6.4.2 Administrative Feasibility

The administrative feasibility of this alternative is as good or better than the rest of the alternatives. This option greatly reduces the volume of material to be landfill. Construction permits necessary for the activities are readily attainable. Due to the volume reduction, there will be minimal transport of hazardous waste, and the number of manifests will be reduced. All the contractors used for excavation and hauling will be experienced in preparing manifests.

Coordination with the various regulatory agencies is also important. The Army has coordinated the entire remedial program with both EPA and NYSDEC, and will consider input from both these agencies in the final remedy selection. It is anticipated that any issues arising with the regulatory agencies will be addressed prior to remedy selection.

5.6.4.3 Availability of Services and Materials

There is good availability of the materials and services necessary to accomplish this alternative. Several companies have extensive experience in implementing soil washing, including Bergmann U.S.A., and Biotrol, Inc. These companies can rapidly assemble the necessary unit operations for SEAD-16 and 17.

The excavation and hauling equipment and Subtitle D landfill space is readily available. The equipment to be used is fairly standard, and is available from a number of vendors.

5.6.5 Cost

5.6.5.1 Capital Costs

There are four major cost items for this alternative, excavation and backfilling, soil washing, solidification, and offsite disposal. Transportation is also a cost to consider. Soil washing costs are estimated to be $127 per cubic yard ($58 per ton). Solidification costs and offsite disposal costs (including transportation) would be $48 per cubic yard ($22 per ton). The total cost including engineering, oversight, and site restoration for remediation of 2,180 cubic yards is $831,345 million. The costs and assumptions made for this alternative is provided in Appendix C.

5.6.5.2 O & M Costs

There will be two O & M costs associated with Alternative 6. The first of these is quarterly groundwater monitoring, which would depend on the number of parameters and wells required by NYSDEC. The second O & M cost is yearly sampling of sediments in Kendaia Creek. The annual cost for O & M is estimated to be $41,688.

Once the remedial action is completed, there will be no residuals remaining on site which require management. Initially, there will be some minor costs associated with the establishment of the vegetative cover, but the cost estimate for these items have been included in the capital costs.

5.6.5.3 Present Worth Costs

The present worth costs for Alternative 6 are estimated to be $991,531 million.

5.7 COMPARATIVE ANALYSIS OF ALTERNATIVES

5.7.1 Introduction

The purpose of this section is to compare each of the four alternatives detailed above to each other with respect to the specific evaluation criteria. The following discussion will rate each of the alternatives with regard to the evaluation criteria, and identify the relative advantages and disadvantages of each. The tradeoffs among the different alternatives will be discussed. This comparison will provide the information necessary to decide the appropriate alternative for this site.

The discussion is divided into two groups. The first group, the threshold criteria, include the overall protection of human health and the environment. The next group includes the remainder of the evaluation criteria: long term effectiveness and permanence, reduction of toxicity, mobility, and volume through treatment, short-term effectiveness, implementability, and cost.

5.7.2 Threshold Criteria

Each alternative must be assessed against the threshold criteria, which are overall protection of human health and the environment and compliance with ARARs, because both criteria must be met by any alternative in order to be eligible for selection.

All of the alternatives for soil/sediment, except Alternative 1 (No-Action), provide protection of human health and the environment. Soils with lead concentrations above 500 mg/kg and sediments with lead concentrations above 31 mg/kg will be removed for the three alternatives considered. Removal of these materials will prevent dermal contact and ingestion, which have been identified during the BRA as the major exposure pathways for soil at SEAD-16 and 17 in Sections 6 and 7 of the RI. Additionally, the BRA determined that the HI at SEAD-16 for future construction worker exposure scenario was above the EPA acceptable risk level. Alternatives 4, 5, or 6 will each reduce risk to acceptable levels at SEAD-16 (refer to discussion in **Section 2.0**). Though at SEAD-17 the BRA determined that the risks were below acceptable EPA target levels, removal of soil at SEAD-17 would reduce risk further, increasing the degree of human health protection.

Removal of sediments in the drainage ditches will protect environmental receptors by preventing migration of sediments with lead concentrations above 31 mg/kg to Kendaia Creek, which is downgradient of SEAD-16 and 17. Additionally, removal of contaminated surface and subsurface soil will decrease any potential for migration to groundwater.

All alternatives remove sediments with lead concentrations above 31 mg/kg. This meets the NYSDEC sediment criteria. Since these criteria are promulgated regulations, they are considered to be ARARs for SEAD-16 and 17 (refer to **Section 2.0**). Therefore, only the No-Action alternative does not comply with ARARs.

5.7.3 Other Considerations

5.7.3.1 Long Term Effectiveness and Permanence

The criteria of long-term effectiveness addresses the long-term protectiveness to human health and the environment. Most of the detailed alternatives are highly effective in eliminating the long-term threats because they rely on treatment technologies to reduce the hazardous constituents in the soils. Alternatives 4, 5, and 6 will excavate all soils with unacceptable levels of lead and sediments from drainage ditches with concentrations of lead above the established criteria; Alternatives 4 and 5 will use a Subtitle D landfill and Alternative 6 will backfill the coarse fraction to the site. This coarse fraction will no longer contain concentrations of lead above 500 mg/kg. Alternative 6 is the most effective in eliminating the long-term threats because the soil washing process segregates the coarse and fine fractions, and all the hazardous constituents are sent off site in the fines fraction. This is a reliable technology which has been successfully utilized at similar sites. All three of the alternatives rely on some type of stabilization technology. This is considered to be technically feasible, and when combined with landfilling, provides effective long term protection.

However, Alternatives 4 and 5 do not score as well as Alternative 6 because the long-term health risks associated with the Subtitle D landfills, which will be used for Alternatives 4 and 5, are not completely understood. Alternative 5, the on-site disposal alternative, is ranked next highest because this alternative involves treatment and construction of a new on-site landfill. Since this landfill would be on-site, it would be easy to monitor and maintain to assure long term effectiveness. The long term liabilities associated with offsite disposal, as for Alternative 4, would be eliminated. Alternative 1, the no action alternative, does not provide long-term protection of human health and the environment.

The rankings of the alternatives based on permanence are essentially the same as the rankings for long-term protectiveness. Since Alternatives 4, 5, and 6 provide treatment, they are essentially permanent. Alternatives 4 and 5 use landfills, which will require some long-term maintenance of the cap and groundwater monitoring. Alternative 1, the no action alternative is not permanent since no treatment is taking place.

5.7.3.2 Reduction of Toxicity, Mobility, or Volume

The alternatives are also compared with respect to the relative decreases in the toxicity, mobility, and volume of the hazardous constituents present at the site. Alternative 6, which uses the soil washing process, yields the greatest reduction in the toxicity by separating the fines and solidifying this smaller volume of material. The hazardous constituents are normally concentrated in the fines fraction of the soil which will be solidified. The solidification process is more effective for fines than large aggregate materials. Alternatives 4 and 5 also significantly decrease the toxicity, but only for the soils which are treated by stabilization/solidification. The solidification/stabilization process decreases the toxicity of the metals because the metals are converted to less soluble forms. Neither Alternative 4 or 5 completely treat all of the soils at the site. For both alternatives, 875 CY of untreated soils and sediments will be placed in a solid waste landfill. Alternative 1, the no action alternative, does not reduce the toxicity of the hazardous constituents.

Alternative 6 provides the best reductions in mobility. Once the fines fraction is solidified and landfilled, the hazardous constituents are essentially immobile. Alternatives 4 and 5 are similar in nature and were ranked the same. For Alternatives 4 and 5, approximately 875 CY of untreated soil are placed in a landfill, which will reduce the mobility of the hazardous constituents in the soils. Alternative 1, the no action alternative does nothing to reduce the mobility of the hazardous constituents.

Alternative 6 provides the greatest volume reduction of the contaminated soils. The hazardous constituents are concentrated in the fines fraction, which reduces the volume of the contaminated soil to approximately 30 percent of the original volume. Alternatives 4 and 5, which rely on solidification, do not score as well on volume reduction. Because soils are treated, the volume of hazardous soil, is reduced, however the treatment residual (soil/cement mixture) has a greater volume than the initial untreated soil. Furthermore, the remaining soils which will be excavated and landfilled will increase in volume by approximately 20% as a result of the excavation process. In Alternative 1, the no action alternative, there is no volume decrease, but there is also no volume increase.

5.7.3.3 Short-term Effectiveness

Alternative 5 is expected to have the best short-term effectiveness because no hazardous materials are removed from the site, and only trained site workers would handle the soils. The soil washing alternative (Alternative 6) does not rate as well because of the necessity of greater handling of the contaminated soil, and because of the greater quantities of treatment residuals, such as spent wash water which must then be treated. Alternative 4 , in which the soils are not treated prior to being transported to the TSD facility also scores lower, because there is transport of approximately 2,180 CY. of RCRA characteristic hazardous waste. Alternative 1, the no action alternative provides good short-term protection of human health because of the administrative controls currently in place, but provides no short-term protection of the environment.

5.7.3.4 Implementability

All of the alternatives score well on implementability. For technical feasibility, Alternative 1, the no action alternative, and Alternative 4, which relies on off site treatment and disposal, score the highest. Alternative 4 requires primarily standard earth moving equipment. Alternatives 4 and 5 are both easy to implement, since they require only standard construction equipment, though a large cement plant is required for these alternatives. Alternative 4 rates higher than Alternative 5 because it is easier to send the soils off site for disposal than to construct an on-site Subtitle D landfill. Alternative 6 is the most difficult to implement because of the need for specialized soil washing equipment, but there are enough soil washing vendors to ensure that this option is still viable.

The availability of the equipment, materials, and vendors is very good for all the alternatives. Alternative 4 rates the best on availability, because these materials are more available from local suppliers than the other alternatives. Alternative 6 scores the worst because there are less soil washing vendors than there are solidification vendors, but this will not preclude implementation of this alternative.

The last item to consider is agency approval. Alternative 6 is the best because of the greatest volume reduction. Alternatives 4 and 5 rate lower because of the work required to site and permit an on site landfill. Alternative 1, the no action alternative is the worst.

5.7.4 <u>Cost</u>

The last criteria to compare is cost. This comparison will evaluate the present worth costs of the alternatives, which are presented on **Table 5-2**. Alternative 4 is the least expensive with an estimated cost of $570,784 to $773,110. Alternative 5, which includes on-site solidification and disposal in a Subtitle D landfill, has a present cost of $991,531 million and Alternative 6 was the most costly, at an estimated cost of $1.1 million. A breakdown of these costs are provided in Appendix C.

5.8 CONCLUSIONS

As described above, all of the alternatives in the detailed analysis will be effective for SEAD-16 and 17 remedial action for the intended future use of the site as industrial/commercial. The baseline human health assessment indicates that, under future industrial and commercial worker exposure scenarios, the risk based non-carginiogenic hazard index is above acceptable levels, although carcinogenic risks are within acceptable levels. Therefore, remedial action is required at SEAD-16 to meet remedial objectives for protecting human health. At SEAD-17, risk based carcinogenic and non-carginogenic health risks are

Table 5-2
Seneca Army Depot Activity
SEAD-16 AND 17 FEASIBILITY STUDY
Cost Estimate Summary for Retained Alternatives

Alternative	Description	Total Project Present Worth Cost	Capital Cost for Construction	Annual O & M Costs
4	On-Site S/S, Off-site Disposal	$773,110	$612,924	$41,688
4	Off-Site S/S, Off-Site Disposal	$570,784	$410,598	$41,688
5	On-Site S/S, On-Site Disposal	$1,116,409	$802,523	$81,688
6	Soil Washing, Off-Site S/S and Disposal	$991,531	$831,345	$41,688

within acceptable levels. Therefore, risk based remedial objectives have been met at SEAD-17 with no further action.

However, the risk analyses could not consider the presence of lead in soils. The allowable level of lead in soil to protect human health has been determined to be 500 mg/kg. The allowable level in sediment is 31 mg/kg based on NYSDEC sediment criteria. Therefore, site specific remedial action for lead are based on removing soils with lead concentrations above 500 mg/kg and sediment with lead concentrations above 31 mg/kg. In addition, at SEAD-16, the material inside abandoned buildings S-311 and 366 contribute significantly to the non-carcinogenic risk levels. Therefore this materials must also be removed and the buildings must be cleaned.

Alternatives 4,5, and 6 were determined to meet the site specific remedial action objectives. That is, they are protective against ingestion of and dermal contact with soils having lead concentrations above 500 mg/kg, sediments having lead concentrations above 31 mg/kg, and dust caused by excess debris and materials that are now inside the abandoned buildings at SEAD-16.

Alternative 6 ranks the highest for long-term protectiveness of human health and the environment, permanence, and reductions in toxicity, mobility, and volume of hazardous constituents. Alternative 4, which involves offsite treatment and disposal, ranks highest for implementability and cost. Furthermore, Alternative 4 is far less costly than Alternative 6. However, Alternative 4 ranks lowest for short-term protectiveness because all the soils, some of which are characteristic RCRA hazardous waste (according to expected TCLP results), are transported offsite for disposal, while Alternative 5 ranks highest for short-term protectiveness because no hazardous materials are transported from the site.

APPENDIX A

ANALYTICAL DATA

Table A-1a
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Building Materials Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	BS-10	BS-11	FS-50	FS-50	FS16-1	FS16-2	FS16-3	FS16-4	FS16-5	FS16-6	FS16-7	FS16-8
			SAMP ID:	16024	16022	16023	16028	FS16-1-1	FS16-2-1	FS16-3-1	FS16-4-1	FS16-5-1	FS16-6-1	FS16-7-1	FS16-8-1
			QC CODE:	SA	SA	SA	DU	SA	SA	SA	SA	SA	SA	SA	SA
			STUDY ID:	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	ESI	ESI	ESI	ESI	ESI	ESI	ESI	ESI
			TOP:												
			BOTTOM:												
			MATRIX:	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS
			SAMPLE DATE:	8/8/96	8/8/96	8/8/96	8/8/96	12/6/93	12/6/93	12/6/93	12/6/93	12/6/93	12/6/93	12/6/93	12/6/93
			UNIT	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q
VOLATILE ORGANICS															
1,1,1-Trichloroethane	800	NYSDEC TAGM	UG/KG	7 J		25 U	22 U	11 U	10 U	11 U	18 U	11 U	11 U	25 UJ	21 UJ
Bromomethane			UG/KG	53 UJ		25 UJ	22 J	11 U	10 U	11 U	18 U	11 U	11 U	25 UJ	21 UJ
Chloroform	300	NYSDEC TAGM	UG/KG	53 U		25 U	14 J	11 U	10 U	11 U	18 U	11 U	11 U	25 UJ	21 UJ
Chloromethane			UG/KG	53 UJ		25 UJ	22 J	11 U	10 U	11 U	18 U	11 U	11 U	25 UJ	21 UJ
Methylene Chloride	100	NYSDEC TAGM	UG/KG	7 J		25 U	22 U	11 U	10 U	11 U	18 U	11 U	11 U	25 UJ	21 UJ
Toluene	1500	NYSDEC TAGM	UG/KG	20 J		25 UJ	22 U	11 U	10 U	11 U	18 U	11 U	11 U	25 UJ	21 UJ
Trichloroethene	700	NYSDEC TAGM	UG/KG	13 J		25 U	22 U	11 U	10 U	11 U	18 U	11 U	11 U	25 UJ	21 UJ
SEMIVOLATILE ORGANICS															
2,4-Dinitrotoluene			UG/KG	3000000 J	19000000 J	200 J	720 UJ	360 U	340 U	5700 U	620 U	380 U	2700	2600 UJ	5100 UJ
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	74000 J	620000 U	800 U	720 U	360 U	340 U	5700 U	620 U	380 U	200 J	2600 UJ	5100 UJ
2-Methylnaphthalene	36400	NYSDEC TAGM	UG/KG	500000 U		800 U	720 U	25 J	21 J	19000	49 J	40 J	360 U	180 J	5100 UJ
Acenaphthene	50000	NYSDEC TAGM	UG/KG	500000 U		800 U	720 U	23 J	340 U	4500 J	620 U	380 U	360 U	560 J	5100 UJ
Anthracene	50000	NYSDEC TAGM	UG/KG	500000 U		800 U	720 U	22 J	340 U	2900 J	620 U	22 J	360 U	670 J	5100 UJ
Benzo(a)anthracene	224	NYSDEC TAGM	UG/KG	500000 U		800 U	720 U	81 J	40 J	1000 J	44 J	54 J	92 J	1600 J	330 J
Benzo(a)pyrene	61	NYSDEC TAGM	UG/KG	500000 U		43 J	42 J	70 J	45 J	770 J	61 J	54 J	90 J	1500 J	400 J
Benzo(b)fluoranthene	1100	NYSDEC TAGM	UG/KG	500000 U		120 J	110 J	91 J	130 J	500 J	73 J	47 J	99 J	1600 J	750 J
Benzo(g,h,i)perylene	50000	NYSDEC TAGM	UG/KG	500000 U		74 J	720 UJ	360 U	120 J	870 J	620 U	380 U	61 J	360 J	5100 UJ
Benzo(k)fluoranthene	1100	NYSDEC TAGM	UG/KG	500000 U		800 UJ	720 UJ	73 J	77 J	630 J	60 J	50 J	92 J	1600 J	630 J
Butylbenzylphthalate	50000	NYSDEC TAGM	UG/KG	54000 J		55 J	720 U	360 U	340 U	5700 U	620 U	380 U	360 UR	2600 UJ	5100 UJ
Carbazole			UG/KG	500000 U		800 U	720 U	24 J	340 U	5700 U	620 U	36 J	21 J	740 J	5100 UJ
Chrysene	400	NYSDEC TAGM	UG/KG	500000 U		96 J	73 J	110 J	150 J	1400 J	74 J	120 J	110 J	1900 J	680 J
Di-n-butylphthalate	8100	NYSDEC TAGM	UG/KG	950000		190 J	210 J	360 U	340 U	5700 U	620 U	50 J	710 UJ	2600 UJ	5100 UJ
Dibenz(a,h)anthracene	14	NYSDEC TAGM	UG/KG	500000 U		800 UJ	720 UJ	360 U	26 J	500 J	620 U	380 U	360 U	2600 UJ	5100 UJ
Dibenzofuran	6200	NYSDEC TAGM	UG/KG	500000 U		800 U	720 U	360 U	46 J	1500 J	620 U	22 J	360 U	390 J	5100 UJ
Diethylphthalate	7100	NYSDEC TAGM	UG/KG	500000 U		800 U	720 U	360 U	340 U	530 J	620 U	380 U	360 U	2600 UJ	5100 UJ
Fluoranthene	50000	NYSDEC TAGM	UG/KG	500000 U		110 J	99 J	160 J	920	3100 J	140 J	120 J	210 J	3900 J	630 J
Fluorene	50000	NYSDEC TAGM	UG/KG	500000 U		800 U	720 U	25 J	340 U	6100	620 U	380 U	360 U	560 J	5100 UJ
Indeno(1,2,3-cd)pyrene	3200	NYSDEC TAGM	UG/KG	500000 U		51 J	720 UJ	360 U	92 J	450 J	620 U	380 U	39 J	400 J	5100 UJ
N-Nitrosodiphenylamine (1)			UG/KG	200000 J		800 U	720 U	360 U	340 U	5700 U	620 U	380 U	450	2600 UJ	5100 UJ
Naphthalene	13000	NYSDEC TAGM	UG/KG	500000 U		800 U	720 U	360 U	43 J	1600 J	620 U	19 J	360 U	410 J	5100 UJ
Pentachlorophenol	1000	NYSDEC TAGM	UG/KG	1200000 U		220 J	1700 U	880 U	830 U	14000 U	1500 U	920 U	870 U	6300 UJ	12000 UJ
Phenanthrene	50000	NYSDEC TAGM	UG/KG	500000 U		64 J	720 U	130 J	550	22000	120 J	100 J	110 J	4100 J	360 J
Phenol	30	NYSDEC TAGM	UG/KG	500000 U		800 U	720 U	81 J	340 U	37000	150 J	380 U	360 U	2600 UJ	5100 UJ
Pyrene	50000	NYSDEC TAGM	UG/KG	500000 U		95 J	130 J	200 J	570	5000 J	120 J	130 J	160 J	3200 J	720 J
bis(2-Ethylhexyl)phthalate	50000	NYSDEC TAGM	UG/KG	500000 U		800 U	800 U	360 U	340 U	5700 U	440 J	5000 J	52 J	500 J	1300 J

Table A-1a
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Building Materials Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	BS-10	BS-11	FS-50	FS-50	FS16-1	FS16-2	FS16-3	FS16-4	FS16-5	FS16-6	FS16-7	FS16-8
			LOC_ID:	BS-10	BS-11	FS-50	FS-50	FS16-1	FS16-2	FS16-3	FS16-4	FS16-5	FS16-6	FS16-7	FS16-8
			SAMP ID:	16024	16022	16023	16028	FS16-1-1	FS16-2-1	FS16-3-1	FS16-4-1	FS16-5-1	FS16-6-1	FS16-7-1	FS16-8-1
			QC CODE:	SA	SA	SA	DU	SA	SA	SA	SA	SA	SA	SA	SA
			STUDY ID:	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	ESI	ESI	ESI	ESI	ESI	ESI	ESI	ESI
			TOP:												
			BOTTOM:												
			MATRIX:	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS
			SAMPLE DATE:	8/8/96	8/8/96	8/8/96	8/8/96	12/6/93	12/6/93	12/6/93	12/6/93	12/6/93	12/6/93	12/6/93	12/6/93
			UNIT	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q
PESTICIDES/PCB															
4,4'-DDD	2900	NYSDEC TAGM	UG/KG	1000 U		8 U	7.2 U	5.2 J	3.1 J	9.2 U	12 U	35 J	3.6 U	39 UJ	76 UJ
4,4'-DDE	2100	NYSDEC TAGM	UG/KG	1000 U		6.3 J	7.3 J	13 J	17 J	73 J	17	750	6.3 J	97 J	180 J
4,4'-DDT	2100	NYSDEC TAGM	UG/KG	940 J		53	61	8.1 J	6.1 J	61 J	140	610	7.2	360 J	870 J
Aroclor-1254	10000	NYSDEC TAGM	UG/KG	10000 U		100 J	120	36 J	56	130	120 U	75 U	36 U	360 J	1400 J
Aroclor-1260	10000	NYSDEC TAGM	UG/KG	10000 U		45 J	61 J	37	51	97	120 U	89	36 U	390 UJ	630 J
Dieldrin	44	NYSDEC TAGM	UG/KG	1000 U		8 U	7.2 U	4.2 J	3.4 U	9.2 U	12 U	7.5 U	3.6 U	28 J	76 UJ
Endosulfan I	900	NYSDEC TAGM	UG/KG	540 U		3.3 J	3.7 U	1.9 U	1.8 U	4.7 U	6.4 U	3.9 U	1.8 U	22 J	39 UJ
Endosulfan II	900	NYSDEC TAGM	UG/KG	1000 U		8 U	7.2 U	3.6 U	3.4 J	5.7 J	12 U	3.9 J	3.6 U	39 UJ	76 UJ
Endrin	100	NYSDEC TAGM	UG/KG	1000 U		8 U	7.2 U	3.6 U	3.4 U	9.2 J	12 U	7.5 U	3.6 U	39 UJ	76 UJ
Heptachlor epoxide	20	NYSDEC TAGM	UG/KG	540 U		4.1 U	3.7 U	1.9 U	1.8 U	2.6 J	6.4 U	3.9 U	1.8 U	20 UJ	39 UJ
alpha-BHC	110	NYSDEC TAGM	UG/KG	540 U		3.7 J	2 J	1.9 U	1.8 U	4.7 U	6.4 U	3.9 U	1.8 U	20 UJ	39 UJ
alpha-Chlordane			UG/KG	540 U		3.8 J	3.7 J	1.2 J	2.1 J	3.8 J	6.4 U	3.1 J	1.8 U	13 J	47 J
gamma-BHC (Lindane)	60	NYSDEC TAGM	UG/KG	540 U		4.1 U	3.7 U	0.93 J	1.8 U	4.7 U	6.4 U	3.9 U	1.8 U	20 UJ	39 UJ
gamma-Chlordane	540	NYSDEC TAGM	UG/KG	540 U		2.3 J	2.3 J	1.9 U	2.1 J	4.6 J	6.4 U	2.9 J	1.8 U	12 J	36 J
OTHER ANALYSES															
Amosite Asbestos			%, +-5%												
Chrysotile Asbestos			%												
Chrysotile Asbestos			%, +-5%												
Chrysotile Asbestos			%, +-2.5% .												
Chrysotile Asbestos			%, > THAN												
Nitrate/Nitrite-Nitrogen			MG/KG	14200		539	638	151	13.7	0.21	0.27	2	104	0.89	0.05
Percent Moisture (PEST/PCB)				8		59	54								
Percent Moisture (SVOCs)				8		58	54								
Percent Moisture (VOCs)				6		60	54								
Percent Solids (Metals)				91.5	72.5	41.2	45.8								
NITROAROMATICS															
1,3,5-Trinitrobenzene			UG/KG	120000 U	620000 U	1200 U	220 J	130 U	130 UJ	130 U	130 U	130 U	130 U	130 UJ	130 UJ
2,4,6-Trinitrotoluene			UG/KG	120000 U	620000 U	1200 U	120 U	170 J	130 UJ	130 U	130 U	130 U	130 U	130 UJ	130 UJ
2,4-Dinitrotoluene			UG/KG	3700000	19000000	36000	4600 J	130 U	72 J	130 U	2900	130 U	610	3100 J	610 J

SEAD-16 Building Materials Analytical Results

PARAMETER	LEVEL	SOURCE		BS-10	BS-11	FS-50	FS-50	FS16-1	FS16-2	FS16-3	FS16-4	FS16-5	FS16-6	FS16-7	FS16-8
			SAMP ID:	16024	16022	16023	16028	FS16-1-1	FS16-2-1	FS16-3-1	FS16-4-1	FS16-5-1	FS16-6-1	FS16-7-1	FS16-8-1
			QC CODE:	SA	SA	SA	DU	SA	SA	SA	SA	SA	SA	SA	SA
			STUDY ID:	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	ESI	ESI	ESI	ESI	ESI	ESI	ESI	ESI
			TOP:												
			BOTTOM:												
			MATRIX:	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS
			SAMPLE DATE:	8/8/96	8/8/96	8/8/96	8/8/96	12/6/93	12/6/93	12/6/93	12/6/93	12/6/93	12/6/93	12/6/93	12/6/93
			UNIT	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q
METALS															
Aluminum	14593	NYSDEC TAGM	MG/KG	13600 R	1380 R	4590 R	9580 R	9540	16500	6610	9550	2960	11300	7960 J	13700 J
Antimony	3.59	NYSDEC TAGM	MG/KG	32.5 J	82.4 J	322 J	1050 J	4.6 U	1250	1560	31.5	11.9 J	11.2 J	21.8 J	93.2 J
Arsenic	7.5	NYSDEC TAGM	MG/KG	9.1 J	1.3 J	6.7 J	13.6 J	3.4	47.3	26.9	7.1	1.9	6.5	8 J	15.9 J
Barium	300	NYSDEC TAGM	MG/KG	40500 J	3520 J	225 J	381 J	145	15600	6950	466	88.2	289	392 J	2110 J
Beryllium	0.73	NYSDEC TAGM	MG/KG	0.16	0.04 U	0.28	0.72	0.51 J	0.09 J	0.08 U	1.1 J	0.19 J	0.49 J	0.32 J	0.27 J
Cadmium	1	NYSDEC TAGM	MG/KG	54.6	0.41	0.94	1.5	22.2 R	36.8 R	156 R	1 R	3	1.2	72.8 J	127 J
Calcium	101904	NYSDEC TAGM	MG/KG	5390	586	85900	107000	19800	13800	21200	23000	215000	41800	41600 J	67400 J
Chromium	22.13	NYSDEC TAGM	MG/KG	518	4.3	36.7	60.7	15.8	220	33.2	6.4	33.2 R	21.3 R	22.1 R	174 R
Cobalt	30	NYSDEC TAGM	MG/KG	26.3	2.7	6.8	10.9	15	20.9	9.7 J	3.3 J	5.6 J	9.9	6 J	40.6 J
Copper	25	NYSDEC TAGM	MG/KG	16200	5260	99.1	130	211 J	38900 J	81400 J	129 J	90 J	198 J	593 J	757 J
Cyanide	0.3	NYSDEC TAGM	MG/KG	24.2 J	9.7 J	1 UJ	1 UJ	1.1	1.4	0.74 U	1 U	0.61 U	0.58 U	2.3 J	4.4 J
Iron	26627	NYSDEC TAGM	MG/KG	79200 J	2690 J	59200 J	79700 J	19700	49300	30500	8420	41300	25000	17200 J	48600 J
Lead	21.86	NYSDEC TAGM	MG/KG	4180	132	391	420	810	437000	527000	596	309	865	1560 J	12100 J
Magnesium	12222	NYSDEC TAGM	MG/KG	8450	3370	8500	15300	4850	16400	19700	2470	15700	16400	10500 J	15700 J
Manganese	669.38	NYSDEC TAGM	MG/KG	507	27.3	574	1040	488 J	334 J	214 J	194 J	480	456	301 J	458 J
Mercury	0.1	NYSDEC TAGM	MG/KG	24.9	0.07 U	0.12 U	0.11	0.81	39.3	1.8	0.34	0.1	1.2	2.4 J	3.7 J
Nickel	33.62	NYSDEC TAGM	MG/KG	154	2.1	20.9	60.1	21.1	119	66.8	7.9 J	18.8	30.5	21.5 J	124 J
Potassium	1761.5	NYSDEC TAGM	MG/KG	80600	2830	3770	4980	10500	1570	636 J	1550 J	704 J	1480	1430 J	1360 J
Selenium	2	NYSDEC TAGM	MG/KG	1.6	0.95	1.3	2.1	5.8 J	1.3 UJ	1.6 UJ	0.26 UJ	0.13 UJ	0.72 J	1.6 J	0.91 J
Silver	0.4	NYSDEC TAGM	MG/KG	3.6	0.62	0.29 U	0.46 U	0.9 U	13.4	22.7	1.5 U	0.73 U	0.8 U	1.3 UJ	1.7 UJ
Sodium	103.74	NYSDEC TAGM	MG/KG	3090 J	63.1 J	3460 J	4440 J	3690	2650	152 J	365 J	179 J	200 J	97.9 J	302 J
Thallium	0.28	NYSDEC TAGM	MG/KG	0.84 U	0.57 U	1 U	1.6 U	0.38 J	2.2 UJ	1.4 J	0.44 UJ	0.22 U	0.25 U	0.45 UJ	0.39 UJ
Vanadium	150	NYSDEC TAGM	MG/KG	20.4 J	0.5	5.6	12.2	17.7	12.9	6.2 J	7 J	8.3 J	18.3	20.6 J	44 J
Zinc	82.5	NYSDEC TAGM	MG/KG	42600	1640	334	495	715 J	12400 J	35700 J	178 J	318	293	1310 J	11600 J
HERBICIDES															
2,4,5-T	1900	NYSDEC TAGM	UG/KG					3.9 J	5.2 U	6.9 U	9.4 U	5.8 U	5.5 U	12 UJ	13 J
2,4,5-TP (Silvex)			UG/KG					7.9 J	5.2 U	6.9 U	9.4 U	5.8 U	5.5 U	12 UJ	12 UJ
2,4-D	500	NYSDEC TAGM	UG/KG					55 U	52 U	69 U	94 U	58 U	55 U	120 UJ	160 J
2,4-DB			UG/KG					130 J	52 U	69 U	94 U	58 U	55 U	120 UJ	120 UJ
Dichloroprop			UG/KG					61 J	52 U	69 U	94 U	58 U	55 U	120 UJ	120 UJ
MCPA			UG/KG					6000 J	5200 U	6900 U	9400 U	5800 U	5500 U	12000 UJ	12000 UJ
MCPP			UG/KG					22000 J	5200 U	6900 U	9400 U	5800 U	5500 U	12000 UJ	12000 UJ

SEAD-16 Building Material Analytical Results (Asbestos)

PARAMETER	LEVEL	SOURCE													
			LOC_ID:	AS16-43		AS16-5		AS16-6		AS16-7		AS16-8		AS16-9	
			SAMP ID:	AS16-43C		AS16-5		AS16-6		AS16-7		AS16-8		AS16-9	
			QC CODE:	SA		SA		DU		SA		SA		SA	
			STUDY ID:	RI ROUND1		ESI		ESI		ESI		ESI		ESI	
			TOP:									0		0	
			BOTTOM:									0.2		0.2	
			MATRIX:	SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS	
			SAMPLE DATE:	8/8/96 8:00											
			UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
OTHER ANALYSES															
Amosite Asbestos			%, +-5%			1	U	1	U	1	U	1	U	1	U
Chrysotile Asbestos			%	0	U	30		30		7.5		1	U	1	U
Chrysotile Asbestos			%, +-5%												
Chrysotile Asbestos			%, +-2.5%												
Chrysotile Asbestos			%, > THAN												

Table A-1b
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Building Material Analytical Results (Asbestos)

			LOC_ID:	AS16-1		AS16-10		AS16-11		AS16-12		AS16-13		AS16-14		AS16-15		AS16-16		AS16-17		AS16-17		AS16-17		AS16-18	
			SAMP ID:	AS16-1		AS16-10		AS16-11		AS16-12		AS16-13		AS16-14		AS16-15		AS16-16		AS16-17A		AS16-17B		AS16-17C		AS16-18A	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	ESI		ESI		ESI		ESI		ESI		ESI		ESI		ESI		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:									0		0		0		0									
			BOTTOM:									0.2		0.2		0.2		0.2									
			MATRIX:	SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS	
			SAMPLE DATE:																	8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
OTHER ANALYSES																											
Amosite Asbestos			%, +-5%	40		1	U	1	U	1	U	1	U	1	U	1	U	1	U								
Chrysotile Asbestos			%	20		0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1		0	U	0	U	1	
Chrysotile Asbestos			%, +-5%																								
Chrysotile Asbestos			%, +-2.5%																								
Chrysotile Asbestos			%, > THAN																								

SEAD-16 Building Material Analytical Results (Asbestos)

			LOC_ID:	AS16-18		AS16-18		AS16-18		AS16-19		AS16-19		AS16-2		AS16-20		AS16-21		AS16-21		AS16-22		AS16-23	
			SAMP ID:	AS16-18B		AS16-46A		AS16-46B		AS16-19A		AS16-19B		AS16-2		AS16-20		AS16-21A		AS16-21B		AS16-22		AS16-23	
			QC CODE:	SA		DU		DU		SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		ESI		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:																						
			BOTTOM:																						
			MATRIX:	SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS	
			SAMPLE DATE:	8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00				8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
OTHER ANALYSES																									
Amosite Asbestos			%, +-5%											1	U										
Chrysotile Asbestos			%	0	U	1		0	U	0	U	0	U	1	U	0	U	0	U	0	U	0	U	0	U
Chrysotile Asbestos			%, +-5%																						
Chrysotile Asbestos			%, +-2.5%																						
Chrysotile Asbestos			%, > THAN																						

Table A-1b
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Building Material Analytical Results (Asbestos)

			LOC_ID:	AS16-24		AS16-24		AS16-25		AS16-26		AS16-27		AS16-28		AS16-29		AS16-29		AS16-29		AS16-3		AS16-30	
			SAMP ID:	AS16-24		AS16-45		AS16-25		AS16-26		AS16-27		AS16-28		AS16-29A		AS16-29B		AS16-29C		AS16-3		AS16-30A	
			QC CODE:	SA		DU		SA		SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		ESI		RI ROUND1	
			TOP:																						
			BOTTOM:																						
			MATRIX:	SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS	
			SAMPLE DATE:	8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00				8/8/96 8:00	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
OTHER ANALYSES																									
Amosite Asbestos			%, +-5%																			50			
Chrysotile Asbestos			%	0	U	0	U	0	U	0	U	45		50		1		0	U	0	U	12.5		1	
Chrysotile Asbestos			%, +-5%																						
Chrysotile Asbestos			%, +-2.5%																						
Chrysotile Asbestos			%, > THAN																						

T[illegible]A-1b
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Building Material Analytical Results (Asbestos)

			LOC_ID:	AS16-30		AS16-30		AS16-31		AS16-32		AS16-33		AS16-34		AS16-35		AS16-36		AS16-37		AS16-37	
			SAMP ID:	AS16-30B		AS16-30C		AS16-31		AS16-32		AS16-33		AS16-34		AS16-35		AS16-36		AS16-37A		AS16-37B	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:																				
			BOTTOM:																				
			MATRIX:	SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS	
			SAMPLE DATE:	8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
OTHER ANALYSES																							
Amosite Asbestos			%, +-5%																				
Chrysotile Asbestos			%	0	U	0	U	0	U	0	U	0	U	0	U	0	U	0	U	0	U	0	U
Chrysotile Asbestos			%, +-5%																				
Chrysotile Asbestos			%, +-2.5%																				
Chrysotile Asbestos			%, > THAN																				

Table A-1b
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Building Material Analytical Results (Asbestos)

			LOC_ID:	AS16-38		AS16-39		AS16-39		AS16-4		AS16-40		AS16-40		AS16-41		AS16-41		AS16-42		AS16-43		AS16-43	
			SAMP ID:	AS16-38		AS16-39A		AS16-39B		AS16-4		AS16-40		AS16-44		AS16-41A		AS16-41B		AS16-42		AS16-43A		AS16-43B	
			QC CODE:	SA		SA		SA		SA		SA		DU		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		ESI		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:																						
			BOTTOM:																						
			MATRIX:	SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS		SOLIDS	
			SAMPLE DATE:	8/8/96 8:00		8/8/96 8:00		8/8/96 8:00				8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00		8/8/96 8:00	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
OTHER ANALYSES																									
Amosite Asbestos			%, +-5%							1	U														
Chrysotile Asbestos			%	0	U	0	U	0	U	1	U	55		35		0	U	0	U	65		0	U	0	U
Chrysotile Asbestos			%, +-5%																						
Chrysotile Asbestos			%, +-2.5%																						
Chrysotile Asbestos			%, > THAN																						

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

			LOC_ID:	SB16-1		SB16-3		SB16-3		SB16-4		SS16-1		SS16-10		SS16-11		SS16-12		SS16-13	
			SAMP ID:	16037		16032		16033		16030		SS16-1-1		SS16-10-1		SS16-11-1		SS16-12-1		SS16-13-1	
			QC CODE:	SA		SA		DU		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		ESI		ESI		ESI		ESI		ESI	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/14/96		8/14/96		8/14/96		8/14/96		10/20/93		11/9/93		10/20/93		10/20/93		10/20/93	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
VOLATILE ORGANICS																					
1,1,2,2-Tetrachloroethane	600	NYSDEC TAGM	UG/KG	12	U	11	U	10	J	10	U	11	U	11	U	13	U	11	UJ	11	UJ
Acetone	200	NYSDEC TAGM	UG/KG	7	J	11	U	22	U	10	U	11	U	11	U	13	U	11	UJ	11	UJ
Benzene	60	NYSDEC TAGM	UG/KG	12	U	11	U	10	U	10	U	11	U	11	U	13	U	11	UJ	11	UJ
Carbon Disulfide	2700	NYSDEC TAGM	UG/KG	12	U	11	U	2	J	10	U	11	U	11	U	13	U	11	UJ	11	UJ
Chloroform	300	NYSDEC TAGM	UG/KG	12	U	11	U	10	U	10	U	11	U	11	U	13	U	11	UJ	11	UJ
Methylene Chloride	100	NYSDEC TAGM	UG/KG	12	U	11	U	10	U	10	U	11	U	11	U	13	U	3	J	11	UJ
Toluene	1500	NYSDEC TAGM	UG/KG	12	U	11	U	2	J	10	J	11	U	11	U	13	U	2	J	11	UJ
Xylene (total)	1200	NYSDEC TAGM	UG/KG	12	U	11	U	3	J	10	U	11	U	11	U	13	U	11	UJ	11	UJ
SEMIVOLATILE ORGANICS																					
2,4-Dinitrotoluene			UG/KG	420	U	1800	U	3500	U	1100	U	2200	J	1800	U	440	U	360	U	750	U
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	420	U	1800	U	3500	U	1100	U	180	J	1800	U	440	U	360	U	750	U
2-Methylnaphthalene	36400	NYSDEC TAGM	UG/KG	420	U	1800	U	3500	U	71	J	710	UR	1800	U	440	U	360	U	750	U
3,3'-Dichlorobenzidine			UG/KG	420	U	1800	U	3500	U	1100	U	710	UR	1800	U	440	U	360	U	750	U
3-Nitroaniline	500	NYSDEC TAGM	UG/KG	1000	U	4200	U	8400	U	2800	U	1700	UR	4300	U	1100	U	880	U	1800	U
Acenaphthene	50000	NYSDEC TAGM	UG/KG	420	U	1800	U	3500	U	72	J	710	UR	1800	U	440	U	360	U	750	U
Acenaphthylene	41000	NYSDEC TAGM	UG/KG	420	U	1800	U	3500	U	310	J	70	J	1800	U	440	U	360	U	750	U
Anthracene	50000	NYSDEC TAGM	UG/KG	420	U	1800	U	3500	U	390	J	82	J	1800	U	27	J	360	U	750	U
Benzo(a)anthracene	224	NYSDEC TAGM	UG/KG	420	U	1800	U	3500	U	**1800**		**420**	**J**	1800	U	110	J	31	J	45	J
Benzo(a)pyrene	61	NYSDEC TAGM	UG/KG	420	U	1800	U	3500	U	**4400**		**560**	**J**	1800	U	**99**	**J**	27	J	40	J
Benzo(b)fluoranthene	1100	NYSDEC TAGM	UG/KG	420	U	1800	U	3500	U	**3800**		480	J	1800	U	100	J	31	J	49	J
Benzo(g,h,i)perylene	50000	NYSDEC TAGM	UG/KG	32	J	900	J	340	J	6300		160	J	1800	U	62	J	360	U	750	U
Benzo(k)fluoranthene	1100	NYSDEC TAGM	UG/KG	420	U	1800	U	3500	U	**2300**		740	J	1800	U	98	J	34	J	53	J
Carbazole			UG/KG	420	U	1800	U	3500	U	100	J	710	UR	1800	U	22	J	360	U	750	U
Chrysene	400	NYSDEC TAGM	UG/KG	420	U	96	J	3500	U	**2100**		**500**	**J**	1800	U	130	J	49	J	72	J
Di-n-butylphthalate	8100	NYSDEC TAGM	UG/KG	420	U	1800	U	3500	U	150	J	1300	J	120	J	250	J	19	J	750	U
Dibenz(a,h)anthracene	14	NYSDEC TAGM	UG/KG	**26**	**J**	**260**	**J**	**220**	**J**	**1100**	**J**	710	UR	1800	U	440	U	360	U	750	U
Dibenzofuran	6200	NYSDEC TAGM	UG/KG	420	U	1800	U	3500	U	1100	U	710	UR	1800	U	440	U	360	U	750	U
Diethylphthalate	7100	NYSDEC TAGM	UG/KG	420	U	1800	U	3500	U	1100	U	710	UR	1800	U	440	U	360	U	750	U
Fluoranthene	50000	NYSDEC TAGM	UG/KG	420	U	91	J	3500	U	1800		470	J	1800	U	240	J	83	J	120	J
Fluorene	50000	NYSDEC TAGM	UG/KG	420	U	1800	U	3500	U	1100	U	710	UR	1800	U	440	U	360	U	750	U
Indeno(1,2,3-cd)pyrene	3200	NYSDEC TAGM	UG/KG	32	J	470	J	320	J	**4600**		710	UR	1800	U	30	J	360	U	750	U

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

			LOC_ID:	SB16-1		SB16-3		SB16-3		SB16-4		SS16-1		SS16-10		SS16-11		SS16-12		SS16-13	
			SAMP ID:	16037		16032		16033		16030		SS16-1-1		SS16-10-1		SS16-11-1		SS16-12-1		SS16-13-1	
			QC CODE:	SA		SA		DU		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		ESI		ESI		ESI		ESI		ESI	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/14/96		8/14/96		8/14/96		8/14/96		10/20/93		11/9/93		10/20/93		10/20/93		10/20/93	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
N-Nitrosodiphenylamine (1)			UG/KG	420	U	1800	U	3500	U	1100	U	680	J	1800	U	22	J	360	U	43	J
Naphthalene	13000	NYSDEC TAGM	UG/KG	420	U	1800	U	3500	U	180	J	710	UR	1800	U	440	U	360	U	750	U
Pentachlorophenol	1000	NYSDEC TAGM	UG/KG	1000	U	4200	U	8400	U	2800	U	1700	UR	4300	U	1100	U	880	U	1800	U
Phenanthrene	50000	NYSDEC TAGM	UG/KG	420	U	1800	U	3500	U	620	J	140	J	1800	U	130	J	45	J	81	J
Pyrene	50000	NYSDEC TAGM	UG/KG	420	U	1800	U	3500	U	2100		980	J	1800	U	200	J	66	J	97	J
bis(2-Ethylhexyl)phthalate	50000	NYSDEC TAGM	UG/KG	30	J	1800	U	3500	U	67	J	710	UR	1800	U	540	J	360	U	320	J
PESTICIDES/PCB																					
4,4'-DDD	2900	NYSDEC TAGM	UG/KG	4.2	U	3.5	U	3.5	U	35	U	5	J	3.6	UJ	4.4	U	3.6	U	3.7	U
4,4'-DDE	2100	NYSDEC TAGM	UG/KG	4.2	U	2	J	3.5	U	35	U	19	J	3.6	UJ	15	J	38		6	
4,4'-DDT	2100	NYSDEC TAGM	UG/KG	4.2	U	3.5	U	3.5	U	35	U	12	J	3.6	UJ	6.3	J	5		2.6	J
Aldrin	41	NYSDEC TAGM	UG/KG	2.2	U	1.8	U	1.8	U	18	U	1.8	UJ	1.8	UJ	2.3	U	1.9	U	1.9	U
Aroclor-1254	10000	NYSDEC TAGM	UG/KG	42	U	35	U	35	U	350	U	30	UJ	36	UJ	44	U	36	U	37	U
Aroclor-1260	10000	NYSDEC TAGM	UG/KG	42	U	35	U	35	U	350	U	35	U	36	UJ	110		36	U	37	U
Dieldrin	44	NYSDEC TAGM	UG/KG	4.2	U	3.5	U	3.5	U	26	J	3.5	UJ	3.6	UJ	4.4	U	3.6	U	3.7	U
Endosulfan I	900	NYSDEC TAGM	UG/KG	1.4	U	1.2	U	1.8	U	25	J	14	J	1.8	UJ	2.3	U	1.4	J	1.9	U
Endosulfan II	900	NYSDEC TAGM	UG/KG	4.2	U	3.5	U	3.5	U	35	U	4.4	J	3.6	UJ	4.4	U	3.6	U	3.7	U
Endosulfan sulfate	1000	NYSDEC TAGM	UG/KG	4.2	U	3.5	U	3.5	U	35	U	3.5	UJ	3.6	UJ	4.4	U	3.6	U	3.7	U
Endrin	100	NYSDEC TAGM	UG/KG	2.2	U	3.5	U	3.5	U	35	U	3.5	UJ	3.6	UJ	4.4	U	3.6	U	3.7	U
Endrin aldehyde			UG/KG	4.2	U	3.5	U	3.5	U	35	U	3	J	3.6	UJ	6.5	J	3.6	U	3.7	U
Endrin ketone			UG/KG	4.2	U	3.5	U	3.5	U	35	U	3.4	J	3.6	UJ	4.4	U	3.6	U	3.7	U
Heptachlor	100	NYSDEC TAGM	UG/KG	2.2	U	1.8	U	1.8	U	18	U	1.8	UJ	1.8	UJ	2.3	U	1.9	U	1.9	U
Heptachlor epoxide	20	NYSDEC TAGM	UG/KG	1.6	J	1.8	U	1.8	U	18	U	1.8	UJ	1.8	UJ	2.3	U	1.6	J	2.1	J
Toxaphene			UG/KG	220	U	180	U	180	U	1800	U	180	UJ	180	UJ	230	U	190	U	190	U
alpha-Chlordane			UG/KG	2.2	U	1.8	U	1.8	U	18	U	1.8	UJ	1.8	UJ	2.3	U	1.9	U	1.9	U
beta-BHC	200	NYSDEC TAGM	UG/KG	2.2	U	1.8	U	1.8	U	18	U	1.8	UJ	1.8	UJ	2.3	U	1.9	U	1.9	U
gamma-BHC (Lindane)	60	NYSDEC TAGM	UG/KG	2.2	U	1.8	U	1.8	U	18	U	1.8	UJ	1.8	UJ	2.3	U	1.9	U	1.9	U
gamma-Chlordane	540	NYSDEC TAGM	UG/KG	2.2	U	1.8	U	1.8	U	18	U	1.8	UJ	1.8	UJ	2.3	U	1.9	U	1.9	U

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

			LOC_ID:	SB16-1		SB16-3		SB16-3		SB16-4		SS16-1		SS16-10		SS16-11		SS16-12		SS16-13	
			SAMP ID:	16037		16032		16033		16030		SS16-1-1		SS16-10-1		SS16-11-1		SS16-12-1		SS16-13-1	
			QC CODE:	SA		SA		DU		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		ESI		ESI		ESI		ESI		ESI	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/14/96		8/14/96		8/14/96		8/14/96		10/20/93		11/9/93		10/20/93		10/20/93		10/20/93	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
OTHER ANALYSES																					
Nitrate/Nitrite-Nitrogen			MG/KG	2.2		0.01		0.01		0.02		0.05		0.07		0.23		0.04		0.05	
Percent Moisture (PEST/PCB)				22		6		5		5											
Percent Moisture (SVOCs)				22		6		5		4											
Percent Moisture (VOCs)				18		6		5		5											
Percent Solids (Metals)				78		93.8		94.6		95.4											
Total Organic Carbon			MG/KG																		
NITROAROMATICS																					
2,4-Dinitrotoluene			UG/KG	120	U	6800	J	280	J	2200		320		130	U	130	U	130	U	130	U
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	120	U	250	U	120	U	130	J	130	U	130	U	130	U	130	U	130	U
2-amino-4,6-Dinitrotoluene			UG/KG	120	U	250	U	120	U	120	U	130	U	130	U	130	U	130	U	130	U
Tetryl			UG/KG	120	U	250	U	120	U	120	U	130	U	130	U	130	U	130	U	130	U
METALS																					
Aluminum	14592.8	NYSDEC TAGM	MG/KG	19700	R	12500	R	11700	R	5100	R	6550		9720		17200		10400		14100	
Antimony	3.59	NYSDEC TAGM	MG/KG	0.42	UJ	0.39	UJ	0.38	UJ	1.6	J	17.1		6.6	U	13.9	U	6.6	U	8.2	U
Arsenic	7.5	NYSDEC TAGM	MG/KG	5	J	4	J	3.8	J	3	J	4.9		5.2	J	7.7		5.2		6.8	
Barium	300	NYSDEC TAGM	MG/KG	198	J	67.6	J	61.5	J	44.4	J	102		33.6		195		52		88.2	
Beryllium	0.73	NYSDEC TAGM	MG/KG	0.72		0.41		0.38		0.08		0.32	J	0.36	J	0.91	J	0.46	J	0.59	J
Cadmium	1	NYSDEC TAGM	MG/KG	0.36		0.06	U	0.06	U	0.18		0.44	U	0.41	UR	0.87	U	0.41	U	0.51	U
Calcium	101904	NYSDEC TAGM	MG/KG	6180		30600		45500		76600		147000		13800		9820		30300		28700	
Chromium	22.13	NYSDEC TAGM	MG/KG	24.7		21.2		20.5		8.6		12.6		13.9		25.5		19.2		26.7	
Cobalt	30	NYSDEC TAGM	MG/KG	14.9	J	12.6	J	13	J	4.6		6.2	J	7.6		16.7		10.6		13.7	
Copper	25	NYSDEC TAGM	MG/KG	19	J	35.6	J	33	J	39.7	J	44		29	J	199		54.8		204	
Cyanide	0.3	NYSDEC TAGM	MG/KG	0.55	UJ	0.52	UJ	0.5	UJ	0.47	UJ	0.64	U	0.53	U	0.69	U	0.64	U	0.63	U
Iron	26626.7	NYSDEC TAGM	MG/KG	31900	J	27100	J	25600	J	10900	J	12300		23200		30600		22700		30400	
Lead	21.86	NYSDEC TAGM	MG/KG	21.9	J	65.9	J	51.7	J	193	J	269		16.1		616		195		460	
Magnesium	12221.8	NYSDEC TAGM	MG/KG	4380		8010		9320		24900		34900		5500		5200		5830		7350	
Manganese	669.38	NYSDEC TAGM	MG/KG	1060		397	J	409	J	417	J	355	J	342		706	J	329	J	417	J
Mercury	0.1	NYSDEC TAGM	MG/KG	0.1	J	0.05	U	0.04	J	0.51	J	0.2		0.02	U	0.73		0.24		1	
Nickel	33.62	NYSDEC TAGM	MG/KG	30	J	40.3	J	39.7	J	12.3	J	23		22.4		35.2		39.5		50.8	
Potassium	1761.48	NYSDEC TAGM	MG/KG	1710		1690		1590		1060		1290		813		1600		1080		1320	

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	SB16-1		SB16-3		SB16-3		SB16-4		SS16-1		SS16-10		SS16-11		SS16-12		SS16-13	
			SAMP ID:	16037		16032		16033		16030		SS16-1-1		SS16-10-1		SS16-11-1		SS16-12-1		SS16-13-1	
			QC CODE:	SA		SA		DU		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		ESI		ESI		ESI		ESI		ESI	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/14/96		8/14/96		8/14/96		8/14/96		10/20/93		11/9/93		10/20/93		10/20/93		10/20/93	
				VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
Selenium	2	NYSDEC TAGM	MG/KG	1.5	J	0.82	J	0.45	UJ	0.44	UJ	0.15	UJ	0.22	UJ	0.24	UJ	0.25	J	0.21	J
Silver	0.4	NYSDEC TAGM	MG/KG	0.3		0.25	U	0.25	U	0.24		0.9	U	0.84	UJ	1.8	U	0.84	U	1	U
Sodium	103.74	NYSDEC TAGM	MG/KG	55.8	U	76.6		99.2		53.4		**213**	**J**	49.7	J	72.2	J	**108**	**J**	**125**	**J**
Thallium	0.28	NYSDEC TAGM	MG/KG	**1.8**		0.82	U	0.79	U	**0.77**		1.6	U	0.24	UJ	0.26	U	0.25	U	0.16	U
Vanadium	150	NYSDEC TAGM	MG/KG	33.6	J	22.4	J	20.4	J	11.2	J	36.9		16.9		28.8		15		21.1	
Zinc	82.5	NYSDEC TAGM	MG/KG	**99.8**		**84.5**		79.8		**90.4**		**219**		65.8	J	**1270**		**89**		**128**	
HERBICIDES																					
2,4,5-T	1900	NYSDEC TAGM	UG/KG									5.4	U	5.4	U	6.7	U	5.5	U	5.7	U
MCPP			UG/KG									5400	U	5400	U	6700	U	5500	U	5700	U

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

			LOC_ID:	SS16-14		SS16-15		SS16-16		SS16-17		SS16-18		SS16-19		SS16-2		SS16-20		SS16-21	
			SAMP ID:	SS16-14-1		SS16-15-1		SS16-16-1		16040		16041		16042		SS16-2-1		16043		16058	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	ESI		ESI		ESI		RI ROUND1		RI ROUND1		RI ROUND1		ESI		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	10/20/93		10/20/93		10/20/93		8/19/96		8/19/96		8/19/96		10/20/93		8/19/96		8/21/96	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
VOLATILE ORGANICS																					
1,1,2,2-Tetrachloroethane	600	NYSDEC TAGM	UG/KG	11	U	11	UJ	11	U	12	U	12	U	10	UJ	12	U	11	UJ	10	UJ
Acetone	200	NYSDEC TAGM	UG/KG	11	U	11	UJ	11	U	6	U	8	U	10	UJ	12	U	11	UJ	10	U
Benzene	60	NYSDEC TAGM	UG/KG	11	U	11	UJ	11	U	12	U	12	U	10	UJ	12	U	2	J	10	U
Carbon Disulfide	2700	NYSDEC TAGM	UG/KG	11	U	11	UJ	11	U	12	U	12	U	10	UJ	1	J	11	UJ	10	U
Chloroform	300	NYSDEC TAGM	UG/KG	11	U	11	UJ	11	U	6	U	6	U	5	UJ	12	U	5	UJ	5	U
Methylene Chloride	100	NYSDEC TAGM	UG/KG	3	J	11	UJ	11	U	12	U	12	U	10	UJ	12	U	11	UJ	10	U
Toluene	1500	NYSDEC TAGM	UG/KG	1	J	11	UJ	11	U	12	U	12	U	2	J	12	U	3	J	10	UJ
Xylene (total)	1200	NYSDEC TAGM	UG/KG	11	U	11	UJ	11	U	12	U	12	U	10	UJ	12	U	11	UJ	10	UJ
SEMIVOLATILE ORGANICS																					
2,4-Dinitrotoluene			UG/KG	370		350	U	1800	UJ	390	U	420	U	340	U	760		58	J	15000	
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	56	J	350	U	1800	UJ	390	U	420	U	340	U	410	U	350	U	**1200**	**J**
2-Methylnaphthalene	36400	NYSDEC TAGM	UG/KG	370	U	350	U	1800	UJ	390	U	420	U	340	U	350	J	350	U	2300	U
3,3'-Dichlorobenzidine			UG/KG	370	U	350	U	1800	UJ	390	U	420	U	340	U	410	U	350	U	2300	U
3-Nitroaniline	500	NYSDEC TAGM	UG/KG	890	U	860	U	4500	UJ	950	U	1000	U	820	U	1000	U	850	U	5600	U
Acenaphthene	50000	NYSDEC TAGM	UG/KG	370	U	350	U	1800	UJ	390	U	420	U	340	U	410	U	350	U	2300	U
Acenaphthylene	41000	NYSDEC TAGM	UG/KG	370	U	350	U	1800	UJ	390	U	420	U	340	U	65	J	350	U	2300	U
Anthracene	50000	NYSDEC TAGM	UG/KG	370	U	350	U	1800	UJ	390	U	420	U	340	U	55	J	350	U	2300	U
Benzo(a)anthracene	224	NYSDEC TAGM	UG/KG	26	J	350	U	1800	UJ	390	U	420	U	340	U	**260**	**J**	26	J	2300	U
Benzo(a)pyrene	61	NYSDEC TAGM	UG/KG	24	J	350	U	1800	UJ	22	J	420	U	340	U	**300**	**J**	34	J	2300	U
Benzo(b)fluoranthene	1100	NYSDEC TAGM	UG/KG	33	J	350	U	1800	UJ	21	J	420	U	20	J	500		32	J	2300	U
Benzo(g,h,i)perylene	50000	NYSDEC TAGM	UG/KG	19	J	350	U	1800	UJ	390	U	420	U	340	U	130	J	350	U	2300	U
Benzo(k)fluoranthene	1100	NYSDEC TAGM	UG/KG	30	J	350	U	1800	UJ	22	J	420	U	16	J	310	J	32	J	2300	U
Carbazole			UG/KG	370	U	350	U	1800	UJ	390	U	420	U	340	U	48	J	350	U	2300	U
Chrysene	400	NYSDEC TAGM	UG/KG	44	J	16	J	1800	UJ	22	J	19	J	24	J	**470**		37	J	2300	U
Di-n-butylphthalate	8100	NYSDEC TAGM	UG/KG	76	J	350	U	1800	UJ	390	U	420	U	340	U	710		350	U	2300	U
Dibenz(a,h)anthracene	14	NYSDEC TAGM	UG/KG	370	U	350	U	1800	UJ	390	U	420	U	340	U	410	U	32	U	2300	U
Dibenzofuran	6200	NYSDEC TAGM	UG/KG	370	U	350	U	1800	UJ	390	U	420	U	340	U	100	J	350	U	2300	U
Diethylphthalate	7100	NYSDEC TAGM	UG/KG	370	U	350	U	1800	UJ	390	U	19	J	16	J	410	U	350	U	2300	U
Fluoranthene	50000	NYSDEC TAGM	UG/KG	68	J	23	J	1800	UJ	37	J	28	J	39	J	580		43	J	2300	U
Fluorene	50000	NYSDEC TAGM	UG/KG	370	U	350	U	1800	UJ	390	U	420	U	340	U	410	U	350	U	2300	U
Indeno(1,2,3-cd)pyrene	3200	NYSDEC TAGM	UG/KG	370	U	350	U	1800	UJ	390	U	420	U	340	U	30	J	350	U	2300	U

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT									
			LOC_ID:	SS16-14	SS16-15	SS16-16	SS16-17	SS16-18	SS16-19	SS16-2	SS16-20	SS16-21
			SAMP ID:	SS16-14-1	SS16-15-1	SS16-16-1	16040	16041	16042	SS16-2-1	16043	16058
			QC CODE:	SA	SA	SA	SA	SA	SA	SA	SA	SA
			STUDY ID:	ESI	ESI	ESI	RI ROUND1	RI ROUND1	RI ROUND1	ESI	RI ROUND1	RI ROUND1
			TOP:	0	0	0	0	0	0	0	0	0
			BOTTOM:	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
			MATRIX:	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL
			SAMPLE DATE:	10/20/93	10/20/93	10/20/93	8/19/96	8/19/96	8/19/96	10/20/93	8/19/96	8/21/96
				VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q
N-Nitrosodiphenylamine (1)			UG/KG	17 J	350 U	1800 UJ	390 U	420 U	340 U	150 J	350 U	1600 J
Naphthalene	13000	NYSDEC TAGM	UG/KG	370 U	350 U	1800 UJ	390 U	420 U	340 U	230 J	350 U	2300 U
Pentachlorophenol	1000	NYSDEC TAGM	UG/KG	890 U	860 U	4500 UJ	950 U	1000 U	820 U	1000 U	850 U	5600 U
Phenanthrene	50000	NYSDEC TAGM	UG/KG	36 J	25 J	1800 UJ	19 J	420 U	29 J	420	27 J	2300 U
Pyrene	50000	NYSDEC TAGM	UG/KG	54 J	19 J	1800 UJ	26 J	22 J	30 J	520	41 J	2300 U
bis(2-Ethylhexyl)phthalate	50000	NYSDEC TAGM	UG/KG	370 J	350 U	1800 UJ	24 U	26 U	84 U	410 U	200 U	2300 U
PESTICIDES/PCB												
4,4'-DDD	2900	NYSDEC TAGM	UG/KG	7.3 U	3.5 U	7.4 U	3.9 U	4.2 U	3.4 U	4.1 UR	3.5 U	3.5 R
4,4'-DDE	2100	NYSDEC TAGM	UG/KG	59	28 J	38	3.9 U	4.2 U	14	9.4 J	37	34 J
4,4'-DDT	2100	NYSDEC TAGM	UG/KG	19	2.1 J	89	3.9 U	4.2 U	1.8 J	8.1 J	6.7	22 J
Aldrin	41	NYSDEC TAGM	UG/KG	3.8 U	1.8 U	3.8 U	2 U	2.2 U	1.7 U	2.1 UR	1.8 U	1.8 R
Aroclor-1254	10000	NYSDEC TAGM	UG/KG	73 U	35 U	74 U	39 U	42 U	34 U	41 UR	35 U	35 R
Aroclor-1260	10000	NYSDEC TAGM	UG/KG	73 U	22 J	74 U	39 U	42 U	34 U	41 UR	35 U	35 R
Dieldrin	44	NYSDEC TAGM	UG/KG	7.3 U	3.5 U	7.4 U	3.9 U	4.2 U	3.4 U	4.1 UR	3.5 U	3.5 R
Endosulfan I	900	NYSDEC TAGM	UG/KG	3.8 U	0.96 J	3.8 U	2 U	2.2 U	2 J	3.4 J	1.8 U	1.8 J
Endosulfan II	900	NYSDEC TAGM	UG/KG	7.3 U	3.5 U	7.4 U	3.9 U	4.2 U	3.4 U	4.1 UR	3.5 U	3.5 R
Endosulfan sulfate	1000	NYSDEC TAGM	UG/KG	7.3 U	3.5 U	7.4 U	3.9 U	4.2 U	3.4 U	4.1 UR	3.5 U	3.5 R
Endrin	100	NYSDEC TAGM	UG/KG	7.3 U	3.5 U	7.4 U	3.9 U	4.2 U	3.4 U	4.1 UR	3.5 U	3.5 R
Endrin aldehyde			UG/KG	7.3 U	3.5 U	7.4 U	3.9 U	4.2 U	3.4 U	4.1 UR	3.5 U	3.5 J
Endrin ketone			UG/KG	7.3 U	3.5 U	7.4 U	3.9 U	4.2 U	3.4 U	4.1 UR	3.5 U	3.5 R
Heptachlor	100	NYSDEC TAGM	UG/KG	3.8 U	1.8 U	3.8 U	2 U	2.2 U	1.7 U	2.1 UR	1.8 U	1.8 J
Heptachlor epoxide	20	NYSDEC TAGM	UG/KG	3.8 U	1.8 U	3.8 U	2 U	2.2 U	1.7 U	2.1 UR	1.8 U	1.8 R
Toxaphene			UG/KG	380 U	180 U	380 U	200 U	220 U	170 U	210 UR	180 U	180 J
alpha-Chlordane			UG/KG	4.8	1.8 U	3.8 U	2 U	2.2 U	1.7 U	2.1 UR	1.8 U	1.3 J
beta-BHC	200	NYSDEC TAGM	UG/KG	3.8 U	1.8 U	3.8 U	2 U	2.2 U	1.7 U	2.1 UR	1.8 U	1.8 R
gamma-BHC (Lindane)	60	NYSDEC TAGM	UG/KG	3.8 U	1.8 U	3.8 U	2 U	2.2 U	1.7 U	2.1 UR	1.8 U	1.8 R
gamma-Chlordane	540	NYSDEC TAGM	UG/KG	3.4 J	1.8 U	3.8 U	2 U	2.2 U	1.7 U	2.1 UR	1.8 U	1.8 R

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE																			
			LOC_ID:	SS16-14		SS16-15		SS16-16		SS16-17		SS16-18		SS16-19		SS16-2		SS16-20		SS16-21	
			SAMP ID:	SS16-14-1		SS16-15-1		SS16-16-1		16040		16041		16042		SS16-2-1		16043		16058	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	ESI		ESI		ESI		RI ROUND1		RI ROUND1		RI ROUND1		ESI		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	10/20/93		10/20/93		10/20/93		8/19/96		8/19/96		8/19/96		10/20/93		8/19/96		8/21/96	
			UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
OTHER ANALYSES																					
Nitrate/Nitrite-Nitrogen			MG/KG	0.05		0.04		0.2		1.4		0.49		0.04		0.9		0.11		0.29	
Percent Moisture (PEST/PCB)										16		21		2				6		5	
Percent Moisture (SVOCs)										16		21		2				6		5	
Percent Moisture (VOCs)										19		17		4				6		5	
Percent Solids (Metals)										84		79.3		97.7				94		94.6	
Total Organic Carbon			MG/KG																	11000	
NITROAROMATICS																					
2,4-Dinitrotoluene			UG/KG	1200		130	U	150		74000		120	U	220		500		310		7300	
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	130	U	130	U	130	U	2500	U	120	U	120	U	130	U	120		250	U
2-amino-4,6-Dinitrotoluene			UG/KG	130	U	130	U	130	U	2500	U	120	U	120	U	130	U	120	U	250	U
Tetryl			UG/KG	130	U	130	U	130	U	2500	U	120	U	120	U	130	U	120	U	250	U
METALS																					
Aluminum	14592.8	NYSDEC TAGM	MG/KG	7680		7510		6310		10200	J	13600	J	9670	J	6340		14100	J	12200	J
Antimony	3.59	NYSDEC TAGM	MG/KG	8.4		6.2	U	9	U	2.9	J	2.5	J	3.5	J	55.6		9.9	J	20.8	J
Arsenic	7.5	NYSDEC TAGM	MG/KG	9.9		4.8		3.8		4.7	J	4.1	J	4.5	J	16.6		5.2	J	6.5	
Barium	300	NYSDEC TAGM	MG/KG	211		35.1		56.6		168	J	148	J	124	J	1200		175	J	442	J
Beryllium	0.73	NYSDEC TAGM	MG/KG	0.41	J	0.34	J	0.37	J	0.24		0.75		0.37		0.42	J	0.52		0.46	
Cadmium	1	NYSDEC TAGM	MG/KG	0.61	J	0.39	U	0.56	U	0.45		0.25		0.36		1.6	R	0.49		0.69	
Calcium	101904	NYSDEC TAGM	MG/KG	178000		26800		135000		7470		5200		113000		11700		36300		34900	
Chromium	22.13	NYSDEC TAGM	MG/KG	14.4		15.6		14.1		16		19.9		20.4		16.5		29.1		40.3	
Cobalt	30	NYSDEC TAGM	MG/KG	8.2		8.1		10.4		9.3		7.9		12.7	J	6.7	J	16.1	J	12.7	
Copper	25	NYSDEC TAGM	MG/KG	163		42.6		69.2		74.4	J	60.1	J	99.4	J	911		207	J	379	
Cyanide	0.3	NYSDEC TAGM	MG/KG	0.64	U	0.63	U	0.67	U	0.59	U	0.53	U	0.51	U	0.74	U	0.49	U	0.52	U
Iron	26626.7	NYSDEC TAGM	MG/KG	16500		17500		11700		19700	J	22700	J	21900	J	25900		30600	J	27100	J
Lead	21.86	NYSDEC TAGM	MG/KG	720		210		643		304	J	187	J	669	J	3780		1370	J	2030	
Magnesium	12221.8	NYSDEC TAGM	MG/KG	5990		4770		56000		3520		3190		10100		4400		8330		8560	
Manganese	669.38	NYSDEC TAGM	MG/KG	270	J	227	J	310	J	948		353		413		178	J	417		381	
Mercury	0.1	NYSDEC TAGM	MG/KG	0.07	J	0.05	J	0.04	J	1.2	J	0.77	J	0.04	U	4		0.13	J	0.26	
Nickel	33.62	NYSDEC TAGM	MG/KG	29.4		30.5		28.5		22.7	J	20.3	J	38.8	J	21.7		55.6	J	45.7	
Potassium	1761.48	NYSDEC TAGM	MG/KG	1100		802		2300		1170		1150		1840		673	J	2020		1240	

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

			LOC_ID:	SS16-14		SS16-15		SS16-16		SS16-17		SS16-18		SS16-19		SS16-2		SS16-20		SS16-21	
			SAMP ID:	SS16-14-1		SS16-15-1		SS16-16-1		16040		16041		16042		SS16-2-1		16043		16058	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	ESI		ESI		ESI		RI ROUND1		RI ROUND1		RI ROUND1		ESI		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	10/20/93		10/20/93		10/20/93		8/19/96		8/19/96		8/19/96		10/20/93		8/19/96		8/21/96	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
Selenium	2	NYSDEC TAGM	MG/KG	0.41	J	0.22	UJ	0.21	UJ	0.59		0.93		0.47		0.4	J	0.46	U	1.2	
Silver	0.4	NYSDEC TAGM	MG/KG	0.93	U	0.79	U	1.1	U	0.26		0.32	U	0.31		1.5	U	0.28		0.21	U
Sodium	103.74	NYSDEC TAGM	MG/KG	176	J	90.1	J	240	J	51.8	U	66.2	U	128		121	J	107		101	
Thallium	0.28	NYSDEC TAGM	MG/KG	0.14	U	0.24	U	0.23	U	1.7	J	1.1	J	0.74	J	0.19	U	0.92	J	0.8	J
Vanadium	150	NYSDEC TAGM	MG/KG	13.4		10.8		61.9		20.1	J	24.5	J	16.5	J	14.5		21.5	J	17.1	
Zinc	82.5	NYSDEC TAGM	MG/KG	104		68.6		93.8		107		87.5		117		478		174		246	
HERBICIDES																					
2,4,5-T	1900	NYSDEC TAGM	UG/KG	8.3		5.4	U	5.6	U							6.3	U				
MCPP			UG/KG	5600	U	5400	U	5600	U							6300	U				

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

			LOC_ID:	SS16-21		SS16-22		SS16-23		SS16-24		SS16-25		SS16-26		SS16-27		SS16-28		SS16-29	
			SAMP ID:	16059		16049		16051		16060		16050		16046		16047		16044		16045	
			QC CODE:	DU		SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/21/96		8/20/96		8/20/96		8/21/96		8/20/96		8/20/96		8/20/96		8/19/96		8/19/96	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
VOLATILE ORGANICS																					
1,1,2,2-Tetrachloroethane	600	NYSDEC TAGM	UG/KG	10	UJ	11	UJ	12	U	10	UJ	11	UJ	11	U	11	U	10	U	10	UJ
Acetone	200	NYSDEC TAGM	UG/KG	10	U	11	U	12	U	10	UJ	11	UJ	5	U	11	U	10	U	11	UJ
Benzene	60	NYSDEC TAGM	UG/KG	10	UJ	11	U	12	U	2	J	11	UJ	11	U	11	U	10	U	2	J
Carbon Disulfide	2700	NYSDEC TAGM	UG/KG	10	U	11	U	12	U	10	UJ	11	UJ	11	U	11	U	10	U	10	UJ
Chloroform	300	NYSDEC TAGM	UG/KG	5	U	6	U	6	U	5	UJ	2	J	5	U	5	U	5	U	5	UJ
Methylene Chloride	100	NYSDEC TAGM	UG/KG	10	U	11	U	12	U	10	UJ	11	UJ	11	U	11	U	10	U	10	UJ
Toluene	1500	NYSDEC TAGM	UG/KG	2	J	11	UJ	12	U	4	J	2	J	1	J	3	J	10	U	4	J
Xylene (total)	1200	NYSDEC TAGM	UG/KG	10	UJ	11	UJ	12	U	10	UJ	11	UJ	11	U	11	U	10	U	10	UJ
SEMIVOLATILE ORGANICS																					
2,4-Dinitrotoluene			UG/KG	19000		95	J	380	U	1800		39	J	870		85000		500		1800	
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	1600	J	360	U	380	U	160	J	340	U	350	U	8000	J	51	J	150	J
2-Methylnaphthalene	36400	NYSDEC TAGM	UG/KG	2900	U	19	J	380	U	76	J	340	U	27	J	14000	U	350	U	340	U
3,3'-Dichlorobenzidine			UG/KG	2900	U	360	U	380	U	340	U	340	U	350	U	14000	U	350	U	340	U
3-Nitroaniline	500	NYSDEC TAGM	UG/KG	7100	U	870	U	920	U	830	U	830	U	850	U	35000	U	840	U	820	U
Acenaphthene	50000	NYSDEC TAGM	UG/KG	2900	U	360	U	380	U	37	J	340	U	64	J	14000	U	350	U	340	U
Acenaphthylene	41000	NYSDEC TAGM	UG/KG	2900	U	19	J	380	U	340	U	340	U	22	J	14000	U	350	U	340	U
Anthracene	50000	NYSDEC TAGM	UG/KG	2900	U	32	J	380	U	44	J	340	U	120	J	14000	U	350	U	340	U
Benzo(a)anthracene	224	NYSDEC TAGM	UG/KG	2900	U	190	J	380	U	340	U	26	J	500		1300	J	42	J	340	U
Benzo(a)pyrene	61	NYSDEC TAGM	UG/KG	2900	U	250	J	380	U	340	U	30	J	520		1500	J	61	J	17	J
Benzo(b)fluoranthene	1100	NYSDEC TAGM	UG/KG	2900	U	420		380	U	480		28	J	810		1800	J	84	J	17	J
Benzo(g,h,i)perylene	50000	NYSDEC TAGM	UG/KG	2900	U	210	U	380	U	340	U	24	J	440	U	14000	U	350	U	340	U
Benzo(k)fluoranthene	1100	NYSDEC TAGM	UG/KG	2900	U	290	J	380	U	340	U	33	J	600		1500	J	65	J	340	U
Carbazole			UG/KG	2900	U	26	J	380	U	41	J	340	U	110	J	14000	U	350	U	340	U
Chrysene	400	NYSDEC TAGM	UG/KG	2900	U	370		380	U	340	U	40	J	720		1600	J	70	J	17	J
Di-n-butylphthalate	8100	NYSDEC TAGM	UG/KG	2300	U	32	J	380	U	340	U	340	U	430		16000		350	U	150	J
Dibenz(a,h)anthracene	14	NYSDEC TAGM	UG/KG	2900	U	67	U	380	U	38	J	340	U	100	U	680	U	28	U	340	U
Dibenzofuran	6200	NYSDEC TAGM	UG/KG	2900	U	21	J	380	U	110	J	340	U	33	J	14000	U	350	U	340	U
Diethylphthalate	7100	NYSDEC TAGM	UG/KG	2900	U	360	U	380	U	340	U	340	U	350	U	14000	U	350	U	340	U
Fluoranthene	50000	NYSDEC TAGM	UG/KG	2900	U	420		380	U	520		56	J	1200		3100	J	94	J	21	J
Fluorene	50000	NYSDEC TAGM	UG/KG	2900	U	360	U	380	U	24	J	340	U	67	J	14000	U	350	U	340	U
Indeno(1,2,3-cd)pyrene	3200	NYSDEC TAGM	UG/KG	2900	U	210	U	380	U	340	U	22	J	440	U	14000	U	350	U	340	U

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	SS16-21	SS16-22	SS16-23	SS16-24	SS16-25	SS16-26	SS16-27	SS16-28	SS16-29
			SAMP ID:	16059	16049	16051	16060	16050	16046	16047	16044	16045
			QC CODE:	DU	SA	SA	SA	SA	SA	SA	SA	SA
			STUDY ID:	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1
			TOP:	0	0	0	0	0	0	0	0	0
			BOTTOM:	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
			MATRIX:	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL
			SAMPLE DATE:	8/21/96	8/20/96	8/20/96	8/21/96	8/20/96	8/20/96	8/20/96	8/19/96	8/19/96
				VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q
N-Nitrosodiphenylamine (1)			UG/KG	1700 J	360 U	380 U	310 J	340 U	950	25000	100 J	110 J
Naphthalene	13000	NYSDEC TAGM	UG/KG	2900 U	360 U	380 U	24 J	340 U	18 J	14000 U	350 U	340 U
Pentachlorophenol	1000	NYSDEC TAGM	UG/KG	7100 U	870 U	920 U	830 U	830 U	850 U	35000 U	840 U	820 U
Phenanthrene	50000	NYSDEC TAGM	UG/KG	2900 U	160 J	380 U	340 U	25 J	770	1800 J	37 J	340 U
Pyrene	50000	NYSDEC TAGM	UG/KG	2900 U	360	380 U	350	51 J	1000	2200 J	81 J	23 J
bis(2-Ethylhexyl)phthalate	50000	NYSDEC TAGM	UG/KG	2800 U	360 U	380 U	340 U	24 J	1200	14000 U	66 U	17 U
PESTICIDES/PCB												
4,4'-DDD	2900	NYSDEC TAGM	UG/KG	2 U	5.4 J	3.8 U	8.9 J	3.4 U	23 J	17 J	1.8 J	3.4 U
4,4'-DDE	2100	NYSDEC TAGM	UG/KG	50	73 J	21	110 J	20	210 J	190 J	20	5.7
4,4'-DDT	2100	NYSDEC TAGM	UG/KG	32 J	18 J	22	24 J	5.2	340 J	320 J	2.7 J	3.4 U
Aldrin	41	NYSDEC TAGM	UG/KG	1.8 R	1.8 U	2 U	1.8 R	1.8 U	5 J	1.8 U	1.8 U	1.8 U
Aroclor-1254	10000	NYSDEC TAGM	UG/KG	35 R	36 U	38 U	1100 J	34 U	180 U	280	34 U	34 U
Aroclor-1260	10000	NYSDEC TAGM	UG/KG	35 R	55 J	38 U	160 J	34 U	340 J	310 J	34 U	34 U
Dieldrin	44	NYSDEC TAGM	UG/KG	3.5 R	3.6 U	3.8 U	2.9 U	2 UJ	18 U	4.3 J	3.4 U	3.4 U
Endosulfan I	900	NYSDEC TAGM	UG/KG	2.1 J	5.9 J	2.3 J	13 J	1.6 UJ	9 U	21 J	2.2 J	1.8 U
Endosulfan II	900	NYSDEC TAGM	UG/KG	3.5 R	3.6 U	3.8 U	3.4 R	3.4 U	9.9 U	2.3 J	3.4 U	3.4 U
Endosulfan sulfate	1000	NYSDEC TAGM	UG/KG	3.5 R	3.6 U	3.8 U	2.8 U	3.4 U	18 U	2.1 J	3.4 U	3.4 U
Endrin	100	NYSDEC TAGM	UG/KG	2.1 R	2.2 J	3.8 U	9.1 J	3.1 UJ	17 U	6.4 J	3.4 U	3.4 U
Endrin aldehyde			UG/KG	1.9 U	3.4 U	3.8 U	4.9 J	3.4 U	15 U	14 J	3.4 U	3.4 U
Endrin ketone			UG/KG	3.5 R	3.6 U	3.8 U	3.4 R	3.4 U	18 U	3.6 J	3.4 U	3.4 U
Heptachlor	100	NYSDEC TAGM	UG/KG	1.8 R	1.8 U	2 U	1.8 R	1.8 U	9 U	1.8 U	1.8 U	1.8 U
Heptachlor epoxide	20	NYSDEC TAGM	UG/KG	1.8 R	1.8 U	2 U	6.7 J	1.8 U	9 U	1.6 J	1 J	1.8 U
Toxaphene			UG/KG	180 R	180 U	200 U	180 R	180 U	900 U	180 U	180 U	180 U
alpha-Chlordane			UG/KG	1.2 U	5.7	2 U	14 J	1.8 U	170 J	11 J	4.6	1.8 U
beta-BHC	200	NYSDEC TAGM	UG/KG	1.8 R	1.8 U	2 U	1.8 R	1.8 U	9 U	2.3	1.8 U	1.8 U
gamma-BHC (Lindane)	60	NYSDEC TAGM	UG/KG	1.8 R	2.3 J	2 U	1.8 R	1.8 U	9 U	1.8 U	1.8 U	1.8 U
gamma-Chlordane	540	NYSDEC TAGM	UG/KG	1.3 J	2.5 J	2 U	11 J	1.8 U	200 J	6.4	5.2	1.8 U

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

			LOC_ID:	SS16-21		SS16-22		SS16-23		SS16-24		SS16-25		SS16-26		SS16-27		SS16-28		SS16-29	
			SAMP ID:	16059		16049		16051		16060		16050		16046		16047		16044		16045	
			QC CODE:	DU		SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/21/96		8/20/96		8/20/96		8/21/96		8/20/96		8/20/96		8/20/96		8/19/96		8/19/96	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
OTHER ANALYSES																					
Nitrate/Nitrite-Nitrogen			MG/KG	0.34		0.03		0.08		0.04		0.06		0.39		0.11		0.06		0.11	
Percent Moisture (PEST/PCB)				6		8		13		4		4		6		8		4		3	
Percent Moisture (SVOCs)				6		8		13		4		4		6		8		5		3	
Percent Moisture (VOCs)				4		13		18		4		9		9		9		5		1	
Percent Solids (Metals)				94.5		92		87.4		95.8		95.8		93.5		91.9		95.5		97.4	
Total Organic Carbon			MG/KG													56400					
NITROAROMATICS																					
2,4-Dinitrotoluene			UG/KG	7700		160	J	120	U	450	J	200	J	490		7500	J	310		180	J
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	250	U	120	U	120	U	120	U	120	U	120	U	320	J	120	U	120	U
2-amino-4,6-Dinitrotoluene			UG/KG	250	U	120	U	120	U	120	U	120	U	120	U	250	U	120	U	120	U
Tetryl			UG/KG	250	U	120	U	120	U	120	U	120	U	120	U	250	U	120	U	120	U
METALS																					
Aluminum	14592.8	NYSDEC TAGM	MG/KG	12900	J	12200	J	10400	J	11100	J	14100	J	6370	J	11300	J	10000	J	3860	J
Antimony	3.59	NYSDEC TAGM	MG/KG	19.2	J	20.3	J	10.4	J	7.1	J	3.1	J	1930	J	122	J	6.7	J	1	J
Arsenic	7.5	NYSDEC TAGM	MG/KG	7.2		6.2	J	7.9		6.1		4	J	23	J	32.2	J	5.2	J	2.9	J
Barium	300	NYSDEC TAGM	MG/KG	676	J	169	J	263	J	148	J	121	J	9340	J	5190	J	107	J	48.1	J
Beryllium	0.73	NYSDEC TAGM	MG/KG	0.52		0.46		0.49		0.46		0.53		0.02	U	0.13		0.36		0.17	
Cadmium	1	NYSDEC TAGM	MG/KG	0.87		1.3		0.76		1.2		0.25		7.1		16.6		0.3		0.11	
Calcium	101904	NYSDEC TAGM	MG/KG	40200		56900		25400		50600		39200		68400		99700		57200		260000	
Chromium	22.13	NYSDEC TAGM	MG/KG	38		31		20.4		26.6		28.4		47.5		43.7		20.5		8.4	
Cobalt	30	NYSDEC TAGM	MG/KG	12.9		12.7	J	9		13.5		17.8	J	8.8		9.6		10.2	J	5.3	
Copper	25	NYSDEC TAGM	MG/KG	536		357	J	291		324		86.6	J	37900	J	3200	J	192	J	28.3	J
Cyanide	0.3	NYSDEC TAGM	MG/KG	0.5	U	0.5	U	0.56	U	0.46	U	0.44	U	0.53	U	0.54	U	0.49	U	0.47	U
Iron	26626.7	NYSDEC TAGM	MG/KG	28700	J	25700	J	20500		27600	J	28800	J	17900	J	20500	J	21900	J	8870	J
Lead	21.86	NYSDEC TAGM	MG/KG	2640		2920	J	1360		1450		439	J	140000	J	12600	J	626	J	66.6	J
Magnesium	12221.8	NYSDEC TAGM	MG/KG	8600		8610		7510		8200		8170		9100		22300		5510		4880	
Manganese	669.38	NYSDEC TAGM	MG/KG	373		414		350		432		465		367		581		322		215	
Mercury	0.1	NYSDEC TAGM	MG/KG	0.3		1.7	J	0.93		0.27		0.4	J	1.6	J	2.6	J	0.11	J	0.03	U
Nickel	33.62	NYSDEC TAGM	MG/KG	49.8		44.1	J	25		48		53.5	J	30.2	J	31.3	J	35.1	J	18.1	J
Potassium	1761.48	NYSDEC TAGM	MG/KG	1560		2200		1080		1540		2280		599		1510		1300		972	

SEAD-16 Surface Soil Analytical Results

				LOC_ID:	SS16-21		SS16-22		SS16-23		SS16-24		SS16-25		SS16-26		SS16-27		SS16-28		SS16-29	
				SAMP ID:	16059		16049		16051		16060		16050		16046		16047		16044		16045	
				QC CODE:	DU		SA		SA		SA		SA		SA		SA		SA		SA	
				STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
				TOP:	0		0		0		0		0		0		0		0		0	
				BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
				MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
				SAMPLE DATE:	8/21/96		8/20/96		8/20/96		8/21/96		8/20/96		8/20/96		8/20/96		8/19/96		8/19/96	
PARAMETER	LEVEL	SOURCE		UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
Selenium	2	NYSDEC TAGM		MG/KG	0.81		0.54		0.73	U	0.57	U	0.65		0.59		0.52	U	0.66		0.43	U
Silver	0.4	NYSDEC TAGM		MG/KG	0.25	U	0.33		0.27		0.28		0.32		**11.1**		**1.9**		**0.41**		0.37	
Sodium	103.74	NYSDEC TAGM		MG/KG	102		89.1		**138**		**120**		61.3		**1830**		**342**		77.8		**115**	
Thallium	0.28	NYSDEC TAGM		MG/KG	**1**	**J**	**0.9**	**J**	0.85	U	0.66	U	0.82	U	**16.6**	**J**	**1.2**	**J**	0.86	U	0.75	U
Vanadium	150	NYSDEC TAGM		MG/KG	18.6		26.7	J	20.1		21.3		22.5	J	15.5	J	23.6	J	16.3	J	8.2	
Zinc	82.5	NYSDEC TAGM		MG/KG	**307**		**299**		**411**		**327**		**113**		**14600**		**2120**		**115**		42.7	

HERBICIDES			
2,4,5-T	1900	NYSDEC TAGM	UG/KG
MCPP			UG/KG

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

			LOC_ID:	SS16-3		SS16-30		SS16-31		SS16-32		SS16-33		SS16-34		SS16-35		SS16-36		SS16-37	
			SAMP ID:	SS16-3-1		16048		16062		16052		16067		16053		16066		16061		16054	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	ESI		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	10/22/93		8/20/96		8/21/96		8/20/96		8/22/96		8/20/96		8/22/96		8/21/96		8/20/96	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
VOLATILE ORGANICS																					
1,1,2,2-Tetrachloroethane	600	NYSDEC TAGM	UG/KG	11	U	11	UJ	11	U	10	U	11	U	21	U	10	UJ	10	UJ	11	U
Acetone	200	NYSDEC TAGM	UG/KG	11	U	11	U	11	U	10	U	11	UJ	15	U	10	UJ	10	UJ	11	U
Benzene	60	NYSDEC TAGM	UG/KG	11	U	11	U	11	U	10	U	11	U	21	U	10	U	5	J	11	U
Carbon Disulfide	2700	NYSDEC TAGM	UG/KG	11	U	11	U	11	U	10	U	11	U	21	U	10	U	2	J	11	U
Chloroform	300	NYSDEC TAGM	UG/KG	11	U	6	U	5	U	5	U	11	U	10	U	10	U	5	UJ	5	U
Methylene Chloride	100	NYSDEC TAGM	UG/KG	11	U	11	U	11	U	10	U	11	U	21	U	10	U	10	UJ	11	U
Toluene	1500	NYSDEC TAGM	UG/KG	4	J	11	UJ	11	U	10	U	11	UJ	21	U	10	UJ	10	J	11	U
Xylene (total)	1200	NYSDEC TAGM	UG/KG	11	U	11	UJ	11	U	10	U	11	UJ	21	U	10	UJ	10	UJ	11	U
SEMIVOLATILE ORGANICS																					
2,4-Dinitrotoluene			UG/KG	7100		9400		91000	UJ	340	U	510	U	1800	U	6900		700	U	350	U
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	310	J	680	J	91000	UJ	350	U	510	U	1800	U	400	J	700	U	350	U
2-Methylnaphthalene	36400	NYSDEC TAGM	UG/KG	510	J	1300	U	19000	J	98	J	510	U	1800	U	850	U	700	U	350	U
3,3'-Dichlorobenzidine			UG/KG	1100	U	1300	U	91000	UJ	350	U	510	UJ	1800	U	850	J	700	U	350	U
3-Nitroaniline	500	NYSDEC TAGM	UG/KG	2700	U	3100	U	220000	UJ	850	U	1200	UJ	4200	U	**2100**	**J**	1700	U	860	U
Acenaphthene	50000	NYSDEC TAGM	UG/KG	1100	U	1300	U	**72000**	**J**	30	J	55	J	1800	U	140	J	700	U	350	U
Acenaphthylene	41000	NYSDEC TAGM	UG/KG	1100	U	1300	U	91000	U	140	J	40	J	1800	U	850	U	700	U	350	U
Anthracene	50000	NYSDEC TAGM	UG/KG	1100	U	1300	U	**120000**	**J**	120	J	310	J	1800	U	260	J	700	U	350	U
Benzo(a)anthracene	224	NYSDEC TAGM	UG/KG	110	J	1300	U	**220000**	**J**	**760**		**1900**		1800	U	**1000**		700	U	350	U
Benzo(a)pyrene	61	NYSDEC TAGM	UG/KG	**120**	**J**	1300	U	**200000**	**J**	**1800**		**1900**		1800	U	**1000**		700	U	350	U
Benzo(b)fluoranthene	1100	NYSDEC TAGM	UG/KG	170	J	1300	U	**200000**	**J**	**2500**		**3300**	**J**	1800	U	850	U	700	U	350	U
Benzo(g,h,i)perylene	50000	NYSDEC TAGM	UG/KG	1100	U	1300	U	**100000**	**J**	1100		1000		1800	U	570	J	700	U	350	U
Benzo(k)fluoranthene	1100	NYSDEC TAGM	UG/KG	97	J	1300	U	**170000**	**J**	350	U	510	U	1800	U	**1700**	**J**	700	U	350	U
Carbazole			UG/KG	1100	U	1300	U	89000	J	34	J	160	J	1800	U	410	J	700	U	350	U
Chrysene	400	NYSDEC TAGM	UG/KG	200	J	170	J	**220000**	**J**	**950**		**1700**		1800	U	**910**		700	U	350	U
Di-n-butylphthalate	8100	NYSDEC TAGM	UG/KG	1200		1500		91000	UJ	350	U	510	U	1800	U	2000		700	U	350	U
Dibenz(a,h)anthracene	14	NYSDEC TAGM	UG/KG	1100	U	1300	U	**49000**	**J**	**520**		**700**		1800	U	**390**	**J**	700	U	350	U
Dibenzofuran	6200	NYSDEC TAGM	UG/KG	110	J	1300	U	**50000**	**J**	350	U	33	J	1800	U	62	J	700	U	350	U
Diethylphthalate	7100	NYSDEC TAGM	UG/KG	1100	U	1300	U	91000	UJ	350	U	510	U	1800	U	850	U	700	U	350	U
Fluoranthene	50000	NYSDEC TAGM	UG/KG	200	J	180	J	**530000**	**J**	700		2400		1800	U	2400		700	U	350	U
Fluorene	50000	NYSDEC TAGM	UG/KG	1100	U	1300	U	**78000**	**J**	350	U	83	J	1800	U	110	J	700	U	350	U
Indeno(1,2,3-cd)pyrene	3200	NYSDEC TAGM	UG/KG	1100	U	1300	U	**100000**	**J**	990		1500		1800	U	700	J	700	U	350	U

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

			LOC_ID:	SS16-3	SS16-30	SS16-31	SS16-32	SS16-33	SS16-34	SS16-35	SS16-36	SS16-37
			SAMP ID:	SS16-3-1	16048	16062	16052	16067	16053	16066	16061	16054
			QC CODE:	SA	SA	SA	SA	SA	SA	SA	SA	SA
			STUDY ID:	ESI	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1
			TOP:	0	0	0	0	0	0	0	0	0
			BOTTOM:	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
			MATRIX:	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL
			SAMPLE DATE:	10/22/93	8/20/96	8/21/96	8/20/96	8/22/96	8/20/96	8/22/96	8/21/96	8/20/96
PARAMETER	LEVEL	SOURCE	UNIT	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q
N-Nitrosodiphenylamine (1)			UG/KG	1400	780 J	91000 UJ	180 J	510 U	1800 U	760 J	700 U	350 U
Naphthalene	13000	NYSDEC TAGM	UG/KG	320 J	1300 U	66000 J	55 J	510 U	1800 U	850 U	700 U	350 U
Pentachlorophenol	1000	NYSDEC TAGM	UG/KG	2700 U	3100 U	220000 UJ	850 U	1200 J	4200 U	2100 UJ	1700 U	860 U
Phenanthrene	50000	NYSDEC TAGM	UG/KG	360 J	99 J	490000 J	350 U	1200	1800 U	1300	700 U	350 U
Pyrene	50000	NYSDEC TAGM	UG/KG	200 J	220 J	360000 J	1200	3200	1800 U	2000	700 U	350 U
bis(2-Ethylhexyl)phthalate	50000	NYSDEC TAGM	UG/KG	390 J	1300 U	91000 UJ	350 U	510 U	1800 U	990	700 U	350 U
PESTICIDES/PCB												
4,4'-DDD	2900	NYSDEC TAGM	UG/KG	3.9 UJ	2.65	3.2 U	3.5 U	1.6 J	3.5 U	34 U	3.5 R	3.5 U
4,4'-DDE	2100	NYSDEC TAGM	UG/KG	32 J	6.12	12	11	20	3.5 U	290	2.3 R	3.5 U
4,4'-DDT	2100	NYSDEC TAGM	UG/KG	18 J	21.5 J	43	9.9	17	2.3 J	340	7.4 J	3.5 U
Aldrin	41	NYSDEC TAGM	UG/KG	2.8 J	2 U	1.9 U	1.8 U	1.9 U	1.8 U	18 U	1.8 R	1.8 U
Aroclor-1254	10000	NYSDEC TAGM	UG/KG	39 UJ	38 U	36 U	35 U	36 U	35 U	340 U	35 R	35 U
Aroclor-1260	10000	NYSDEC TAGM	UG/KG	110 J	80	36 U	35 U	36 U	35 U	160 J	35 R	35 U
Dieldrin	44	NYSDEC TAGM	UG/KG	3.9 UJ	3.8 U	3.6 U	3.5 U	3.6 U	3.5 U	34 U	3.5 R	3.5 U
Endosulfan I	900	NYSDEC TAGM	UG/KG	2 UJ	10.5 J	7.7	33 J	1.9 U	1.8 U	18 U	1.2 R	1.8 U
Endosulfan II	900	NYSDEC TAGM	UG/KG	4.6 J	3.8 U	3.6 U	5 J	3.6 U	3.5 U	34 U	3.5 R	3.5 U
Endosulfan sulfate	1000	NYSDEC TAGM	UG/KG	3.9 UJ	3.8 U	3.6 U	3.5 U	3.6 U	3.5 U	34 U	3.5 R	3.5 U
Endrin	100	NYSDEC TAGM	UG/KG	3.9 UJ	3.8 U	3.6 U	9.9	3.6 U	3.5 U	34 U	3.5 R	3.5 U
Endrin aldehyde			UG/KG	3.9 UJ	4.15 J	3.6 U	3.7 R	3.6 U	3.5 U	34 U	3.5 R	3.5 U
Endrin ketone			UG/KG	3.3 J	3.8 U	1.7 J	3.4 U	3.6 U	3.5 U	34 U	3.5 R	3.5 U
Heptachlor	100	NYSDEC TAGM	UG/KG	2 UJ	2 U	1.9 U	1.8 U	1.9 U	1.8 U	18 U	1.8 R	1.8 U
Heptachlor epoxide	20	NYSDEC TAGM	UG/KG	2 UJ	2 U	1.9 U	1.5 R	1.9 U	1.8 U	18 U	1.8 R	1.8 U
Toxaphene			UG/KG	200 UJ	200 U	190 U	180 U	190 U	180 U	1800 U	180 R	180 U
alpha-Chlordane			UG/KG	4.7 J	10.1	5.1 J	8.6 J	1.9 U	1.8 U	18 J	1.8 R	1.8 U
beta-BHC	200	NYSDEC TAGM	UG/KG	1.3 J	2 U	1.9 U	1.8 U	1.9 U	1.8 U	18 U	1.8 R	1.8 U
gamma-BHC (Lindane)	60	NYSDEC TAGM	UG/KG	2 UJ	2 U	1.9 U	1.8 U	1.9 U	1.8 U	18 U	1.8 R	1.8 U
gamma-Chlordane	540	NYSDEC TAGM	UG/KG	4.7 J	17.4	5.3	9.4	1.9 U	1.8 U	15 J	1.8 R	1.8 U

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

			LOC_ID:	SS16-3		SS16-30		SS16-31		SS16-32		SS16-33		SS16-34		SS16-35		SS16-36		SS16-37	
			SAMP ID:	SS16-3-1		16048		16062		16052		16067		16053		16066		16061		16054	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	ESI		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	10/22/93		8/20/96		8/21/96		8/20/96		8/22/96		8/20/96		8/22/96		8/21/96		8/20/96	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
OTHER ANALYSES																					
Nitrate/Nitrite-Nitrogen			MG/KG	0.26		4.8		0.41		0.11		0.04		0.04		0.08		0.16		0.02	
Percent Moisture (PEST/PCB)						13		9		6		9		6		4		6		7	
Percent Moisture (SVOCs)						13		9		6		9		6		4		6		7	
Percent Moisture (VOCs)						11		7		5		9		5		2		5		6	
Percent Solids (Metals)						86.8		90.5		94.1		90.6		93.9		95.9		94.4		93.3	
Total Organic Carbon			MG/KG																		
NITROAROMATICS																					
2,4-Dinitrotoluene			UG/KG	1100		510		120	U	120	U	120	U	4400		3000	J	120	U	120	U
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	130	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U
2-amino-4,6-Dinitrotoluene			UG/KG	430	J	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U
Tetryl			UG/KG	220	J	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U
METALS																					
Aluminum	14592.8	NYSDEC TAGM	MG/KG	7250		8420	J	11300	J	12000	J	13500	J	8660	J	6930	J	10200	J	10200	J
Antimony	3.59	NYSDEC TAGM	MG/KG	121	R	28.1	J	0.81	J	1.5	J	1.2	J	0.35	UJ	7.1	J	0.5	J	0.37	UJ
Arsenic	7.5	NYSDEC TAGM	MG/KG	23.6		11.2	J	6.6		5.1		6		5.8		5.3		6.7		5.5	
Barium	300	NYSDEC TAGM	MG/KG	1540	R	1220	J	70.9	J	85.3	J	70.7	J	47.7	J	314	J	42.3	J	42	J
Beryllium	0.73	NYSDEC TAGM	MG/KG	0.39	J	0.27		0.47		0.42		0.47		0.3		0.24		0.34		0.28	
Cadmium	1	NYSDEC TAGM	MG/KG	2.5		1.2		0.49		0.5		0.06	U	0.31		5.3		0.29		0.14	
Calcium	101904	NYSDEC TAGM	MG/KG	21400		77300		32800		56100		10700		59700		110000		22400		24100	
Chromium	22.13	NYSDEC TAGM	MG/KG	33.3		19.4		18.4		24.5		22.6		13.2		35.3		14.7		15.9	
Cobalt	30	NYSDEC TAGM	MG/KG	9.1		8.4		12.2		11.4		10.9		7.7		8.2		8.1		9.5	
Copper	25	NYSDEC TAGM	MG/KG	1730		617	J	39.5		104		44.6		41.5		407		34.4		30.9	
Cyanide	0.3	NYSDEC TAGM	MG/KG	0.68	U	0.51	U	0.54	U	0.49	U	0.53	U	0.49	U	1.5		0.51	U	0.46	U
Iron	26626.7	NYSDEC TAGM	MG/KG	25700		17600	J	23000	J	23900		25800		20300		18300		22700	J	23700	
Lead	21.86	NYSDEC TAGM	MG/KG	9140		2560	J	81.1		265		131		43.7		1290		34.7		23.6	
Magnesium	12221.8	NYSDEC TAGM	MG/KG	4300		9010		10700		11200		7130		7480		27000		10100		5890	
Manganese	669.38	NYSDEC TAGM	MG/KG	4140		365		459		508		443	J	422		375	J	337		502	
Mercury	0.1	NYSDEC TAGM	MG/KG	11.4	J	2.3	J	0.07		0.12		0.12		0.03	U	0.12		0.04	U	0.04	U
Nickel	33.62	NYSDEC TAGM	MG/KG	37.3		22.7	J	28.9		36.3		31.2		23.7		28.6		24.7		27.6	
Potassium	1761.48	NYSDEC TAGM	MG/KG	886		1200		1260		1840		1650		953		1340		1130		1300	

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

			LOC_ID:	SS16-3		SS16-30		SS16-31		SS16-32		SS16-33		SS16-34		SS16-35		SS16-36		SS16-37	
			SAMP ID:	SS16-3-1		16048		16062		16052		16067		16053		16066		16061		16054	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	ESI		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	10/22/93		8/20/96		8/21/96		8/20/96		8/22/96		8/20/96		8/22/96		8/21/96		8/20/96	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
Selenium	2	NYSDEC TAGM	MG/KG	0.22	UJ	0.66		0.71	U	0.76		0.52	U	0.62	U	1.2	J	0.55	U	0.66	U
Silver	0.4	NYSDEC TAGM	MG/KG	1.1	UJ	0.44		0.26	U	0.35		0.28	U	0.3		0.5		0.2	U	0.24	U
Sodium	103.74	NYSDEC TAGM	MG/KG	147	J	91.6		53.2		126		58	U	78.6		137		41.1	U	83.2	
Thallium	0.28	NYSDEC TAGM	MG/KG	0.24	U	0.71	U	1.1	J	1	J	0.91	U	0.98		0.78	U	0.64	U	0.77	U
Vanadium	150	NYSDEC TAGM	MG/KG	17.9		18.3	J	20.3		28.9		22.7		28.4		33.8		18.8		18.2	
Zinc	82.5	NYSDEC TAGM	MG/KG	929		573		134		157		109	J	109		466	J	95.7		80.6	
HERBICIDES																					
2,4,5-T	1900	NYSDEC TAGM	UG/KG	7.2																	
MCPP			UG/KG	6000	U																

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
			LOC_ID:	SS16-38		SS16-4		SS16-5		SS16-6		SS16-7		SS16-8		SS16-9	
			SAMP ID:	16068		SS16-4-1		SS16-5-1		SS16-6-1		SS16-7-1		SS16-8-1		SS16-9-1	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		ESI		ESI		ESI		ESI		ESI		ESI	
			TOP:	0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/22/96		10/20/93		10/20/93		10/20/93		10/20/93		10/20/93		11/9/93	
VOLATILE ORGANICS																	
1,1,2,2-Tetrachloroethane	600	NYSDEC TAGM	UG/KG	10	UJ	11	U	11	U	10	U	53	U	10	U	11	U
Acetone	200	NYSDEC TAGM	UG/KG	10	UJ	17		11	U	10	U	53	U	10	U	11	U
Benzene	60	NYSDEC TAGM	UG/KG	10	UJ	11	U	11	U	10	U	53	U	10	U	11	U
Carbon Disulfide	2700	NYSDEC TAGM	UG/KG	10	UJ	11	U	11	U	10	U	53	U	10	U	11	U
Chloroform	300	NYSDEC TAGM	UG/KG	10	UJ	11	U	11	U	2	J	53	U	10	U	11	U
Methylene Chloride	100	NYSDEC TAGM	UG/KG	10	UJ	11	U	2	J	10	U	53	U	10	U	11	U
Toluene	1500	NYSDEC TAGM	UG/KG	10	UJ	11	U	5	J	3	J	53	U	2	J	11	U
Xylene (total)	1200	NYSDEC TAGM	UG/KG	10	UJ	11	U	11	U	10	U	53	U	10	U	11	U
SEMIVOLATILE ORGANICS																	
2,4-Dinitrotoluene			UG/KG	350	U	7200	U	530	J	14000	U	1300	U	1800	U	2700	U
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	350	U	7200	U	750	U	14000	U	1300	U	1800	U	2700	U
2-Methylnaphthalene	36400	NYSDEC TAGM	UG/KG	350	U	7200	U	97	J	14000	U	1300	U	1800	U	2700	U
3,3'-Dichlorobenzidine			UG/KG	350	U	7200	U	750	U	14000	U	1300	U	1800	U	2700	U
3-Nitroaniline	500	NYSDEC TAGM	UG/KG	840	U	18000	U	1800	U	34000	U	3100	U	4200	U	6600	U
Acenaphthene	50000	NYSDEC TAGM	UG/KG	350	U	7200	U	44	J	14000	U	1300	U	1800	U	2700	U
Acenaphthylene	41000	NYSDEC TAGM	UG/KG	350	U	7200	U	750	U	14000	U	1300	U	1800	U	2700	U
Anthracene	50000	NYSDEC TAGM	UG/KG	350	U	7200	U	70	J	14000	U	1300	U	1800	U	2700	U
Benzo(a)anthracene	224	NYSDEC TAGM	UG/KG	17	J	7200	U	**240**	**J**	14000	U	1300	U	1800	U	2700	U
Benzo(a)pyrene	61	NYSDEC TAGM	UG/KG	19	J	7200	U	**270**	**J**	14000	U	1300	U	1800	U	2700	U
Benzo(b)fluoranthene	1100	NYSDEC TAGM	UG/KG	350	U	7200	U	350	J	14000	U	1300	U	1800	U	2700	U
Benzo(g,h,i)perylene	50000	NYSDEC TAGM	UG/KG	54	J	7200	U	180	J	14000	U	1300	U	1800	U	2700	U
Benzo(k)fluoranthene	1100	NYSDEC TAGM	UG/KG	350	U	7200	U	330	J	14000	U	1300	U	1800	U	2700	U
Carbazole			UG/KG	350	U	7200	U	78	J	14000	U	1300	U	1800	U	2700	U
Chrysene	400	NYSDEC TAGM	UG/KG	22	J	7200	U	340	J	14000	U	1300	U	1800	U	2700	U
Di-n-butylphthalate	8100	NYSDEC TAGM	UG/KG	350	U	7200	U	350	J	14000	U	1300	U	1400	J	510	J
Dibenz(a,h)anthracene	14	NYSDEC TAGM	UG/KG	350	U	7200	U	750	U	14000	U	1300	U	1800	U	2700	U
Dibenzofuran	6200	NYSDEC TAGM	UG/KG	350	U	7200	U	82	J	14000	U	1300	U	1800	U	2700	U
Diethylphthalate	7100	NYSDEC TAGM	UG/KG	350	U	7200	U	750	U	14000	U	1300	U	1800	U	2700	U
Fluoranthene	50000	NYSDEC TAGM	UG/KG	22	J	7200	U	710	J	14000	U	1300	U	1800	U	2700	U
Fluorene	50000	NYSDEC TAGM	UG/KG	350	U	7200	U	750	U	14000	U	1300	U	1800	U	2700	U
Indeno(1,2,3-cd)pyrene	3200	NYSDEC TAGM	UG/KG	350	U	7200	U	200	J	14000	U	1300	U	1800	U	2700	U

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

			LOC_ID:	SS16-38		SS16-4		SS16-5		SS16-6		SS16-7		SS16-8		SS16-9	
			SAMP ID:	16068		SS16-4-1		SS16-5-1		SS16-6-1		SS16-7-1		SS16-8-1		SS16-9-1	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		ESI		ESI		ESI		ESI		ESI		ESI	
			TOP:	0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/22/96		10/20/93		10/20/93		10/20/93		10/20/93		10/20/93		11/9/93	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
N-Nitrosodiphenylamine (1)			UG/KG	350	U	7200	U	130	J	14000	U	1300	U	350	J	2700	U
Naphthalene	13000	NYSDEC TAGM	UG/KG	350	U	7200	U	750	U	14000	U	1300	U	1800	U	2700	U
Pentachlorophenol	1000	NYSDEC TAGM	UG/KG	840	UJ	18000	U	1800	U	34000	U	3100	U	4200	U	6600	U
Phenanthrene	50000	NYSDEC TAGM	UG/KG	22	J	7200	U	410	J	14000	U	1300	U	1800	U	2700	U
Pyrene	50000	NYSDEC TAGM	UG/KG	31	J	7200	U	550	J	14000	U	1300	U	1800	U	160	J
bis(2-Ethylhexyl)phthalate	50000	NYSDEC TAGM	UG/KG	350	U	7200	U	450	J	14000	U	1300	U	1800	U	2100	J
PESTICIDES/PCB																	
4,4'-DDD	2900	NYSDEC TAGM	UG/KG	3.5	U	36	U	19	U	3.5	UJ	3.5	U	7	U	3.5	UJ
4,4'-DDE	2100	NYSDEC TAGM	UG/KG	5.1		1400		130		3.5	UJ	6.3		84	J	2.8	J
4,4'-DDT	2100	NYSDEC TAGM	UG/KG	2.1	J	180		29		1.8	J	5.6		79	J	2.9	J
Aldrin	41	NYSDEC TAGM	UG/KG	1.8	U	19	U	9.7	U	1.8	UJ	1.8	U	3.6	U	1.8	UJ
Aroclor-1254	10000	NYSDEC TAGM	UG/KG	35	U	360	U	190	U	35	UJ	35	U	57	UJ	35	UJ
Aroclor-1260	10000	NYSDEC TAGM	UG/KG	35	U	360	U	190	U	35	UJ	35	U	70	U	35	UJ
Dieldrin	44	NYSDEC TAGM	UG/KG	3.5	U	36	U	19	U	3.5	UJ	3.5	U	7	U	3.5	UJ
Endosulfan I	900	NYSDEC TAGM	UG/KG	1.8	U	19	U	6.2	J	1.8	UJ	1.8	U	1.9	J	1.8	UJ
Endosulfan II	900	NYSDEC TAGM	UG/KG	3.5	U	36	U	19	U	3.5	UJ	2.2	J	7	U	3.5	UJ
Endosulfan sulfate	1000	NYSDEC TAGM	UG/KG	3.5	U	36	U	19	U	3.5	UJ	3.5	U	7	U	3.5	UJ
Endrin	100	NYSDEC TAGM	UG/KG	3.5	U	36	U	19	U	3.5	UJ	3.5	U	7	U	3.5	UJ
Endrin aldehyde			UG/KG	3.5	U	36	U	19	U	3.5	UJ	3.5	U	7	U	3.5	UJ
Endrin ketone			UG/KG	3.5	U	36	U	19	U	3.5	UJ	3.5	U	7	U	3.5	UJ
Heptachlor	100	NYSDEC TAGM	UG/KG	1.8	U	19	U	9.7	U	1.8	UJ	1.8	U	3.6	U	1.8	UJ
Heptachlor epoxide	20	NYSDEC TAGM	UG/KG	1.8	U	19	U	9.7	U	1.8	UJ	1.8	U	3.6	U	1.8	UJ
Toxaphene			UG/KG	180	U	1900	U	970	U	180	UJ	180	U	360	U	180	UJ
alpha-Chlordane			UG/KG	1.8	U	19	U	9.7	U	1.8	UJ	6.1		3.6	U	1.8	UJ
beta-BHC	200	NYSDEC TAGM	UG/KG	1.8	U	19	U	9.7	U	1.8	UJ	1.8	U	3.6	U	1.8	UJ
gamma-BHC (Lindane)	60	NYSDEC TAGM	UG/KG	1.8	U	19	U	9.7	U	1.8	UJ	1.8	U	3.6	U	1.8	UJ
gamma-Chlordane	540	NYSDEC TAGM	UG/KG	1.8	U	19	U	9.7	U	1.8	UJ	7		3.6	U	1.8	UJ

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

			LOC_ID:	SS16-38		SS16-4		SS16-5		SS16-6		SS16-7		SS16-8		SS16-9	
			SAMP ID:	16068		SS16-4-1		SS16-5-1		SS16-6-1		SS16-7-1		SS16-8-1		SS16-9-1	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		ESI		ESI		ESI		ESI		ESI		ESI	
			TOP:	0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/22/96		10/20/93		10/20/93		10/20/93		10/20/93		10/20/93		11/9/93	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
OTHER ANALYSES																	
Nitrate/Nitrite-Nitrogen			MG/KG	1		0.45		0.5		0.42		0.05		0.23		0.01	U
Percent Moisture (PEST/PCB)				6													
Percent Moisture (SVOCs)				6													
Percent Moisture (VOCs)				5													
Percent Solids (Metals)				94													
Total Organic Carbon			MG/KG	8400													
NITROAROMATICS																	
2,4-Dinitrotoluene			UG/KG	120	U	170		780	J	130	U	130	U	770		450	J
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	120	U	130	U	130	U	130	U	130	U	130	U	130	U
2-amino-4,6-Dinitrotoluene			UG/KG	120	U	130	U	130	U	130	U	130	U	130	U	130	U
Tetryl			UG/KG	120	U	130	U	130	U	130	U	130	U	130	U	130	U
METALS																	
Aluminum	14592.8	NYSDEC TAGM	MG/KG	14400		11900		13600		9650		8670		7600		10700	
Antimony	3.59	NYSDEC TAGM	MG/KG	0.56	J	26.3		27.3		7.9	U	8.8	U	8.2	U	7	U
Arsenic	7.5	NYSDEC TAGM	MG/KG	3.8		11.3		10.8		5.1		5		5.2		4.2	J
Barium	300	NYSDEC TAGM	MG/KG	127	J	227		630		45.1		41.2		72.2		53.6	
Beryllium	0.73	NYSDEC TAGM	MG/KG	0.56		0.45	J	0.56	J	0.24	J	0.29	J	0.39	J	0.43	J
Cadmium	1	NYSDEC TAGM	MG/KG	0.06	U	0.55	U	2.8		0.49	U	0.55	U	0.52	U	0.43	UR
Calcium	101904	NYSDEC TAGM	MG/KG	18000		55600		37100		25600		36600		107000		35400	
Chromium	22.13	NYSDEC TAGM	MG/KG	25.4		24		43.3		12.9	R	11.9		15.9		17.6	
Cobalt	30	NYSDEC TAGM	MG/KG	12.4		11.9		13.4		7.9		7.5	J	8.1		8.2	
Copper	25	NYSDEC TAGM	MG/KG	34.4		399		635		26.2		28.9		88.9		31.4	J
Cyanide	0.3	NYSDEC TAGM	MG/KG	0.53	U	0.6	U	0.63	U	0.58	U	0.6	U	0.58	U	0.52	U
Iron	26626.7	NYSDEC TAGM	MG/KG	26500		27700		36500		22100		20000		16700		22400	
Lead	21.86	NYSDEC TAGM	MG/KG	60.3		2940		2860		8.5		81.2		1890		76.2	
Magnesium	12221.8	NYSDEC TAGM	MG/KG	6090		8690		7930		7710		13800		9940		15300	
Manganese	669.38	NYSDEC TAGM	MG/KG	391	J	411	J	444	J	305	J	478	J	333	J	349	
Mercury	0.1	NYSDEC TAGM	MG/KG	0.04	U	0.21		0.99		0.03	U	0.04	U	0.08		0.05	J
Nickel	33.62	NYSDEC TAGM	MG/KG	43.5		41.6		148		22.7		21.7		28.7		29.3	
Potassium	1761.48	NYSDEC TAGM	MG/KG	2020		1250		1410		720	J	794	J	1150		1160	

Table A-2
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT														
			LOC_ID:	SS16-38		SS16-4		SS16-5		SS16-6		SS16-7		SS16-8		SS16-9	
			SAMP ID:	16068		SS16-4-1		SS16-5-1		SS16-6-1		SS16-7-1		SS16-8-1		SS16-9-1	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		ESI		ESI		ESI		ESI		ESI		ESI	
			TOP:	0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/22/96		10/20/93		10/20/93		10/20/93		10/20/93		10/20/93		11/9/93	
				VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
Selenium	2	NYSDEC TAGM	MG/KG	0.55	J	0.2	UJ	0.22	UJ	0.13	UJ	0.13	UJ	0.21	UJ	0.19	UJ
Silver	0.4	NYSDEC TAGM	MG/KG	0.25	U	1.1	U	1	U	1	U	1.1	U	1	U	0.88	UJ
Sodium	103.74	NYSDEC TAGM	MG/KG	84.1		**128**	**J**	**132**	**J**	79.6	J	**109**	**J**	**170**	**J**	**125**	**J**
Thallium	0.28	NYSDEC TAGM	MG/KG	0.82	U	0.22	U	0.24	U	0.14	U	0.14	U	0.23	U	0.21	UJ
Vanadium	150	NYSDEC TAGM	MG/KG	22.6		20.3		23.9		38.1		35.7		34.5		22.8	
Zinc	82.5	NYSDEC TAGM	MG/KG	**117**	**J**	**416**		**562**		65.8		66.1		**105**		78.8	J
HERBICIDES																	
2,4,5-T	1900	NYSDEC TAGM	UG/KG			5.5	U	5.7	U	5.3	U	5.3	U	5.3	U	5.5	U
MCPP			UG/KG			5500	U	16000		5300	U	5300	U	5300	U	5500	U

Table A-3
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Subsurface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
			LOC_ID:	SB16-1		SB16-1		SB16-2		SB16-4		SB16-5		SB16-5	
			SAMP ID:	16038		16093		16036		16031		16034		16035	
			QC CODE:	SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	2		6		1		2		1		2	
			BOTTOM:	3		12		2		4		2		3.3	
			MATRIX:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
			SAMPLE DATE:	8/14/96		8/22/96		8/14/96		8/14/96		8/14/96		8/14/96	
VOLATILE ORGANICS															
2-Butanone	300	NYSDEC TAGM	UG/KG	12	U	11	U	11	U	5	J	2	U	11	U
Acetone	200	NYSDEC TAGM	UG/KG	11	J	11	U	11	U	46		12	U	11	U
Benzene	60	NYSDEC TAGM	UG/KG	12	U	11	U	2	J	2	J	11	U	11	U
Toluene	1500	NYSDEC TAGM	UG/KG	12	U	11	UJ	3	J	2	J	2	J	6	J
SEMIVOLATILE ORGANICS															
2,4-Dinitrotoluene			UG/KG	390	U	67	J	1700		1900	U	1800	U	370	U
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	390	U	340	U	160	J	1900	U	1800	U	370	U
2-Methylnaphthalene	36400	NYSDEC TAGM	UG/KG	390	U	340	U	190	J	1900	U	1800	U	370	U
Acenaphthene	50000	NYSDEC TAGM	UG/KG	390	U	340	U	380	U	1900	U	1100	J	370	U
Acenaphthylene	41000	NYSDEC TAGM	UG/KG	390	U	340	U	380	U	300	J	1800	U	370	U
Anthracene	50000	NYSDEC TAGM	UG/KG	390	U	340	U	380	U	310	J	2000		40	J
Benzo(a)anthracene	224	NYSDEC TAGM	UG/KG	390	U	340	U	55	J	**420**	**J**	**6600**		110	J
Benzo(a)pyrene	61	NYSDEC TAGM	UG/KG	390	U	20	J	**63**	**J**	**1400**	**J**	**6200**		**170**	**J**
Benzo(b)fluoranthene	1100	NYSDEC TAGM	UG/KG	390	U	18	J	72	J	670	J	**6000**		110	J
Benzo(g,h,i)perylene	50000	NYSDEC TAGM	UG/KG	390	U	26	J	84	J	11000		4500		660	
Benzo(k)fluoranthene	1100	NYSDEC TAGM	UG/KG	390	U	20	J	60	J	690	J	**5600**		110	J
Butylbenzylphthalate	50000	NYSDEC TAGM	UG/KG	390	U	18	J	380	U	1900	U	1800	U	370	U
Carbazole			UG/KG	390	U	340	U	380	U	1900	U	730	J	370	U
Chrysene	400	NYSDEC TAGM	UG/KG	390	U	22	J	90	J	**480**	**J**	**7000**		120	J
Di-n-butylphthalate	8100	NYSDEC TAGM	UG/KG	390	U	35	J	240	J	1900	U	1800	U	370	U
Dibenz(a,h)anthracene	14	NYSDEC TAGM	UG/KG	390	U	340	U	**32**	**J**	**2500**		**1700**	**J**	**220**	**J**
Dibenzofuran	6200	NYSDEC TAGM	UG/KG	390	U	340	U	45	J	1900	U	270	J	370	U
Fluoranthene	50000	NYSDEC TAGM	UG/KG	390	U	32	J	110	J	480	J	13000		190	J
Fluorene	50000	NYSDEC TAGM	UG/KG	390	U	340	U	380	U	1900	U	800	J	370	U
Indeno(1,2,3-cd)pyrene	3200	NYSDEC TAGM	UG/KG	390	U	24	J	65	J	**7100**		**3900**		510	

Table A-3
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Subsurface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	SB16-1		SB16-1		SB16-2		SB16-4		SB16-5		SB16-5	
			SAMP ID:	16038		16093		16036		16031		16034		16035	
			QC CODE:	SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	2		6		1		2		1		2	
			BOTTOM:	3		12		2		4		2		3.3	
			MATRIX:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
			SAMPLE DATE:	8/14/96		8/22/96		8/14/96		8/14/96		8/14/96		8/14/96	
				VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
N-Nitrosodiphenylamine (1)			UG/KG	390	U	340	U	530		1900	U	1800	U	370	U
Naphthalene	13000	NYSDEC TAGM	UG/KG	390	U	340	U	120	J	1900	U	1800	U	370	U
Pentachlorophenol	1000	NYSDEC TAGM	UG/KG	940	U	830	U	920	U	4600	U	4400	U	120	J
Phenanthrene	50000	NYSDEC TAGM	UG/KG	390	U	23	J	160	J	160	J	7600		100	J
Pyrene	50000	NYSDEC TAGM	UG/KG	390	U	25	J	80	J	550	J	11000		160	J
bis(2-Ethylhexyl)phthalate	50000	NYSDEC TAGM	UG/KG	390	U	340	U	110	J	1900	U	1800	U	370	U
PESTICIDES/PCB															
4,4'-DDE	2100	NYSDEC TAGM	UG/KG	3.9	U	8.3		38	U	3.8	U	37	U	3.7	U
4,4'-DDT	2100	NYSDEC TAGM	UG/KG	3.9	U	1.7	J	38	U	3.8	U	37	U	3.4	J
Dieldrin	44	NYSDEC TAGM	UG/KG	3.9	U	3.4	U	38	U	12		37	U	3.7	U
Endosulfan I	900	NYSDEC TAGM	UG/KG	2	U	1.8	U	20	U	7.3	J	15	U	2.4	J
Endrin	100	NYSDEC TAGM	UG/KG	3.9	U	3.4	U	38	U	2.9	J	37	U	3.4	U
OTHER ANALYSES															
Nitrate/Nitrite-Nitrogen			MG/KG	0.11		0.32		0.78		0.3		0.09		0.17	
Percent Moisture (PEST/PCB)				15		4		13		13		10		11	
Percent Moisture (SVOCs)				15		4		13		13		10		11	
Percent Moisture (VOCs)				16		6		12		10		13		13	
Percent Solids (Metals)				85.3		95.6		87.3		87.2		89.8		88.7	
Total Organic Carbon			MG/KG					9850				668		1010	
NITROAROMATICS															
2,4-Dinitrotoluene			UG/KG	120	U	280	J	150	J	500		120	U	120	U

Table A-3
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Subsurface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
			LOC_ID:	SB16-1		SB16-1		SB16-2		SB16-4		SB16-5		SB16-5	
			SAMP ID:	16038		16093		16036		16031		16034		16035	
			QC CODE:	SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	2		6		1		2		1		2	
			BOTTOM:	3		12		2		4		2		3.3	
			MATRIX:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
			SAMPLE DATE:	8/14/96		8/22/96		8/14/96		8/14/96		8/14/96		8/14/96	
METALS															
Aluminum	14592.8	NYSDEC TAGM	MG/KG	13200	R	12800	J	9350	R	13200	R	9850	R	10500	R
Antimony	3.59	NYSDEC TAGM	MG/KG	0.45	UJ	3.3	J	**8.3**	**J**	0.41	UJ	**135**	**J**	0.4	UJ
Arsenic	7.5	NYSDEC TAGM	MG/KG	3.3	J	6.3	J	6.9	J	5.2	J	6.9	J	5	J
Barium	300	NYSDEC TAGM	MG/KG	98	J	125	J	197	J	51.8	J	**302**	**J**	84.7	J
Beryllium	0.73	NYSDEC TAGM	MG/KG	0.51		0.42		0.29		0.43		0.34		0.29	
Cadmium	1	NYSDEC TAGM	MG/KG	0.07	U	0.19		0.45		0.06		0.09		0.09	
Calcium	101904	NYSDEC TAGM	MG/KG	67700		22500		24400		25000		37100		97900	
Chromium	22.13	NYSDEC TAGM	MG/KG	18.2		20.9		15.4		21.1		18		16.7	
Cobalt	30	NYSDEC TAGM	MG/KG	7		12.1		10.2	J	12.2	J	11.5	J	11.2	J
Copper	25	NYSDEC TAGM	MG/KG	23.6	J	**66.4**		**206**	**J**	16.4	J	**736**	**J**	**26.6**	**J**
Cyanide	0.3	NYSDEC TAGM	MG/KG	0.58	UJ	0.5	U	0.56	UJ	**0.52**	**J**	0.5	UJ	0.51	UJ
Iron	26626.7	NYSDEC TAGM	MG/KG	20700	J	**31400**		23900	J	**27300**	**J**	21800	J	21500	J
Lead	21.86	NYSDEC TAGM	MG/KG	12.6	J	**309**		**791**	**J**	21.4	J	**35400**	**J**	**61.6**	**J**
Magnesium	12221.8	NYSDEC TAGM	MG/KG	**12600**		6230		7250		**13300**		7410		11500	
Manganese	669.38	NYSDEC TAGM	MG/KG	210		586		606	J	457	J	315	J	650	J
Mercury	0.1	NYSDEC TAGM	MG/KG	0.04	U	**0.48**		**1.9**	**J**	0.04	J	**0.54**	**J**	0.03	U
Nickel	33.62	NYSDEC TAGM	MG/KG	23.8	J	**34.5**		23.9	J	30.7	J	**37**	**J**	29.2	J
Potassium	1761.48	NYSDEC TAGM	MG/KG	**1990**		1310		1290		1180		1160		1470	
Selenium	2	NYSDEC TAGM	MG/KG	0.54	UJ	1.2		0.82	J	0.64	J	0.5	UJ	0.48	UJ
Silver	0.4	NYSDEC TAGM	MG/KG	0.29	U	0.26	U	0.25		0.27	U	**1.2**		0.26	U
Sodium	103.74	NYSDEC TAGM	MG/KG	59.8	U	54.4	U	59.2		**160**		56.3	U	82.9	
Thallium	0.28	NYSDEC TAGM	MG/KG	0.94	U	0.85	U	**0.91**		0.87	U	88.2	U	0.85	U
Vanadium	150	NYSDEC TAGM	MG/KG	22.6	J	19.3		17.1	J	19.6	J	15.2	J	17.6	J
Zinc	82.5	NYSDEC TAGM	MG/KG	54.8		**119**		**183**		**89.2**		**165**		70.9	

Table A-4
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Downwind Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
			LOC_ID:	SS16-500-N		SS16-500-S		1000-N		1000-S		2000-N		2000-N		2000-S		3000-N		3000-S	
			SAMP ID:	16074		16086		16083		16087		16089		16090		16085		16088		16056	
			QC CODE:	SA		SA		SA		SA		SA		DU		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/20/96	
VOLATILE ORGANICS																					
Benzene	60	NYSDEC TAGM	UG/KG	16	U	13	U	11	UJ	12	U	12	U	12	U	12	U	12	U	11	U
Toluene	1500	NYSDEC TAGM	UG/KG	16	U	13	UJ	11	UJ	12	U	12	U	12	U	12	U	12	U	11	U
SEMIVOLATILE ORGANICS																					
2,4-Dinitrotoluene			UG/KG	450	U	410	U	370	U	380	U	390	U	390	U	410	U	380	U	380	U
2-Methylnaphthalene	36400	NYSDEC TAGM	UG/KG	450	UJ	410	U	370	U	380	U	390	U	390	U	410	U	380	U	380	U
2-Methylphenol	100	NYSDEC TAGM	UG/KG	450	U	410	U	370	U	380	U	390	U	390	U	**120**	**J**	380	U	380	U
Acenaphthene	50000	NYSDEC TAGM	UG/KG	450	U	410	U	370	U	18	J	390	U	390	U	410	U	380	U	380	U
Acenaphthylene	41000	NYSDEC TAGM	UG/KG	450	U	410	U	370	U	380	U	390	U	390	U	410	U	380	U	380	U
Anthracene	50000	NYSDEC TAGM	UG/KG	450	U	410	U	370	U	380	U	390	U	390	U	410	U	380	U	380	U
Benzo(a)anthracene	224	NYSDEC TAGM	UG/KG	450	U	410	U	39	J	85	J	57	J	52	J	19	J	54	J	380	U
Benzo(a)pyrene	61	NYSDEC TAGM	UG/KG	450	U	410	U	39	J	**110**	**J**	**69**	**J**	**62**	**J**	22	J	**73**	**J**	380	U
Benzo(b)fluoranthene	1100	NYSDEC TAGM	UG/KG	450	U	410	U	42	J	120	J	68	J	54	J	410	U	58	J	380	U
Benzo(g,h,i)perylene	50000	NYSDEC TAGM	UG/KG	450	U	410	U	35	J	130	J	65	J	55	J	51	J	78	J	380	U
Benzo(k)fluoranthene	1100	NYSDEC TAGM	UG/KG	450	U	410	U	47	J	94	J	65	J	61	J	38	J	73	J	380	U
Carbazole			UG/KG	450	UJ	410	U	370	UJ	380	U	390	U	390	U	410	UJ	380	U	380	U
Chrysene	400	NYSDEC TAGM	UG/KG	450	U	410	U	55	J	110	J	70	J	62	J	25	J	69	J	380	U
Di-n-butylphthalate	8100	NYSDEC TAGM	UG/KG	450	U	410	U	370	U	380	U	390	U	390	U	410	U	380	U	380	U
Dibenz(a,h)anthracene	14	NYSDEC TAGM	UG/KG	450	U	410	U	370	U	**54**	**J**	**34**	**J**	**30**	**J**	410	U	**39**	**J**	**18**	**J**
Dibenzofuran	6200	NYSDEC TAGM	UG/KG	450	U	410	U	370	U	380	U	390	U	390	U	410	U	380	U	380	U
Fluoranthene	50000	NYSDEC TAGM	UG/KG	450	U	410	U	70	J	160	J	110	J	93	J	36	J	100	J	380	U
Fluorene	50000	NYSDEC TAGM	UG/KG	450	U	410	U	370	U	380	U	390	U	390	U	410	U	380	U	380	U
Indeno(1,2,3-cd)pyrene	3200	NYSDEC TAGM	UG/KG	450	U	410	U	32	J	110	J	55	J	50	J	20	J	70	J	380	U
N-Nitrosodiphenylamine (1)			UG/KG	450	U	410	U	370	U	380	U	390	U	390	U	410	U	380	U	380	U
Naphthalene	13000	NYSDEC TAGM	UG/KG	450	U	410	U	370	U	380	U	390	U	390	U	410	U	380	U	380	U
Phenanthrene	50000	NYSDEC TAGM	UG/KG	450	U	410	U	34	J	90	J	36	J	35	J	410	U	42	J	380	U
Pyrene	50000	NYSDEC TAGM	UG/KG	22	J	410	U	76	J	160	J	92	J	81	J	38	J	90	J	380	U

Table A-4
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Downwind Surface Soil Analytical Results

			LOC_ID:	SS16-500-N		SS16-500-S		1000-N		1000-S		2000-N		2000-N		2000-S		3000-N		3000-S	
			SAMP ID:	16074		16086		16083		16087		16089		16090		16085		16088		16056	
			QC CODE:	SA		SA		SA		SA		SA		DU		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/20/96	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
PESTICIDES/PCB																					
4,4'-DDE	2100	NYSDEC TAGM	UG/KG	4.5	U	4.1	U	5.2	J	1.9	J	3.9	U	3.9	U	4.1	U	3.8	U	3.7	U
4,4'-DDT	2100	NYSDEC TAGM	UG/KG	4.5	U	4.1	U	6	J	3.8	U	3.9	U	3.9	U	4.1	U	3.8	U	3.7	U
Dieldrin	44	NYSDEC TAGM	UG/KG	4.5	U	4.1	U	3.7	U	3.8	U	3.9	U	3.9	U	4.1	U	8.4	J	3.5	UJ
Endosulfan I	900	NYSDEC TAGM	UG/KG	2.3	U	2.1	U	1.6	J	2	U	2	U	2	U	2.1	U	2	U	1.9	U
Endosulfan sulfate	1000	NYSDEC TAGM	UG/KG	4.5	U	4.1	U	3.7	U	3.8	U	3.9	U	3.9	U	4.1	U	3.8	U	3.7	U
Endrin	100	NYSDEC TAGM	UG/KG	4.5	U	4.1	U	3.7	U	3.8	U	3.9	U	3.9	U	4.1	U	3.8	U	3.7	U
Endrin ketone			UG/KG	4.5	U	4.1	U	3.7	U	3.8	U	3.9	U	3.9	U	4.1	U	3.8	U	3.7	U
alpha-Chlordane			UG/KG	2.3	U	2.1	U	1.1	J	2	U	2	U	2	U	2.1	U	2	U	1.9	U
beta-BHC	200	NYSDEC TAGM	UG/KG	2.3	U	2.1	U	1.9	U	2	U	2	U	2	U	2.1	U	2	U	1.9	U
delta-BHC	300	NYSDEC TAGM	UG/KG	2.3	U	2.1	U	2.2		2	U	2	U	2	U	2.1	U	2	U	1.9	U
OTHER ANALYSES																					
Nitrate/Nitrite-Nitrogen			MG/KG	0.16		0.35		0.34		0.27		6.1		6		0.27		0.64		0.06	
Percent Moisture (PEST/PCB)				27		19		11		14		16		16		19		14		12	
Percent Moisture (SVOCs)				27		19		11		14		16		16		19		14		12	
Percent Moisture (VOCs)				38		21		11		14		17		17		20		18		11	
Percent Solids (Metals)				73.4		80.6		88.7		86.1		83.5		83.6		81.4		85.7		87.9	
NITROAROMATICS																					
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	120	U	120	UJ	120	U	120	UJ	120	UJ	120	UJ	120	U	120	UJ	120	U

Table A-4
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Downwind Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
			LOC_ID:	SS16-500-N		SS16-500-S		1000-N		1000-S		2000-N		2000-N		2000-S		3000-N		3000-S	
			SAMP ID:	16074		16086		16083		16087		16089		16090		16085		16088		16056	
			QC CODE:	SA		SA		SA		SA		SA		DU		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/20/96	
METALS																					
Aluminum	14592.8	NYSDEC TAGM	MG/KG	**14600**	**J**	13200	J	13900	J	11600	J	11700	J	11500	J	14100	J	12700	J	11800	J
Antimony	3.59	NYSDEC TAGM	MG/KG	0.54	UJ	0.88	J	0.7		0.8	J	0.39	U	0.45	U	0.36		0.7	J	0.37	UJ
Arsenic	7.5	NYSDEC TAGM	MG/KG	4.1		3.5	J	4.9		4.5	J	4.6	J	4.5	J	5.1		5.1	J	5.6	
Barium	300	NYSDEC TAGM	MG/KG	128	J	143	J	81.8	J	90.3	J	113	J	109	J	129	J	98.7	J	69.1	J
Beryllium	0.73	NYSDEC TAGM	MG/KG	0.64		0.51		0.54		0.48		0.41		0.44		0.57		0.43		0.51	
Cadmium	1	NYSDEC TAGM	MG/KG	0.08	U	0.25		0.07		0.34		0.21		0.21		0.21		0.1		0.18	
Calcium	101904	NYSDEC TAGM	MG/KG	4280		6060		9650		14500		3410		3420		3600		18200		10800	
Chromium	22.13	NYSDEC TAGM	MG/KG	20.5		17		**24.4**		18.5		14.8		14.8		19.5		18.4		19.9	
Cobalt	30	NYSDEC TAGM	MG/KG	8.5		9.2		15.7		9.2		7.2		7.1		10.7		10.3		12.3	
Copper	25	NYSDEC TAGM	MG/KG	**25.4**		20.8		**39**		21.2		17.9		17.7		19.9		20.4		**28.9**	
Iron	26626.7	NYSDEC TAGM	MG/KG	23400		21300		**29300**		22500		19100		19100		24000		23600		24900	
Lead	21.86	NYSDEC TAGM	MG/KG	**53.4**		**33.4**		**52**		**58**		19.7		19.5		**29**		19.3		16.7	
Magnesium	12221.8	NYSDEC TAGM	MG/KG	3940		3850		6120		5330		3230		3200		3840		6820		5330	
Manganese	669.38	NYSDEC TAGM	MG/KG	295	J	647		399	J	452		663		587		**704**	**J**	**670**		550	
Mercury	0.1	NYSDEC TAGM	MG/KG	**0.16**		0.05		0.06		0.06		0.07		0.09		0.06		**0.56**		0.05	
Nickel	33.62	NYSDEC TAGM	MG/KG	24.5		21.7		**50.8**		26.4		16.6		16.4		25.9		27.2		**34.6**	
Potassium	1761.48	NYSDEC TAGM	MG/KG	1200		901		1460		1100		1030		1060		1730		1420		1320	
Selenium	2	NYSDEC TAGM	MG/KG	1.3	J	1.6		1.3	J	1.4		1.3		1.5		1.4	J	1.2		0.74	
Sodium	103.74	NYSDEC TAGM	MG/KG	73	U	56.3	U	83.1		59.2	U	51.7	U	59.9	U	49.4		57.9	U	49.5	U
Thallium	0.28	NYSDEC TAGM	MG/KG	1.1	U	0.88	U	0.88	U	0.93	U	0.81	U	0.94	U	**0.83**		0.91	U	**1.2**	
Vanadium	150	NYSDEC TAGM	MG/KG	24.1		21.7		20.5		19		19.4		19.5		22.3		20.1		19	
Zinc	82.5	NYSDEC TAGM	MG/KG	**85.2**	**J**	56.4		**109**	**J**	**92.5**		55.8		55.8		78.7	J	68.2		**97.9**	

Table A-4
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Downwind Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	3500-N VALUE	Q	3500-S VALUE	Q
			LOC_ID:	3500-N		3500-S	
			SAMP ID:	16084		16055	
			QC CODE:	SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1	
			TOP:	0		0	
			BOTTOM:	0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/22/96		8/20/96	
VOLATILE ORGANICS							
Benzene	60	NYSDEC TAGM	UG/KG	2	J	11	U
Toluene	1500	NYSDEC TAGM	UG/KG	3	J	2	J
SEMIVOLATILE ORGANICS							
2,4-Dinitrotoluene			UG/KG	880		400	
2-Methylnaphthalene	36400	NYSDEC TAGM	UG/KG	340	U	28	J
2-Methylphenol	100	NYSDEC TAGM	UG/KG	340	U	350	U
Acenaphthene	50000	NYSDEC TAGM	UG/KG	340	U	33	J
Acenaphthylene	41000	NYSDEC TAGM	UG/KG	96	J	35	J
Anthracene	50000	NYSDEC TAGM	UG/KG	110	J	130	J
Benzo(a)anthracene	224	NYSDEC TAGM	UG/KG	**720**		**480**	
Benzo(a)pyrene	61	NYSDEC TAGM	UG/KG	**940**		**640**	
Benzo(b)fluoranthene	1100	NYSDEC TAGM	UG/KG	**2200**	**J**	580	
Benzo(g,h,i)perylene	50000	NYSDEC TAGM	UG/KG	710		540	
Benzo(k)fluoranthene	1100	NYSDEC TAGM	UG/KG	340	U	530	
Carbazole			UG/KG	85	J	40	J
Chrysene	400	NYSDEC TAGM	UG/KG	**670**		**520**	
Di-n-butylphthalate	8100	NYSDEC TAGM	UG/KG	340	U	90	J
Dibenz(a,h)anthracene	14	NYSDEC TAGM	UG/KG	**470**		**200**	**J**
Dibenzofuran	6200	NYSDEC TAGM	UG/KG	340	U	36	J
Fluoranthene	50000	NYSDEC TAGM	UG/KG	1000		780	
Fluorene	50000	NYSDEC TAGM	UG/KG	340	U	38	J
Indeno(1,2,3-cd)pyrene	3200	NYSDEC TAGM	UG/KG	790		520	
N-Nitrosodiphenylamine (1)			UG/KG	95	J	47	J
Naphthalene	13000	NYSDEC TAGM	UG/KG	16	J	29	J
Phenanthrene	50000	NYSDEC TAGM	UG/KG	320	J	360	
Pyrene	50000	NYSDEC TAGM	UG/KG	1200		620	

Table A-4
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Downwind Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	3500-N VALUE	Q	3500-S VALUE	Q
			LOC_ID:	3500-N		3500-S	
			SAMP ID:	16084		16055	
			QC CODE:	SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1	
			TOP:	0		0	
			BOTTOM:	0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/22/96		8/20/96	
PESTICIDES/PCB							
4,4'-DDE	2100	NYSDEC TAGM	UG/KG	8.9		140	J
4,4'-DDT	2100	NYSDEC TAGM	UG/KG	13	J	35	U
Dieldrin	44	NYSDEC TAGM	UG/KG	3.4	U	17	U
Endosulfan I	900	NYSDEC TAGM	UG/KG	12	J	430	J
Endosulfan sulfate	1000	NYSDEC TAGM	UG/KG	3.4	U	20	J
Endrin	100	NYSDEC TAGM	UG/KG	5.6		43	
Endrin ketone			UG/KG	4.8		71	
alpha-Chlordane			UG/KG	1.8	U	11	R
beta-BHC	200	NYSDEC TAGM	UG/KG	1.8	U	20	J
delta-BHC	300	NYSDEC TAGM	UG/KG	1.8	U	18	U
OTHER ANALYSES							
Nitrate/Nitrite-Nitrogen			MG/KG	0.34		0.44	
Percent Moisture (PEST/PCB)				3		6	
Percent Moisture (SVOCs)				3		6	
Percent Moisture (VOCs)				3		8	
Percent Solids (Metals)				97.2		93.7	
NITROAROMATICS							
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	120	U	900	J

Table A-4
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Downwind Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q
			LOC_ID:	3500-N		3500-S	
			SAMP ID:	16084		16055	
			QC CODE:	SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1	
			TOP:	0		0	
			BOTTOM:	0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/22/96		8/20/96	
METALS							
Aluminum	14592.8	NYSDEC TAGM	MG/KG	4120	J	8620	J
Antimony	3.59	NYSDEC TAGM	MG/KG	0.56		0.74	J
Arsenic	7.5	NYSDEC TAGM	MG/KG	3.8		4.5	
Barium	300	NYSDEC TAGM	MG/KG	27.2	J	86.4	J
Beryllium	0.73	NYSDEC TAGM	MG/KG	0.16		0.32	
Cadmium	1	NYSDEC TAGM	MG/KG	0.23		0.32	
Calcium	101904	NYSDEC TAGM	MG/KG	**229000**		**107000**	
Chromium	22.13	NYSDEC TAGM	MG/KG	9.3		14	
Cobalt	30	NYSDEC TAGM	MG/KG	4.7		6.8	
Copper	25	NYSDEC TAGM	MG/KG	14.9		**29.6**	
Iron	26626.7	NYSDEC TAGM	MG/KG	9760		15800	J
Lead	21.86	NYSDEC TAGM	MG/KG	**36.7**		**36**	
Magnesium	12221.8	NYSDEC TAGM	MG/KG	8430		6310	
Manganese	669.38	NYSDEC TAGM	MG/KG	286	J	558	
Mercury	0.1	NYSDEC TAGM	MG/KG	0.04	U	0.05	
Nickel	33.62	NYSDEC TAGM	MG/KG	15.8		18.1	
Potassium	1761.48	NYSDEC TAGM	MG/KG	848		1410	
Selenium	2	NYSDEC TAGM	MG/KG	0.5	J	1.2	
Sodium	103.74	NYSDEC TAGM	MG/KG	**383**		68.9	
Thallium	0.28	NYSDEC TAGM	MG/KG	0.74	U	**1**	
Vanadium	150	NYSDEC TAGM	MG/KG	15.5		19.8	
Zinc	82.5	NYSDEC TAGM	MG/KG	53.2	J	**90.8**	

Table A-5
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Sediment Analytical Results

			LOC_ID:	SW/SD16-1		SW/SD16-10		SW/SD16-2		SW/SD16-3		SW/SD16-4		SW/SD16-4		SW/SD16-5		SW/SD16-6	
			SAMP ID:	16143A		16129A		16135A		16133A		16119A		16125A		16142A		16126A	
			QC CODE:	SA		SA		SA		SA		SA		DU		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0	
			BOTTOM:	6		6		6		6		6		6		6		6	
			MATRIX:	SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT	
			SAMPLE DATE:	9/18/96		9/18/96		9/18/96		9/18/96		9/18/96		9/18/96		9/18/96		9/18/96	
PARAMETER	LEVE	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
VOLATILE ORGANICS																			
2-Butanone			UG/KG	24	U	18	U	17	U	21	U	22	U	16	U	13	U	14	U
Acetone			UG/KG	37	U	20		17	U	21	U	21	J	20		13	U	36	
SEMIVOLATILE ORGANICS																			
2,4-Dinitrotoluene			UG/KG	5400		620	U	720	U	480	U	430	UJ	1000	UJ	430	U	820	
2-Methylnaphthalene			UG/KG	850	U	620	U	55	J	480	U	430	UJ	1000	UJ	430	U	40	J
Acenaphthene	5110	NYS BALCT	UG/KG	850	U	32	J	720	U	480	U	430	UJ	1000	UJ	430	U	530	U
Acenaphthylene			UG/KG	54	J	620	U	41	J	480	U	430	UJ	1000	UJ	430	U	530	U
Anthracene			UG/KG	99	J	57	J	42	J	480	U	430	UJ	1000	UJ	430	U	530	U
Benzo(a)anthracene	47.45	NYS HHB	UG/KG	**570**	**J**	**260**	**J**	**240**	**J**	480	U	430	UJ	1000	UJ	430	U	**110**	**J**
Benzo(a)pyrene	47.45	NYS HHB	UG/KG	**600**	**J**	**320**	**J**	**270**	**J**	480	U	430	UJ	1000	UJ	430	U	**120**	**J**
Benzo(b)fluoranthene	47.45	NYS HHB	UG/KG	**1200**		**480**	**J**	**450**	**J**	480	U	430	UJ	1000	UJ	430	U	**200**	**J**
Benzo(g,h,i)perylene			UG/KG	530	J	280	J	250	J	41	J	430	UJ	1000	UJ	430	U	110	J
Benzo(k)fluoranthene	47.45	NYS HHB	UG/KG	**780**	**J**	**320**	**J**	**370**	**J**	480	U	430	UJ	1000	UJ	430	U	**130**	**J**
Carbazole			UG/KG	110	J	52	J	720	U	480	U	430	UJ	1000	UJ	430	U	530	U
Chrysene	47.45	NYS HHB	UG/KG	**1200**		**440**	**J**	**440**	**J**	480	U	430	UJ	1000	UJ	430	U	**220**	**J**
Di-n-butylphthalate			UG/KG	250	J	210	J	720	U	480	U	430	UJ	1000	UJ	430	U	160	J
Dibenz(a,h)anthracene			UG/KG	170	J	100	J	720	U	480	U	430	UJ	1000	UJ	430	U	38	J
Fluoranthene	37230	NYS BALCT	UG/KG	1600		550	J	490	J	33	J	430	UJ	1000	UJ	430	U	250	J
Indeno(1,2,3-cd)pyrene	47.45	NYS HHB	UG/KG	**500**	**J**	**250**	**J**	**240**	**J**	39	J	430	UJ	1000	UJ	430	U	**98**	**J**
N-Nitrosodiphenylamine (1)			UG/KG	600	J	620	U	720	U	480	U	430	UJ	1000	UJ	430	U	530	U
Phenanthrene	4380	NYS BALCT	UG/KG	420	J	340	J	140	J	31	J	430	UJ	1000	UJ	430	U	150	J
Pyrene			UG/KG	1400		620	J	510	J	30	J	430	UJ	1000	UJ	430	U	240	J
bis(2-Ethylhexyl)phthalate	7300	NYS BALCT	UG/KG	180	J	270	J	720	U	120	J	27	J	160	J	430	U	73	J

Table A-5
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Sediment Analytical Results

			LOC_ID:	SW/SD16-1		SW/SD16-10		SW/SD16-2		SW/SD16-3		SW/SD16-4		SW/SD16-4		SW/SD16-5		SW/SD16-6	
			SAMP ID:	16143A		16129A		16135A		16133A		16119A		16125A		16142A		16126A	
			QC CODE:	SA		SA		SA		SA		SA		DU		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0	
			BOTTOM:	6		6		6		6		6		6		6		6	
			MATRIX:	SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT	
			SAMPLE DATE:	9/18/96		9/18/96		9/18/96		9/18/96		9/18/96		9/18/96		9/18/96		9/18/96	
PARAMETER	LEVE	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
PESTICIDES/PCB																			
4,4'-DDD	0.37	NYS HHB	UG/KG	**730**	**J**	**61**		**4.4**	**J**	**3**	**J**	4.3	U	10	UJ	4.3	U	**11**	**J**
4,4'-DDE	0.37	NYS HHB	UG/KG	**570**	**J**	**150**		**13**	**J**	**32**		**3**	**J**	**15**	**J**	**4.3**	**J**	**120**	**J**
4,4'-DDT	0.37	NYS HHB	UG/KG	**420**	**J**	**54**		**5.3**	**J**	4.9	U	4.3	U	**7.9**	**J**	4.3	U	**31**	
Aroclor-1254	0.03	NYS HHB	UG/KG	**670**		**100**	**J**	72	U	**41**	**J**	43	U	100	UJ	43	U	**65**	**J**
Aroclor-1260	0.03	NYS HHB	UG/KG	**130**	**J**	**72**	**J**	72	U	**39**	**J**	43	U	100	UJ	43	U	36	U
Endosulfan I	1.10	NYS BALCT	UG/KG	**26**		**8.8**		**11**	**J**	**2.3**	**J**	2.2	U	5.2	UJ	2.2	U	**5.5**	**J**
Endosulfan II	1.10	NYS BALCT	UG/KG	8.5	U	**6.3**	**J**	7.2	U	4.9	U	**2.6**	**J**	**6.8**	**J**	4.3	U	4.6	U
Endosulfan sulfate			UG/KG	18	J	6.2	U	7.2	U	4.9	U	4.3	U	10	UJ	4.3	U	2.7	U
Endrin aldehyde			UG/KG	8.5	U	6.2	U	7.2	U	3.2	J	4.3	U	10	UJ	4.3	U	3.2	U
Heptachlor epoxide	0.03	NYS HHB	UG/KG	4.4	U	3.2	U	**2.8**	**J**	2.5	U	2.2	U	5.2	UJ	2.2	U	2.4	U
alpha-Chlordane			UG/KG	10	J	3.2	U	3.7	U	2.5	U	2.2	U	5.2	UJ	2.2	U	2.4	U
gamma-Chlordane			UG/KG	4.4	U	3.2	U	3.7	U	2.5	U	2.2	U	5.2	UJ	2.2	U	1.4	U
OTHER ANALYSES																			
Nitrate/Nitrite-Nitrogen			MG/KG	0.67		0.09		0.24		0.01	U	0.01	U	0.03	U	0.12		0.14	
Percent Moisture (PEST/PCB)				61		47		54		32		24		67		24		28	
Percent Moisture (SVOCs)				61		47		54		32		24		67		24		38	
Percent Moisture (VOCs)				59		44		40		52		54		39		23		28	
Percent Solids (Metals)				38.9		52.8		46.2		67.8		75.5		33.1		75.6		71.8	
Total Organic Carbon			MG/KG	62500		56600		30300		28900		7150		56800		2780		19400	
NITROAROMATICS																			
2,4-Dinitrotoluene			UG/KG	190	J	120	U	120	UJ	120	U	120	U	120	UJ	120	U	910	J

Table A-5
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Sediment Analytical Results

			LOC_ID:	SW/SD16-1		SW/SD16-10		SW/SD16-2		SW/SD16-3		SW/SD16-4		SW/SD16-4		SW/SD16-5		SW/SD16-6	
			SAMP ID:	16143A		16129A		16135A		16133A		16119A		16125A		16142A		16126A	
			QC CODE:	SA		SA		SA		SA		SA		DU		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0	
			BOTTOM:	6		6		6		6		6		6		6		6	
			MATRIX:	SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT	
			SAMPLE DATE:	9/18/96		9/18/96		9/18/96		9/18/96		9/18/96		9/18/96		9/18/96		9/18/96	
PARAMETER	LEVE	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
METALS																			
Aluminum			MG/KG	11000	J	14300		22900	J	8040		6430	J	11400	J	17500		19500	
Antimony	2	NSY LEL	MG/KG	**10.9**	**J**	**11.5**	**J**	**13.5**	**J**	**50.3**	**J**	1.4	J	**8.7**	**J**	0.77	UJ	**32.2**	**J**
Arsenic	6	NSY LEL	MG/KG	**8.7**	**J**	**9.6**		**7.2**	**J**	4.5		3.4	J	**6.1**	**J**	5.6		**7.6**	
Barium			MG/KG	109	J	636		242	J	433		27.8	J	92	J	99.9		3980	
Beryllium			MG/KG	0.46	J	0.69		0.93	J	0.41		0.24	J	0.39	J	0.73		0.78	
Cadmium	0.6	NSY LEL	MG/KG	**1.6**	**J**	**7.6**		**0.72**	**J**	0.57		0.24	J	**0.61**	**J**	0.26		**0.92**	
Calcium			MG/KG	75700	J	38300		13400	J	26400		19200	J	43500	J	72700		30900	
Chromium	26	NSY LEL	MG/KG	**43.5**	**J**	**41.3**		**32.9**	**J**	20.4		10.8	J	18.3	J	**27.8**		**36.2**	
Cobalt			MG/KG	7.6	J	13.6		13.1	J	7.6		6.5	J	11.8	J	10.6		15.6	
Copper	16	NSY LEL	MG/KG	**335**	**J**	**573**	**J**	**260**	**J**	**17500**	**J**	**27.4**	**J**	**116**	**J**	**50**	**J**	**363**	**J**
Iron	20000	NSY LEL	MG/KG	**28500**	**J**	**46400**		**34300**	**J**	**20400**		15300	J	**23200**	**J**	**31000**		**31700**	
Lead	31	NSY LEL	MG/KG	**1720**	**J**	**1950**		**1250**	**J**	**4480**		**175**	**J**	**634**	**J**	**112**		**2700**	
Magnesium			MG/KG	12300	J	8390		7500	J	4720		3200	J	5700	J	8350		9430	
Manganese	460	NSY LEL	MG/KG	218	J	386	J	174	J	217	J	186	J	343	J	303		359	J
Mercury	0.15	NSY LEL	MG/KG	**0.52**	**J**	**0.31**		**2**	**J**	**2.5**		0.08	J	**0.2**	**J**	0.08		**0.23**	
Nickel	16	NSY LEL	MG/KG	**32.6**	**J**	**45.2**	**J**	**44.8**	**J**	**32.4**	**J**	**18.2**	**J**	**30**	**J**	**40.1**	**J**	**50.9**	**J**
Potassium			MG/KG	2420	J	2440	J	2660	J	880	J	557	J	1630	J	2450	J	3870	J
Selenium			MG/KG	4.9	J	1.5	U	1.7	UJ	1.1	U	0.7	UJ	1.8	UJ	1	U	1.4	
Silver	1	NSY LEL	MG/KG	0.69	UJ	0.48	U	0.53	UJ	0.35		0.22	UJ	0.58	UJ	0.32	U	0.28	U
Sodium			MG/KG	153	J	782		182	J	404		69.1	J	147	J	142		197	
Thallium			MG/KG	1.9	UJ	1.3	U	1.6	J	0.94	U	0.61	UJ	1.6	UJ	0.88	U	1	
Vanadium			MG/KG	39.8	J	29.3		33.5	J	10		8.9	J	18.3	J	26.6		34.3	
Zinc	120	NSY LEL	MG/KG	**549**	**J**	**557**		**339**	**J**	**952**		**138**	**J**	**284**	**J**	103		**307**	

Table A-5
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Sediment Analytical Results

PARAMETER	LEVE	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q
			LOC_ID:	SW/SD16-7		SW/SD16-8		SW/SD16-9	
			SAMP ID:	16127A		16134A		16128A	
			QC CODE:	SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0	
			BOTTOM:	6		6		6	
			MATRIX:	SEDIMENT		SEDIMENT		SEDIMENT	
			SAMPLE DATE:	9/18/96		9/18/96		9/18/96	
VOLATILE ORGANICS									
2-Butanone			UG/KG	14	U	16	U	12	J
Acetone			UG/KG	20		16	U	32	
SEMIVOLATILE ORGANICS									
2,4-Dinitrotoluene			UG/KG	43	J	470	U	520	U
2-Methylnaphthalene			UG/KG	570	U	470	U	520	U
Acenaphthene	5110	NYS BALCT	UG/KG	570	U	470	U	520	U
Acenaphthylene			UG/KG	570	U	470	U	37	J
Anthracene			UG/KG	570	U	470	U	100	J
Benzo(a)anthracene	47.45	NYS HHB	UG/KG	**92**	**J**	22	J	**370**	**J**
Benzo(a)pyrene	47.45	NYS HHB	UG/KG	**120**	**J**	470	U	**470**	**J**
Benzo(b)fluoranthene	47.45	NYS HHB	UG/KG	**120**	**J**	470	U	**690**	
Benzo(g,h,i)perylene			UG/KG	100	J	470	U	400	J
Benzo(k)fluoranthene	47.45	NYS HHB	UG/KG	**120**	**J**	470	U	**520**	
Carbazole			UG/KG	570	U	470	U	54	J
Chrysene	47.45	NYS HHB	UG/KG	**120**	**J**	36	J	**640**	
Di-n-butylphthalate			UG/KG	570	U	470	U	160	J
Dibenz(a,h)anthracene			UG/KG	47	J	470	U	150	J
Fluoranthene	37230	NYS BALCT	UG/KG	190	J	41	J	550	
Indeno(1,2,3-cd)pyrene	47.45	NYS HHB	UG/KG	**91**	**J**	470	U	**380**	**J**
N-Nitrosodiphenylamine (1)			UG/KG	570	U	470	U	520	U
Phenanthrene	4380	NYS BALCT	UG/KG	100	J	24	J	300	J
Pyrene			UG/KG	190	J	41	J	660	
bis(2-Ethylhexyl)phthalate	7300	NYS BALCT	UG/KG	150	J	470	U	51	J

Table A-5
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Sediment Analytical Results

PARAMETER	LEVE	SOURCE	UNIT	SW/SD16-7 VALUE	Q	SW/SD16-8 VALUE	Q	SW/SD16-9 VALUE	Q
			LOC_ID:	SW/SD16-7		SW/SD16-8		SW/SD16-9	
			SAMP ID:	16127A		16134A		16128A	
			QC CODE:	SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0	
			BOTTOM:	6		6		6	
			MATRIX:	SEDIMENT		SEDIMENT		SEDIMENT	
			SAMPLE DATE:	9/18/96		9/18/96		9/18/96	
PESTICIDES/PCB									
4,4'-DDD	0.37	NYS HHB	UG/KG	**100**	**J**	**3**	**J**	**18**	**J**
4,4'-DDE	0.37	NYS HHB	UG/KG	**140**	**J**	**13**		**76**	
4,4'-DDT	0.37	NYS HHB	UG/KG	**100**	**J**	**3**	**J**	**49**	
Aroclor-1254	0.03	NYS HHB	UG/KG	**150**		**35**	**J**	**61**	**J**
Aroclor-1260	0.03	NYS HHB	UG/KG	**51**	**J**	47	U	**63**	**J**
Endosulfan I	1.10	NYS BALCT	UG/KG	**4.4**	**J**	2.4	U	**12**	
Endosulfan II	1.10	NYS BALCT	UG/KG	5.7	U	4.7	U	5.2	U
Endosulfan sulfate			UG/KG	4.6	J	4.7	U	3	U
Endrin aldehyde			UG/KG	5.7	U	4.7	U	5.2	U
Heptachlor epoxide	0.03	NYS HHB	UG/KG	2.9	U	2.4	U	2.7	U
alpha-Chlordane			UG/KG	4.2		2.4	U	12.1	J
gamma-Chlordane			UG/KG	3.8		2.4	U	2.9	
OTHER ANALYSES									
Nitrate/Nitrite-Nitrogen			MG/KG	0.03		0.2		0.05	
Percent Moisture (PEST/PCB)				42		30		36	
Percent Moisture (SVOCs)				42		30		36	
Percent Moisture (VOCs)				31		37		53	
Percent Solids (Metals)				57.7		70		64	
Total Organic Carbon			MG/KG	50600		26400		59800	
NITROAROMATICS									
2,4-Dinitrotoluene			UG/KG	120	U	120	U	120	U

Table A-5
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Sediment Analytical Results

			LOC_ID:	SW/SD16-7		SW/SD16-8		SW/SD16-9	
			SAMP ID:	16127A		16134A		16128A	
			QC CODE:	SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0	
			BOTTOM:	6		6		6	
			MATRIX:	SEDIMENT		SEDIMENT		SEDIMENT	
			SAMPLE DATE:	9/18/96		9/18/96		9/18/96	
PARAMETER	LEVE	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q
METALS									
Aluminum			MG/KG	10200		17300		9600	
Antimony	2	NSY LEL	MG/KG	3.2	J	2.6	J	3	J
Arsenic	6	NSY LEL	MG/KG	1.9		6.5		4.2	
Barium			MG/KG	62.7		300		131	
Beryllium			MG/KG	0.42		0.61		0.48	
Cadmium	0.6	NSY LEL	MG/KG	1.9		0.23		1.2	
Calcium			MG/KG	25700		6680		58000	
Chromium	26	NSY LEL	MG/KG	23.5		25		16.9	
Cobalt			MG/KG	7.5		8		8.9	
Copper	16	NSY LEL	MG/KG	120	J	85	J	124	J
Iron	20000	NSY LEL	MG/KG	17700		36400		18100	
Lead	31	NSY LEL	MG/KG	511		992		476	
Magnesium			MG/KG	6660		5260		15100	
Manganese	460	NSY LEL	MG/KG	192	J	223	J	447	J
Mercury	0.15	NSY LEL	MG/KG	0.06		0.06		0.16	
Nickel	16	NSY LEL	MG/KG	27.3	J	24.8	J	24.7	J
Potassium			MG/KG	1970	J	1640	J	2010	J
Selenium			MG/KG	1.6	U	0.76	U	0.98	U
Silver	1	NSY LEL	MG/KG	0.5	U	0.24	U	0.31	U
Sodium			MG/KG	127		68.6		376	
Thallium			MG/KG	1.4	U	0.66	U	0.85	U
Vanadium			MG/KG	26.5		27.2		20.1	
Zinc	120	NSY LEL	MG/KG	176		96.3		192	

Table A-6
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Groundwater Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	MW16-1	MW16-1	MW16-1	MW16-2	MW16-2	MW16-2	MW16-2	MW16-3	MW16-3	MW16-3
		SAMP ID:		MW16-1-1	16101	16152	MW16-2-1	MW16-41-1	16102	16150	MW16-3-1	16110	16115
		QC CODE:		SA	SA	SA	SA	DU	SA	SA	SA	SA	SA
		STUDY ID:		ESI	RI ROUND1	RI ROUND2	ESI	ESI	RI ROUND1	RI ROUND2	ESI	RI ROUND1	RI ROUND1
		MATRIX:		WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
		SAMPLE DATE:		11/19/93	8/27/96	12/7/96	11/19/93	11/19/93	8/27/96	12/6/96	11/19/93	8/30/96	9/10/96
				VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q
SEMIVOLATILE ORGANICS													
3-Nitroaniline			UG/L	27 U	26 UJ	25 U	27 U	27 U	25 U	25 U	27 U	25 U	25 U
4-Chloroaniline	5	NYS CLASS GA STANDARD	UG/L	11 U	10 UJ	10 U	11 U	11 U	10 U	10 U	11 U	10 U	10 U
Benzo[ghi]perylene			UG/L	11 U	10 UJ	10 U	11 U	11 U	10 U	10 U	11 U	1 J	10 U
Dibenz[a,h]anthracene			UG/L	11 U	10 UJ	10 U	11 U	11 U	10 U	10 U	11 U	0.7 J	10 U
Diethyl phthalate			UG/L	11 U	10 UJ	10 U	11 U	11 U	10 U	10 U	0.5 J	10 U	10 U
Indeno[1,2,3-cd]pyrene			UG/L	11 U	10 UJ	10 U	11 U	11 U	10 U	10 U	11 U	0.6 J	10 U
OTHER ANALYSES													
Nitrate/Nitrite Nitrogen			MG/L	0.11	0.02	0.01 U	0.86	0.77	0.67	2	0.23	0.04	0.11
Percent Solids (Metals)					0	0			0	0		0	0
Total Petroleum Hydrocarbons			MG/L		0.44 U	0.4 U			0.4 U	0.36 U		0.41 U	1.3
NITROAROMATICS													
1,3-Dinitrobenzene	5	NYS CLASS GA STANDARD	UG/L	0.13 U	0.26 U	0.26 U	0.13 U	0.13 U	1.8 J	0.26 U	0.13 U	0.26 U	0.26 U
2,4-Dinitrotoluene	5	NYS CLASS GA STANDARD	UG/L	0.13 U	0.26 U	0.26 U	0.13 U	0.13 U	0.26 U	0.26 U	0.07 J	0.26 U	0.26 U
METALS													
Aluminum	200	EPA SECONDARY MCL	UG/L	53600	1850	143 U	3500	4540	1010	490	149000	336	1470
Antimony	6	EPA MCL	UG/L	52.5 U	2 U	3 U	52.4 U	52.7 U	2 U	3 U	89.6	7.5	12.3
Arsenic	25	NYS CLASS GA STANDARD	UG/L	15.4	2.7 U	4.4 U	1 U	1.3 J	2.7 U	4.4 U	33.2	2.7 U	3.2
Barium	1000	NYS CLASS GA STANDARD	UG/L	401	74.2	48.2 U	43 J	48.4 J	48.1	31.4 U	1170	64.4	74
Beryllium	4	EPA MCL	UG/L	3.1 J	0.23	0.2 U	0.3 U	0.3 U	0.22	0.2 U	8.1	0.21	0.15
Cadmium	5	EPA MCL	UG/L	3.3 U	0.3 U	0.6 U	3.3 U	3.3 U	0.3 U	0.6 U	3.9 J	0.3 U	0.32
Calcium			UG/L	239000	157000	116000	114000	117000	193000	164000	477000	99800	91600
Chromium	50	NYS CLASS GA STANDARD	UG/L	88.5	2.7	1 U	6 J	6.9 J	2.3	1.1 U	293	1 U	3.4
Cobalt			UG/L	59.9	2.1	1.3 U	4.9 U	4.9 U	1.5	1.3 U	166	1.2 U	1.6
Copper	200	NYS CLASS GA STANDARD	UG/L	64.2	4.9	1.9 U	12.1 J	14.8 J	7.9	2.9 U	2150	19.2	56.8
Iron	300	NYS CLASS GA STANDARD	UG/L	88100	2400 J	296	5310	6400	1720 J	923 J	246000	432 J	1900 J
Lead	15	EPA MCL	UG/L	71.1	1.7 U	1.5 U	27.3	34.5	5.9	6.8	3240	6.1	24.1 J
Magnesium			UG/L	42000	23300	17600	15200	15900	23700	20900	92000	11600	10500
Manganese	50	EPA SECONDARY MCL	UG/L	2110	210	64.2	167	189	129	65.2	6300	130	66.3
Mercury	2	NYS CLASS GA STANDARD	UG/L	0.07 UJ	0.1 U	0.1 U	0.07 UJ	0.07 UJ	0.1 U	0.1 U	3.9 J	0.1 U	0.1 U
Nickel	100	EPA MCL	UG/L	135	4.7	2.5 U	10.2 J	11.5 J	11	3.1 U	406	3	6.1
Potassium			UG/L	10200	1670	998 U	4810 J	4520 J	4760	3410 U	24800	2740	2970
Selenium	10	NYS CLASS GA STANDARD	UG/L	2.5 J	2.4 U	4.7 UJ	0.8 U	0.99 J	2.4 U	4.7 UJ	10.3	2.4 U	2.8
Sodium	20000	NYS CLASS GA STANDARD	UG/L	7710	8750	3870 U	11400	11700	19100	17000	10500	9480	6740
Thallium	2	EPA MCL	UG/L	1.8 U	4.2 U	5.9 U	1.8 U	1.8 U	9.2	9.6 U	17.8 U	4.2 U	4.2 UJ
Vanadium			UG/L	86.5	3.3	1.6 U	7.2 J	9.3 J	2.9	1.6 U	257	1.2 U	3.8
Zinc	300	NYS CLASS GA STANDARD	UG/L	460	15.6 R	5.8 U	30.4	33.4	37.4 R	13.5 U	3370	32.4 R	91.2 R

Table A-6
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Groundwater Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	MW16-3	MW16-4	MW16-4	MW16-5	MW16-6	MW16-6	MW16-7	MW16-7	MW16-7
		SAMP ID:		16165	16105	16156	16162	16111	16155	16104	16158	16159
		QC CODE:		SA	SA	SA	SA	SA	SA	SA	SA	DU
		STUDY ID:		RI ROUND2	RI ROUND1	RI ROUND2	RI ROUND2	RI ROUND1	RI ROUND2	RI ROUND1	RI ROUND2	RI ROUND2
		MATRIX:		WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
		SAMPLE DATE:		12/10/96	8/28/96	12/7/96	12/9/96	9/3/96	12/8/96	8/28/96	12/8/96	12/8/96
				VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q
SEMIVOLATILE ORGANICS												
3-Nitroaniline			UG/L	25 U	26 U	25 U	25 U	25 U	25 U	25 J	25 U	25 U
4-Chloroaniline	5	NYS CLASS GA STANDARD	UG/L	10 U	10 U	10 U	10 U	10 U	10 U	10 J	10 U	10 U
Benzo[ghi]perylene			UG/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenz[a,h]anthracene			UG/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diethyl phthalate			UG/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno[1,2,3-cd]pyrene			UG/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
OTHER ANALYSES												
Nitrate/Nitrite Nitrogen			MG/L	0.64	0.29	0.26	1.4	0.01 U	0.01 U	0.83	0.24	0.23
Percent Solids (Metals)				0	0	0	0	0	0	0	0	0
Total Petroleum Hydrocarbons			MG/L	1	0.41 U	0.42 U	0.91	0.89	0.73	0.41 U	0.46 U	1.3
NITROAROMATICS												
1,3-Dinitrobenzene	5	NYS CLASS GA STANDARD	UG/L	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26	0.26 U	0.26 U
2,4-Dinitrotoluene	5	NYS CLASS GA STANDARD	UG/L	0.26 U	0.68 J	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
METALS												
Aluminum	200	EPA SECONDARY MCL	UG/L	36.1 U	24.9	36.1 U	148 U	208	170 U	12.4	67.4 U	52.9 U
Antimony	6	EPA MCL	UG/L	5.3 U	2 U	3 U	3 U	2 U	3 U	15.7 U	8.9 U	10 U
Arsenic	25	NYS CLASS GA STANDARD	UG/L	4.4 U	2.7 U	4.4 U	4.4 U	2.7 U	4.4 U	4 U	4.4 U	4.4 U
Barium	1000	NYS CLASS GA STANDARD	UG/L	57.4 U	97.4	55.2 U	67.6 U	86.4	80.2 U	89.2	59.1 U	60.2 U
Beryllium	4	EPA MCL	UG/L	0.2 U	0.21	0.2 U	0.2 U	0.1 U	0.2 U	0.21	0.2 U	0.2 U
Cadmium	5	EPA MCL	UG/L	0.6 U	0.3 U	0.6 U	0.6 U	0.3 U	0.6 U	0.3 U	0.6 U	0.6 U
Calcium			UG/L	85500	130000	158000	90000	44600	84900	109000	114000	117000
Chromium	50	NYS CLASS GA STANDARD	UG/L	1 U	1 U	1 U	1 U	1.5	1 U	1	1 U	1 U
Cobalt			UG/L	1.3 U	1.2 U	1.3 U	1.3 U	1.2	1.3 U	1.2	1.3 U	1.3 U
Copper	200	NYS CLASS GA STANDARD	UG/L	11.4 U	3.6	1.1 U	1.1 U	4.4	1.1 U	5.1	1.4 U	2.1 U
Iron	300	NYS CLASS GA STANDARD	UG/L	77.8 U	38.2	126	211	273 J	290	23.4	174	160
Lead	15	EPA MCL	UG/L	1.5 U	1.7 U	1.5 U	3 U	1.7 U	1.5 U	8.4	9.9	9.2
Magnesium			UG/L	10000	17700	22900	11800	6370	12800	16900	22600	23200
Manganese	50	EPA SECONDARY MCL	UG/L	5.9 U	132	66.9	51	545	1380	85.7	43.2	44.3
Mercury	2	NYS CLASS GA STANDARD	UG/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	100	EPA MCL	UG/L	2.5 U	2.2	2.5 U	2.5 U	4.1	2.5 U	2.2	2.5 U	2.5 U
Potassium			UG/L	1900 U	4040	1660 U	18800	3530	2230 U	3220	2090 U	2160 U
Selenium	10	NYS CLASS GA STANDARD	UG/L	4.7 UJ	2.4 U	4.7 UJ	4.7 UJ	2.4 U	4.7 UJ	2.4 U	4.7 UJ	4.7 UJ
Sodium	20000	NYS CLASS GA STANDARD	UG/L	7660	17200	12300	49500	396000	409000	12000	9940	10200
Thallium	2	EPA MCL	UG/L	4.1 U	4.2 U	4.1 U	6.9 U	6.2	4.1 U	4.2	11	4.1 U
Vanadium			UG/L	1.6 U	1.2 U	1.6 U	1.6 U	2.9	1.6 U	1.2	1.6 U	1.6 U
Zinc	300	NYS CLASS GA STANDARD	UG/L	42	4.5 R	5.1 U	6.3 U	13.2 R	10.5 U	2.9 R	2.2 U	7.3 U

Table A-7
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Water Analytical Results

			LOC_ID:	SW/SD16-1	SW/SD16-10	SW/SD16-2	SW/SD16-3	SW/SD16-4	SW/SD16-4	SW/SD16-5	SW/SD16-6
			SAMP ID:	16143	16129	16135	16133	16119	16125	16142	16126
			QC CODE:	SA	SA	SA	SA	SA	DU	SA	SA
			STUDY ID:	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1
			TOP:								
			BOTTOM:								
			MATRIX:	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER
			SAMPLE DATE:	9/18/96	9/18/96	9/18/96	9/18/96	9/18/96	9/18/96	9/18/96	9/18/96
PARAMETER	LEVEL	SOURCE	UNIT	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q
SEMIVOLATILE ORGANICS											
Di-n-butylphthalate			UG/L	10 U	10 U	10 U	10 U	10 U	10 U	0.5 J	10 U
Pentachlorophenol	0.4	NYS AWQS CLASS C	UG/L	25 U	0.7 J	25 U	25 U	25 U	25 U	25 U	25 U
bis(2-Ethylhexyl)phthalate	0.6	NYS AWQS CLASS C	UG/L	10 U	3 J	10 U	10 U	10 U	10 U	3 J	10 U
OTHER ANALYSES											
Nitrate/Nitrite-Nitrogen			MG/L	0.34	0.01 U	0.49	0.43	0.26	0.31	0.15	0.02
Percent Solids (Metals)				0	0	0	0	0	0	0	0
Total Organic Carbon			MG/L	5	6.4	3.2	2.3	2.8	2.8	4	12.5
pH			MG/L	7.39	7.62	7.34	7.57	7.46	7.59	7.36	7.75
METALS											
Aluminum	100	NYS AWQS CLASS C	UG/L	26.8 R	118 R	34.2 R	401 R	123 R	69.6 R	976 R	43.2 R
Antimony			UG/L	10.4 J	5.3 J	14.7 J	124 J	59.1 J	68.8 J	3.6 J	27.3 J
Arsenic	190	NYS AWQS CLASS C	UG/L	3 J	2.7 U	2.7 U	5.7 J	4 J	2.7 U	3.6 J	3 J
Barium			UG/L	75.3 J	103 J	114 J	100 J	155 J	116 J	64.4 J	348 J
Cadmium	1.86	NYS AWQS CLASS C	UG/L	0.3 U	0.71 J	0.3 U	2 J	0.43 J	0.3 U	0.63 J	0.54 J
Calcium			UG/L	79000	73300	87900	69800	78600	75300	89900	79600
Chromium	347.27	NYS AWQS CLASS C	UG/L	1 U	1 U	1 U	2.1 J	1 U	1 U	2.2 J	1 U
Cobalt	5	NYS AWQS CLASS C	UG/L	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	2.6	1.2 U
Copper	20.29	NYS AWQS CLASS C	UG/L	13.5	17.9	13.9	424	33.4	26.7	25.7	40.9
Iron	300	NYS AWQS CLASS C	UG/L	32.4 J	210 J	41 J	1550 J	1140 J	272 J	3340 J	58.3 J
Lead	7.16	NYS AWQS CLASS C	UG/L	5.4	11.7	34.3	813	96.8	34.2	66.8	36.6
Magnesium			UG/L	8080	6800	11400	11200	11400	11100	10100	10500
Manganese			UG/L	18.4	47.3	8.6	22.6	53	42.8	161	11.6
Mercury			UG/L	0.1 U	0.1 U	0.1 U	0.9	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	154.49	NYS AWQS CLASS C	UG/L	1.6 U	4.8	1.6 U	3.5	2.7	3.7	3.8	1.6 U
Potassium			UG/L	2380	2460	1200	4590	3890	3790	2510	4510
Selenium	1	NYS AWQS CLASS C	UG/L	2.4 U	2.4 U	2.8 J	2.4 U	2.4 U	2.4 U	4.3 J	2.4 U
Silver	0.1	NYS AWQS CLASS C	UG/L	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
Sodium			UG/L	4720	4830	5540	8280	7730	7620	5670	1320
Vanadium	14	NYS AWQS CLASS C	UG/L	1.2 U	1.2 U	1.2 U	1.3 J	1.5 J	1.2 U	3.7 J	1.2 U
Zinc	141.38	NYS AWQS CLASS C	UG/L	28.5	158	71.7	253	217	125	104	55

Table A-7
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 Surface Water Analytical Results

PARAMETER	LEVEL	SOURCE	LOC_ID:	SW/SD16-7		SW/SD16-8		SW/SD16-9		SW16-1		SW16-2	
			SAMP ID:	16127		16134		16128		SW16-1-1		SW16-2-1	
			QC CODE:	SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		ESI		ESI	
			TOP:							0		0	
			BOTTOM:							0.2		0.2	
			MATRIX:	SURFACE WATER		SURFACE WATER		SURFACE WATER		SURFACE WATER		SURFACE WATER	
			SAMPLE DATE:	9/18/96		9/18/96		9/18/96		12/6/93		12/6/93	
			UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
SEMIVOLATILE ORGANICS													
Di-n-butylphthalate			UG/L	10	U	10	U	10	U	11	U	10	U
Pentachlorophenol	0.4	NYS AWQS CLASS C	UG/L	1	J	25	U	4	J	27	U	26	U
bis(2-Ethylhexyl)phthalate	0.6	NYS AWQS CLASS C	UG/L	10	U	10	U	1	J	11	U	10	U
OTHER ANALYSES													
Nitrate/Nitrite-Nitrogen			MG/L	0.12		0.01	U	0.04		1.27		1.77	
Percent Solids (Metals)				0		0		0					
Total Organic Carbon			MG/L	2.8		10.4		9.3					
pH			MG/L	7.57		7.53		7.8					
METALS													
Aluminum	100	NYS AWQS CLASS C	UG/L	1540	R	77.1	R	190	R	152	J	261	
Antimony			UG/L	6.5	J	7.2	J	7.7	J	21.5	U	21.4	U
Arsenic	190	NYS AWQS CLASS C	UG/L	4.5	J	4.3	J	3.6	J	0.8	U	0.8	U
Barium			UG/L	74.4	J	117	J	122	J	60.6	J	84.5	J
Cadmium	1.86	NYS AWQS CLASS C	UG/L	0.72	J	0.3	U	0.5	J	2.1	U	2.1	U
Calcium			UG/L	88400		46100		45900		71700		53400	
Chromium	347.27	NYS AWQS CLASS C	UG/L	3	J	1	U	1	U	2.6	U	2.6	U
Cobalt	5	NYS AWQS CLASS C	UG/L	4.1		1.2	U	1.2	U	4.4	U	4.4	U
Copper	20.29	NYS AWQS CLASS C	UG/L	24.9		15.6		41.1		19.3	J	67.6	
Iron	300	NYS AWQS CLASS C	UG/L	3650	J	94.7	J	220	J	281	R	551	R
Lead	7.16	NYS AWQS CLASS C	UG/L	67.4		6.5		37.3		67.8		178	
Magnesium			UG/L	10000		5990		4300		9590		8170	
Manganese			UG/L	252		2.4		18.4		8.7	J	33.9	
Mercury			UG/L	0.1	U	0.1	U	0.1	U	0.1	J	0.19	J
Nickel	154.49	NYS AWQS CLASS C	UG/L	5.5		1.6	U	4.1		4	U	5.2	J
Potassium			UG/L	2500		3150		2090		2560	J	3120	J
Selenium	1	NYS AWQS CLASS C	UG/L	2.4	U	2.4	U	2.7	J	1.1	J	0.7	U
Silver	0.1	NYS AWQS CLASS C	UG/L	1.3	U	1.3	U	1.3	U	4.2	U	5.2	J
Sodium			UG/L	5380		1150		3040		9220		8850	
Vanadium	14	NYS AWQS CLASS C	UG/L	4.9	J	1.2	U	1.3	J	3.7	J	4.5	J
Zinc	141.38	NYS AWQS CLASS C	UG/L	121		28.8		66.7		34.7		380	

Table A-8
SENEDA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 Surface Soil Analytical Results

			LOC_ID:	SS17-1	SS17-10	SS17-11	SS17-12	SS17-13	SS17-14	SS17-15	SS17-16	SS17-17
			SAMP ID:	SS17-1-1	SS17-10-1	SS17-11-1	SS17-12-1	SS17-13-1	SS17-14-1	SS17-15-1	SS17-16-1	SS17-17-1
			QC CODE:	SA	SA	SA	SA	SA	SA	SA	SA	SA
			STUDY ID:	ESI	ESI	ESI	ESI	ESI	ESI	ESI	ESI	ESI
			TOP:	0	0	0	0	0	0	0	0	0
			BOTTOM:	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
			MATRIX:	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL
			SAMPLE DATE:	10/21/93	11/9/93	11/9/93	10/21/93	10/20/93	10/21/93	10/20/93	10/21/93	10/21/93
PARAMETER	LEVEL	SOURCE	UNIT	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q
VOLATILE ORGANICS												
Acetone	200	NYSDEC TAGM	UG/KG	12 U	11 U	13 U	12 U	7 J	11 U	11 UR	13 U	72 U
Benzene	60	NYSDEC TAGM	UG/KG	12 U	11 U	13 U	12 U	11 U	11 U	11 UR	13 U	14 U
Methylene Chloride	100	NYSDEC TAGM	UG/KG	12 U	11 U	13 U	12 U	4 J	11 U	11 UR	13 U	14 U
Toluene	1500	NYSDEC TAGM	UG/KG	12 U	11 U	13 U	12 U	1 J	11 U	11 UR	13 U	14 U
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			UG/KG	420 U	61 J	420 U	390 U	350 U	350 UJ	350 UR	450 U	430 U
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	420 U	350 U	420 U	390 U	350 U	350 UJ	350 UR	450 U	430 U
2-Methylnaphthalene	36400	NYSDEC TAGM	UG/KG	420 U	350 U	420 U	390 U	350 U	350 UJ	350 UR	450 U	430 U
3,3'-Dichlorobenzidine			UG/KG	420 U	350 U	420 U	390 U	350 U	350 UJ	350 UR	450 U	430 U
3-Nitroaniline	500	NYSDEC TAGM	UG/KG	1000 U	850 U	1000 U	940 U	860 U	850 UJ	850 UR	1100 U	1100 U
4-Nitroaniline			UG/KG	1000 U	850 U	1000 U	940 U	860 U	850 UJ	850 UR	1100 U	1100 U
Anthracene	50000	NYSDEC TAGM	UG/KG	23 J	350 U	420 U	390 U	350 U	350 UJ	350 UR	450 U	430 U
Benzo(a)anthracene	224	NYSDEC TAGM	UG/KG	72 J	38 J	420 U	390 U	350 U	350 UJ	350 UR	450 U	430 U
Benzo(a)pyrene	61	NYSDEC TAGM	UG/KG	58 J	32 J	420 U	390 U	350 U	350 UJ	350 UR	450 U	430 U
Benzo(b)fluoranthene	1100	NYSDEC TAGM	UG/KG	70 J	50 J	420 U	390 U	350 U	350 UJ	350 UR	450 U	430 U
Benzo(g,h,i)perylene	50000	NYSDEC TAGM	UG/KG	63 J	27 J	420 U	390 U	350 U	350 UJ	350 UR	450 U	430 U
Benzo(k)fluoranthene	1100	NYSDEC TAGM	UG/KG	49 J	38 J	420 U	390 U	350 U	350 UJ	350 UR	450 U	430 U
Butylbenzylphthalate	50000	NYSDEC TAGM	UG/KG	420 U	46 J	420 U	390 U	350 U	350 UJ	350 UR	450 U	430 U
Carbazole			UG/KG	420 U	350 U	420 U	390 U	350 U	350 UJ	350 UR	450 U	430 U
Chrysene	400	NYSDEC TAGM	UG/KG	75 J	78 J	420 U	390 U	350 U	350 UJ	350 UR	450 U	430 U
Di-n-butylphthalate	8100	NYSDEC TAGM	UG/KG	51 J	48 J	66 J	210 J	21 J	350 UJ	350 UR	340 J	480
Dibenz(a,h)anthracene	14	NYSDEC TAGM	UG/KG	40 J	350 U	420 U	390 U	350 U	350 UJ	350 UR	450 U	430 U
Fluoranthene	50000	NYSDEC TAGM	UG/KG	190 J	150 J	420 U	390 U	19 J	350 UJ	350 UR	31 J	23 J
Indeno(1,2,3-cd)pyrene	3200	NYSDEC TAGM	UG/KG	62 J	25 J	420 U	390 U	350 U	350 UJ	350 UR	450 U	430 U
N-Nitrosodiphenylamine (1)			UG/KG	420 U	350 U	420 U	390 U	350 U	350 UJ	350 UR	450 U	430 U
Naphthalene	13000	NYSDEC TAGM	UG/KG	420 U	350 U	420 U	390 U	350 U	350 UJ	350 UR	450 U	430 U
Pentachlorophenol	1000	NYSDEC TAGM	UG/KG	1000 U	850 U	1000 U	940 U	860 U	850 UJ	850 UR	1100 U	1100 U
Phenanthrene	50000	NYSDEC TAGM	UG/KG	120 J	72 J	420 U	390 U	19 J	350 UJ	350 UR	450 U	430 U
Pyrene	50000	NYSDEC TAGM	UG/KG	170 J	110 J	26 J	390 U	17 J	350 UJ	350 UR	28 J	430 U
bis(2-Chloroisopropyl) ether			UG/KG									
bis(2-Ethylhexyl)phthalate	50000	NYSDEC TAGM	UG/KG	530	810 U	1300	390 U	460 J	50 J	350 UR	450 U	430 U

Table A-8
SENEDA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	SS17-1		SS17-10		SS17-11		SS17-12		SS17-13		SS17-14		SS17-15		SS17-16		SS17-17	
			SAMP ID:	SS17-1-1		SS17-10-1		SS17-11-1		SS17-12-1		SS17-13-1		SS17-14-1		SS17-15-1		SS17-16-1		SS17-17-1	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	ESI		ESI		ESI		ESI		ESI		ESI		ESI		ESI		ESI	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	10/21/93		11/9/93		11/9/93		10/21/93		10/20/93		10/21/93		10/20/93		10/21/93		10/21/93	
			UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
PESTICIDES/PCB																					
4,4'-DDD	2900	NYSDEC TAGM	UG/KG	4.7	J	3.5	U	4.2	U	3.9	U	3.5	UJ	3.5	U	3.5	U	4.5	U	4.3	U
4,4'-DDE	2100	NYSDEC TAGM	UG/KG	5.2		37		4.2	U	2.9	J	11	J	2.7	J	3.5	U	4.5	U	4.3	U
4,4'-DDT	2100	NYSDEC TAGM	UG/KG	4.1	U	10		4.2	U	3.9	U	4.9	J	3.5	U	3.5	U	4.5	U	4.3	U
Aldrin	41	NYSDEC TAGM	UG/KG	2.1	U	1.8	U	2.2	U	2	U	1.8	UJ	1.8	U	1.8	U	2.3	U	2.2	U
Aroclor-1260	10000	NYSDEC TAGM	UG/KG	41	U	35	U	42	U	39	U	35	UJ	35	U	35	U	45	U	43	U
Dieldrin	44	NYSDEC TAGM	UG/KG	4.1	U	3.5	U	62		3.9	U	3.5	UJ	3.5	U	3.5	U	4.5	U	4.3	U
Endosulfan I	900	NYSDEC TAGM	UG/KG	2.1	U	1.8	U	2.2	U	2	U	0.76	J	1.8	U	1.8	U	2.3	U	2.2	U
Endrin	100	NYSDEC TAGM	UG/KG	4.1	U	3.5	U	4.2	U	3.9	U	3.5	UJ	3.5	U	3.5	U	4.5	U	4.3	U
Heptachlor epoxide	20	NYSDEC TAGM	UG/KG	2.1	U	1.8	U	2.2	U	2	U	1.8	UJ	1.8	U	1.8	U	2.3	U	2.2	U
OTHER ANALYSES																					
Nitrate/Nitrite-Nitrogen			MG/KG	0.21		0.1		2.4		0.06		0.81		1.1		0.84		0.21		0.14	
Percent Moisture (PEST/PCB)																					
Percent Moisture (SVOCs)																					
Percent Moisture (VOCs)																					
Percent Solids (Metals)																					
Total Organic Carbon			MG/KG																		
NITROAROMATICS																					
2,4-Dinitrotoluene			UG/KG	130	U	330	J	130	U	130	U	130		130	U	130	U	130	U	130	U

Table A-8
SENEDA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
			LOC_ID:	SS17-1		SS17-10		SS17-11		SS17-12		SS17-13		SS17-14		SS17-15		SS17-16		SS17-17	
			SAMP ID:	SS17-1-1		SS17-10-1		SS17-11-1		SS17-12-1		SS17-13-1		SS17-14-1		SS17-15-1		SS17-16-1		SS17-17-1	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	ESI		ESI		ESI		ESI		ESI		ESI		ESI		ESI		ESI	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	10/21/93		11/9/93		11/9/93		10/21/93		10/20/93		10/21/93		10/20/93		10/21/93		10/21/93	
METALS																					
Aluminum	14592.8	NYSDEC TAGM	MG/KG	11800		9990	J	14200		13100		10700		4660		12600		17300		14100	
Antimony	3.59	NYSDEC TAGM	MG/KG	12.9	UR	52	J	12.4	U	10.8	UR	39.2		11.4	JR	9.8	U	12.4	UR	11.6	UR
Arsenic	7.5	NYSDEC TAGM	MG/KG	6		7	J	4.5	J	6.5		6.7		10.6		6.1		6.5		5.7	
Barium	300	NYSDEC TAGM	MG/KG	102	R	357	J	189		203	R	343		199	R	122		210	R	132	R
Beryllium	0.73	NYSDEC TAGM	MG/KG	0.5	J	0.48	J	0.73	J	0.59	J	0.5	J	0.34	J	0.54	J	0.82	J	0.74	J
Cadmium	1	NYSDEC TAGM	MG/KG	2.3		21.7	R	1.2	R	4.5		8.3		10.8		0.93	J	2.3		2	
Calcium	101904	NYSDEC TAGM	MG/KG	99300		113000	J	4670		88400		104000		209000		37800		4760		3400	
Chromium	22.13	NYSDEC TAGM	MG/KG	16.6		21.3	J	19.7		20		23.8		9.8		23.1		23		19.7	
Cobalt	30	NYSDEC TAGM	MG/KG	6.1	J	9.9	J	9.3	J	12.3		8	J	5.6	J	12		7.7	J	21.9	
Copper	25	NYSDEC TAGM	MG/KG	81		546	J	60.7	J	202		404		499		94.5		182		47.8	
Cyanide	0.3	NYSDEC TAGM	MG/KG	0.74	U	0.51	UJ	0.6	U	0.56	U	0.62	U	0.53	U	0.62	U	0.64	U	0.65	U
Iron	26626.7	NYSDEC TAGM	MG/KG	16400		21600	J	23100		23600		19500		11100		27500		24200		23400	
Lead	21.86	NYSDEC TAGM	MG/KG	594		6340	R	329		1210		2940		1310		472		595		373	
Magnesium	12221.8	NYSDEC TAGM	MG/KG	7430		9830	J	3640		6600		8890		8330		8880		4170		3520	
Manganese	669.38	NYSDEC TAGM	MG/KG	430		392	J	685		595		314	J	221		324	J	613		880	
Mercury	0.1	NYSDEC TAGM	MG/KG	0.07	J	0.03	UJ	0.07	J	0.07	J	0.03	J	0.1	J	0.05	J	0.36	J	0.07	J
Nickel	33.62	NYSDEC TAGM	MG/KG	19.8		34.6	J	21.3		33.9		31.9		28.5		43.5		25.2		23.5	
Potassium	1761.48	NYSDEC TAGM	MG/KG	1500		1350	J	1210		1260		1610		1370		1810		1810		1070	J
Selenium	2	NYSDEC TAGM	MG/KG	0.26	J	1.6	J	0.64	J	0.23	UJ	0.47	J	0.34	J	0.2	J	0.25	UJ	0.25	UJ
Silver	0.4	NYSDEC TAGM	MG/KG	1.6	UJ	4.6	J	1.6	UJ	1.4	UJ	5.2		3.8	J	1.2	U	1.6	UJ	1.5	UJ
Sodium	103.74	NYSDEC TAGM	MG/KG	147	J	197	J	49.8	J	121	J	249	J	179	J	167	J	56.6	J	71.3	J
Thallium	0.28	NYSDEC TAGM	MG/KG	0.24	U	0.22	UJ	0.22	UJ	0.25	U	0.21	U	1.3	U	0.21	U	0.27	U	0.28	U
Vanadium	150	NYSDEC TAGM	MG/KG	21		15.3	J	25.9		20		17.7		10.2	J	18.3		29.8		25.5	
Zinc	82.5	NYSDEC TAGM	MG/KG	200		620	J	110	J	574		315		480		155		150		140	
HERBICIDES																					
MCPA			UG/KG	16000		5300	U	6300	U	5900	U	5400	U	5300	U	5300	U	6800	U	32000	

Table A-8
SENEDA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT									
			LOC_ID:	SS17-18	SS17-18	SS17-19	SS17-2	SS17-20	SS17-21	SS17-22	SS17-23	SS17-24
			SAMP ID:	SS17-18-1	SS17-24-1	SS17-19-1	SS17-2-1	SS17-20-1	SS17-21-1	SS17-22-1	SS17-23-1	16072
			QC CODE:	SA	DU	SA	SA	SA	SA	SA	SA	SA
			STUDY ID:	ESI	ESI	ESI	ESI	ESI	ESI	ESI	ESI	RI ROUND1
			TOP:	0	0	0	0	0	0	0	0	0
			BOTTOM:	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
			MATRIX:	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL
			SAMPLE DATE:	10/22/93	10/22/93	10/21/93	10/21/93	10/21/93	10/21/93	10/21/93	10/21/93	8/22/96
				VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q
VOLATILE ORGANICS												
Acetone	200	NYSDEC TAGM	UG/KG	13 U	15 J	41 U	13 U	12 U	14 U	14 U	14 U	12 U
Benzene	60	NYSDEC TAGM	UG/KG	13 U	13 UJ	16 U	13 U	12 U	14 U	14 U	14 U	12 U
Methylene Chloride	100	NYSDEC TAGM	UG/KG	13 U	13 UJ	16 U	13 U	12 U	14 U	14 U	14 U	12 U
Toluene	1500	NYSDEC TAGM	UG/KG	13 U	13 UJ	16 U	13 U	12 U	14 U	14 U	14 U	12 UJ
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			UG/KG	24 J	430 U	2300 U	450 U	420 U	430 U	430 U	430 U	390 U
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	430 U	430 U	2300 U	450 U	420 U	430 U	430 U	430 U	390 U
2-Methylnaphthalene	36400	NYSDEC TAGM	UG/KG	430 U	430 U	2300 U	450 U	420 U	430 U	430 U	430 U	390 U
3,3'-Dichlorobenzidine			UG/KG	430 U	430 U	2300 U	450 U	420 U	430 U	430 U	430 U	390 UJ
3-Nitroaniline	500	NYSDEC TAGM	UG/KG	1100 U	1000 U	5500 U	1100 U	1000 U	1100 U	1000 U	1000 U	940 UJ
4-Nitroaniline			UG/KG	1100 U	1000 U	5500 U	1100 U	1000 U	1100 U	1000 U	1000 U	940 UJ
Anthracene	50000	NYSDEC TAGM	UG/KG	430 U	430 U	2300 U	450 U	420 U	430 U	430 U	430 U	390 U
Benzo(a)anthracene	224	NYSDEC TAGM	UG/KG	31 J	430 U	2300 U	23 J	420 U	430 U	21 J	430 U	390 U
Benzo(a)pyrene	61	NYSDEC TAGM	UG/KG	31 J	430 U	2300 U	24 J	420 U	430 U	21 J	430 U	390 U
Benzo(b)fluoranthene	1100	NYSDEC TAGM	UG/KG	46 J	32 J	2300 U	28 J	420 U	430 U	28 J	430 U	390 U
Benzo(g,h,i)perylene	50000	NYSDEC TAGM	UG/KG	42 J	430 U	2300 U	31 J	420 U	430 U	430 U	430 U	390 U
Benzo(k)fluoranthene	1100	NYSDEC TAGM	UG/KG	37 J	24 J	2300 U	450 U	420 U	430 U	21 J	430 U	390 U
Butylbenzylphthalate	50000	NYSDEC TAGM	UG/KG	430 U	430 U	2300 U	450 U	420 U	430 U	430 U	430 U	390 U
Carbazole			UG/KG	430 U	430 U	2300 U	450 U	420 U	430 U	430 U	430 U	390 UJ
Chrysene	400	NYSDEC TAGM	UG/KG	55 J	38 J	2300 U	29 J	420 U	430 U	28 J	430 U	23 J
Di-n-butylphthalate	8100	NYSDEC TAGM	UG/KG	500	430 U	1200 J	76 J	510	760	430 U	430 U	390 U
Dibenz(a,h)anthracene	14	NYSDEC TAGM	UG/KG	430 U	430 U	2300 U	450 U	420 U	430 U	430 U	430 U	390 U
Fluoranthene	50000	NYSDEC TAGM	UG/KG	88 J	52 J	2300 U	47 J	420 U	430 U	49 J	430 U	27 J
Indeno(1,2,3-cd)pyrene	3200	NYSDEC TAGM	UG/KG	40 J	430 U	2300 U	30 J	420 U	430 U	430 U	430 U	390 U
N-Nitrosodiphenylamine (1)			UG/KG	430 U	430 U	2300 U	450 U	420 U	430 U	430 U	430 U	390 U
Naphthalene	13000	NYSDEC TAGM	UG/KG	430 U	430 U	2300 U	450 U	420 U	430 U	430 U	430 U	390 U
Pentachlorophenol	1000	NYSDEC TAGM	UG/KG	1100 U	1000 U	5500 U	1100 U	1000 U	1100 U	1000 U	1000 U	940 UJ
Phenanthrene	50000	NYSDEC TAGM	UG/KG	48 J	34 J	2300 U	450 U	420 U	430 U	20 J	430 U	18 J
Pyrene	50000	NYSDEC TAGM	UG/KG	73 J	38 J	2300 U	47 J	420 U	430 U	40 J	430 U	36 J
bis(2-Chloroisopropyl) ether			UG/KG									390 U
bis(2-Ethylhexyl)phthalate	50000	NYSDEC TAGM	UG/KG	1200	1300	2300 U	330 J	420 U	200 J	430 U	430 U	390 U

Table A-8
SENEDA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
			LOC_ID:	SS17-18		SS17-18		SS17-19		SS17-2		SS17-20		SS17-21		SS17-22		SS17-23		SS17-24	
			SAMP ID:	SS17-18-1		SS17-24-1		SS17-19-1		SS17-2-1		SS17-20-1		SS17-21-1		SS17-22-1		SS17-23-1		16072	
			QC CODE:	SA		DU		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	ESI		ESI		ESI		ESI		ESI		ESI		ESI		ESI		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	10/22/93		10/22/93		10/21/93		10/21/93		10/21/93		10/21/93		10/21/93		10/21/93		8/22/96	
PESTICIDES/PCB																					
4,4'-DDD	2900	NYSDEC TAGM	UG/KG	4.3	U	4.3	U	15		4.4	U	4.2	U	4.3	U	4.3	U	4.3	U	3.9	U
4,4'-DDE	2100	NYSDEC TAGM	UG/KG	17		17		2.5	J	4.4	U	4.2	U	4.3	U	4.3	U	4.3	U	3.9	U
4,4'-DDT	2100	NYSDEC TAGM	UG/KG	7		7.4		4.5	U	4.4	U	4.2	U	4.3	U	4.3	U	4.3	U	3.9	U
Aldrin	41	NYSDEC TAGM	UG/KG	2.2	U	2.2	U	2.3	U	2.3	U	2.2	U	2.2	U	2.2	U	2.2	U	2	U
Aroclor-1260	10000	NYSDEC TAGM	UG/KG	43	U	43	U	45	U	44	U	21	J	28	J	43	U	43	U	39	U
Dieldrin	44	NYSDEC TAGM	UG/KG	4.3	U	4.3	U	4.5	U	4.4	U	4.2	U	4.3	U	4.3	U	4.3	U	3.9	U
Endosulfan I	900	NYSDEC TAGM	UG/KG	2.2	U	2.2	U	2.3	U	2.3	U	2.2	U	2.2	U	2.2	U	2.2	U	2	U
Endrin	100	NYSDEC TAGM	UG/KG	4.3	U	4.3	U	4.5	U	4.4	U	4.2	U	4.3	U	4.3	U	4.3	U	3.9	U
Heptachlor epoxide	20	NYSDEC TAGM	UG/KG	1.1	J	2.2	U	2.3	U	2.3	U	2.2	U	2.2	U	2.2	U	2.2	U	2	U
OTHER ANALYSES																					
Nitrate/Nitrite-Nitrogen			MG/KG	0.13		0.08		0.2		0.67		0.22		0.24		0.09		0.07		0.15	
Percent Moisture (PEST/PCB)																				16	
Percent Moisture (SVOCs)																				16	
Percent Moisture (VOCs)																				18	
Percent Solids (Metals)																				84.1	
Total Organic Carbon			MG/KG																		
NITROAROMATICS																					
2,4-Dinitrotoluene			UG/KG	130	UR	72	J	130	U	130	U	130	U	130	U	130	U	130	U	120	U

Table A-8
SENEDA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
			LOC_ID:	SS17-18		SS17-18		SS17-19		SS17-2		SS17-20		SS17-21		SS17-22		SS17-23		SS17-24	
			SAMP ID:	SS17-18-1		SS17-24-1		SS17-19-1		SS17-2-1		SS17-20-1		SS17-21-1		SS17-22-1		SS17-23-1		16072	
			QC CODE:	SA		DU		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	ESI		ESI		ESI		ESI		ESI		ESI		ESI		ESI		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	10/22/93		10/22/93		10/21/93		10/21/93		10/21/93		10/21/93		10/21/93		10/21/93		8/22/96	
METALS																					
Aluminum	14592.8	NYSDEC TAGM	MG/KG	14400		18400		15500		14900		13900		14400		18100		15700		14400	J
Antimony	3.59	NYSDEC TAGM	MG/KG	15.3	R	17.4	J	9	UR	12.9	UR	8.7	UR	11	UR	12.8	UJ	13.1	UJ	3.3	J
Arsenic	7.5	NYSDEC TAGM	MG/KG	8.4		9.1		6.3		5.4		6.5		8.9		5.9		5.3		5.4	
Barium	300	NYSDEC TAGM	MG/KG	452	R	447		149	R	122	R	96.2	R	96.5	R	127		92.6		140	
Beryllium	0.73	NYSDEC TAGM	MG/KG	0.71		0.87	J	0.83	J	0.58	J	0.71	J	0.74	J	0.8	J	0.72	J	0.56	
Cadmium	1	NYSDEC TAGM	MG/KG	14.3		14.3		2.9		1.6		0.54	U	0.69	U	1.5		0.82	U	2.8	
Calcium	101904	NYSDEC TAGM	MG/KG	39800		27600		4210		2830		6230		3910		6900		2510		2300	
Chromium	22.13	NYSDEC TAGM	MG/KG	23.9		27.2		22.9		19		21.4		23.2		23.8		20.3		20.1	
Cobalt	30	NYSDEC TAGM	MG/KG	11.9		12.5		10.2		6.4	J	11.1		12.4		9.9	J	9.4	J	11	
Copper	25	NYSDEC TAGM	MG/KG	409		378	J	81.7		54.4		26.9		25.9		52	J	22.6	J	59	
Cyanide	0.3	NYSDEC TAGM	MG/KG	0.63	U	0.11	U	0.66	U	0.79	U	0.61	U	0.65	U	0.11	U	0.1	U	0.46	U
Iron	26626.7	NYSDEC TAGM	MG/KG	25300		28000		25500		20800		28700		28800		24700		22700		25300	
Lead	21.86	NYSDEC TAGM	MG/KG	2780		2310		402		371		69.2		44.9		226		111		496	
Magnesium	12221.8	NYSDEC TAGM	MG/KG	7590		6910		4260		3110		4770		4930		4880		3720		3340	
Manganese	669.38	NYSDEC TAGM	MG/KG	525		611		741		319		602		857		662		598		652	J
Mercury	0.1	NYSDEC TAGM	MG/KG	0.09	J	0.07		0.07	J	1	J	0.08	J	0.06	J	0.06	J	0.04	J	0.06	
Nickel	33.62	NYSDEC TAGM	MG/KG	39.5		40.4		30.2		18.3		31		35.6		27		22.6		21.2	
Potassium	1761.48	NYSDEC TAGM	MG/KG	1570		2260		1610		1080		1270		1410		1960		1430		1230	
Selenium	2	NYSDEC TAGM	MG/KG	0.19	J	0.45	J	0.23	UJ	0.27	UJ	0.18	UJ	0.2	UJ	0.24	UJ	0.26	UJ	1	J
Silver	0.4	NYSDEC TAGM	MG/KG	4.7	J	3.2		1.1	UJ	1.3	UJ	1.1	UJ	1.4	UJ	1.6	U	1.7	U	0.58	
Sodium	103.74	NYSDEC TAGM	MG/KG	109	J	129	J	59.5	J	33.7	J	40.4	J	36.3	J	87	J	46	J	61.2	U
Thallium	0.28	NYSDEC TAGM	MG/KG	0.19	U	0.27	U	0.25	U	0.3	U	0.2	U	0.22	U	0.26	U	0.29	U	1.5	
Vanadium	150	NYSDEC TAGM	MG/KG	23.6		30		26.3		26.6		24		24.1		30.1		26.4		26.7	
Zinc	82.5	NYSDEC TAGM	MG/KG	1530		1420		351		136		71.6		83.9		196		75.5		222	J
HERBICIDES																					
MCPA			UG/KG	6600	U	6600	U	6900	U	6700	U	6500	U	6600	U	6500	U	6600	U		

Table A-8
SENEDA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT								
			LOC_ID:	SS17-25	SS17-26	SS17-27	SS17-28	SS17-29	SS17-3	SS17-30	SS17-31
			SAMP ID:	16073	16069	16063	16064	16065	SS17-3-1	16070	16071
			QC CODE:	SA	SA	SA	SA	SA	SA	SA	SA
			STUDY ID:	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	ESI	RI ROUND1	RI ROUND1
			TOP:	0	0	0	0	0	0	0	0
			BOTTOM:	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
			MATRIX:	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL
			SAMPLE DATE:	8/22/96	8/22/96	8/21/96	8/21/96	8/21/96	10/21/93	8/22/96	8/22/96
			UNIT	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q
VOLATILE ORGANICS											
Acetone	200	NYSDEC TAGM	UG/KG	13 U	12 U	12 UJ	12 U	10 U	13 U	12 U	8 J
Benzene	60	NYSDEC TAGM	UG/KG	13 U	12 U	12 UJ	12 U	2 J	13 U	12 U	12 U
Methylene Chloride	100	NYSDEC TAGM	UG/KG	13 U	12 U	12 UJ	12 U	10 UJ	13 U	12 U	12 U
Toluene	1500	NYSDEC TAGM	UG/KG	13 U	12 U	12 UJ	12 U	8 J	13 U	12 U	12 UJ
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene			UG/KG	410 U	390 U	400 U	390 U	340 U	430 U	380 U	380 U
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	410 U	390 U	400 U	390 U	340 U	430 U	380 U	380 U
2-Methylnaphthalene	36400	NYSDEC TAGM	UG/KG	410 U	390 U	400 U	390 U	130 J	430 U	380 U	380 U
3,3'-Dichlorobenzidine			UG/KG	410 J	390 U	400 U	390 U	340 U	430 U	380 UJ	380 UJ
3-Nitroaniline	500	NYSDEC TAGM	UG/KG	**990 J**	960 U	960 U	950 U	830 U	1000 U	920 UJ	930 UJ
4-Nitroaniline			UG/KG	990 J	960 U	960 U	950 U	830 U	1000 U	920 UJ	930 UJ
Anthracene	50000	NYSDEC TAGM	UG/KG	410 U	390 U	400 U	390 U	340 U	430 U	380 U	380 U
Benzo(a)anthracene	224	NYSDEC TAGM	UG/KG	410 U	390 U	400 U	390 U	340 U	430 U	19 J	380 U
Benzo(a)pyrene	61	NYSDEC TAGM	UG/KG	410 U	25 J	400 U	390 U	340 U	430 U	18 J	380 U
Benzo(b)fluoranthene	1100	NYSDEC TAGM	UG/KG	410 U	390 U	400 U	390 U	340 U	430 U	49 J	20 J
Benzo(g,h,i)perylene	50000	NYSDEC TAGM	UG/KG	410 U	82 J	400 U	390 U	340 U	430 U	380 U	380 U
Benzo(k)fluoranthene	1100	NYSDEC TAGM	UG/KG	410 U	390 U	400 U	390 U	340 U	430 U	380 U	18 J
Butylbenzylphthalate	50000	NYSDEC TAGM	UG/KG	410 U	390 U	400 U	390 U	340 U	430 U	380 U	380 U
Carbazole			UG/KG	410 J	390 UJ	400 U	390 U	340 U	430 U	380 UJ	380 UJ
Chrysene	400	NYSDEC TAGM	UG/KG	19 J	21 J	400 U	390 U	340 U	430 U	22 J	21 J
Di-n-butylphthalate	8100	NYSDEC TAGM	UG/KG	410 U	390 U	400 U	390 U	340 U	45 J	380 U	380 U
Dibenz(a,h)anthracene	14	NYSDEC TAGM	UG/KG	410 U	390 U	**59 J**	**55 J**	340 U	430 U	380 U	380 U
Fluoranthene	50000	NYSDEC TAGM	UG/KG	23 J	28 J	400 U	390 U	340 U	430 U	28 J	26 J
Indeno(1,2,3-cd)pyrene	3200	NYSDEC TAGM	UG/KG	410 U	390 U	400 U	390 U	340 U	430 U	380 U	380 U
N-Nitrosodiphenylamine (1)			UG/KG	410 U	390 U	400 U	390 U	340 U	430 U	380 U	380 U
Naphthalene	13000	NYSDEC TAGM	UG/KG	410 U	390 U	400 U	390 U	37 J	430 U	380 U	380 U
Pentachlorophenol	1000	NYSDEC TAGM	UG/KG	990 J	1700 UJ	960 U	950 U	830 U	1000 U	43 J	930 UJ
Phenanthrene	50000	NYSDEC TAGM	UG/KG	410 U	20 J	400 U	390 U	340 U	430 U	380 U	380 U
Pyrene	50000	NYSDEC TAGM	UG/KG	29 J	50 J	400 U	390 U	340 U	430 U	34 J	32 J
bis(2-Chloroisopropyl) ether			UG/KG	410 J	390 U	400 U	390 U	340 U		380 U	380 U
bis(2-Ethylhexyl)phthalate	50000	NYSDEC TAGM	UG/KG	410 U	390 U	400 U	390 U	340 U	290 J	380 U	380 U

Table A-8
SENEDA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	SS17-25		SS17-26		SS17-27		SS17-28		SS17-29		SS17-3		SS17-30		SS17-31	
			SAMP ID:	16073		16069		16063		16064		16065		SS17-3-1		16070		16071	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		ESI		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/22/96		8/22/96		8/21/96		8/21/96		8/21/96		10/21/93		8/22/96		8/22/96	
			UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
PESTICIDES/PCB																			
4,4'-DDD	2900	NYSDEC TAGM	UG/KG	4.1	U	4	U	4	U	3.9	U	1.7	J	4.3	U	3.8	U	3.9	U
4,4'-DDE	2100	NYSDEC TAGM	UG/KG	4.1	U	4	U	24		3.7	U	2.2	J	4.3	U	3.8	U	3.9	U
4,4'-DDT	2100	NYSDEC TAGM	UG/KG	4.1	U	4	U	16		2.7	J	3.4	U	4.3	U	3.8	U	3.9	U
Aldrin	41	NYSDEC TAGM	UG/KG	2.1	U	2	U	2	U	2	U	1.9		2.2	U	2	U	2	U
Aroclor-1260	10000	NYSDEC TAGM	UG/KG	41	U	40	U	40	U	39	U	34	U	43	U	38	U	39	U
Dieldrin	44	NYSDEC TAGM	UG/KG	12	J	4	U	13		**80**	**J**	3.4	U	4.3	U	4	U	3.9	U
Endosulfan I	900	NYSDEC TAGM	UG/KG	2.1	U	2	U	1.4	U	2	U	1.8	U	2.2	U	2	U	2	U
Endrin	100	NYSDEC TAGM	UG/KG	4.1	U	4	U	4	U	3.9	U	3.4	U	4.3	U	3.8	U	3.9	U
Heptachlor epoxide	20	NYSDEC TAGM	UG/KG	2.1	U	2	U	2	U	2	U	1.8	U	2.2	U	2	U	2	U

PARAMETER	LEVEL	SOURCE	UNIT	SS17-25		SS17-26		SS17-27		SS17-28		SS17-29		SS17-3		SS17-30		SS17-31	
OTHER ANALYSES																			
Nitrate/Nitrite-Nitrogen			MG/KG	0.07		0.1		0.06		0.12		0.53		0.13		0.07		0.11	
Percent Moisture (PEST/PCB)				19		17		17		16		4				14		15	
Percent Moisture (SVOCs)				19		17		17		16		4				14		15	
Percent Moisture (VOCs)				25		17		17		16		3				15		17	
Percent Solids (Metals)				80.9		83.4		82.9		84		96.1				85.7		84.7	
Total Organic Carbon			MG/KG			40900													

PARAMETER	LEVEL	SOURCE	UNIT	SS17-25		SS17-26		SS17-27		SS17-28		SS17-29		SS17-3		SS17-30		SS17-31	
NITROAROMATICS																			
2,4-Dinitrotoluene			UG/KG	120	U	120	U	120	U	120	U	120	U	130	U	120	U	120	U

Table A-8
SENEDA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
			LOC_ID:	SS17-25		SS17-26		SS17-27		SS17-28		SS17-29		SS17-3		SS17-30		SS17-31	
			SAMP ID:	16073		16069		16063		16064		16065		SS17-3-1		16070		16071	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		ESI		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/22/96		8/22/96		8/21/96		8/21/96		8/21/96		10/21/93		8/22/96		8/22/96	
METALS																			
Aluminum	14592.8	NYSDEC TAGM	MG/KG	16700	J	16000	J	14900	J	14100	J	12100	J	15200		14400	J	13200	J
Antimony	3.59	NYSDEC TAGM	MG/KG	3.9	J	5	J	12.7	J	2.7	J	2	J	13.6	UR	1.4	J	3.4	J
Arsenic	7.5	NYSDEC TAGM	MG/KG	6.2		6.5		6.1		5		4		5		4		4.1	
Barium	300	NYSDEC TAGM	MG/KG	192	J	164	J	387	J	141	J	153	J	102	R	97.7	J	123	J
Beryllium	0.73	NYSDEC TAGM	MG/KG	0.64		0.51		0.61		0.58		0.52		0.42	J	0.48		0.43	
Cadmium	1	NYSDEC TAGM	MG/KG	3.5		3.6		15		5.6		0.93		2.2		0.53		1.6	
Calcium	101904	NYSDEC TAGM	MG/KG	3940		2500		34900		7310		42500		2180		2180		2260	
Chromium	22.13	NYSDEC TAGM	MG/KG	22.3		22.2		22.9		21.7		23.3		16.8		18.1		16.7	
Cobalt	30	NYSDEC TAGM	MG/KG	11.3		11.5		11.6		10.2		13.5		5.7	J	8.4		7.4	
Copper	25	NYSDEC TAGM	MG/KG	58.2		80.6		480		141		71.2		39.3		36.7		67.6	
Cyanide	0.3	NYSDEC TAGM	MG/KG	0.61	U	0.57	U	0.58	U	0.56	U	0.52	U	0.75	U	0.53	U	0.59	U
Iron	26626.7	NYSDEC TAGM	MG/KG	25500		26800		23300	J	24200	J	26100	J	19300		21100		18100	
Lead	21.86	NYSDEC TAGM	MG/KG	448		697		2740		524		254		375		172		450	
Magnesium	12221.8	NYSDEC TAGM	MG/KG	3500		3260		6210		4380		6390		2540		2950		2850	
Manganese	669.38	NYSDEC TAGM	MG/KG	996	J	950	J	573		579		404		277		430	J	304	J
Mercury	0.1	NYSDEC TAGM	MG/KG	0.07		0.11		0.12		0.06		0.06		0.07	J	0.09		0.06	
Nickel	33.62	NYSDEC TAGM	MG/KG	23.4		22.3		30.6		32.6		47.8		14.1		17.5		16.6	
Potassium	1761.48	NYSDEC TAGM	MG/KG	1540		1390		1520		1370		1660		1060	J	975		983	
Selenium	2	NYSDEC TAGM	MG/KG	1.2	J	1.7	J	1.1		0.79		0.65	U	0.37	J	0.99	J	0.98	J
Silver	0.4	NYSDEC TAGM	MG/KG	0.29	U	0.55		2.9		1.1		0.24	U	1.7	UJ	0.3	U	0.29	U
Sodium	103.74	NYSDEC TAGM	MG/KG	60.7	U	60	U	198		119		131		33.5	J	62.5	U	60.2	U
Thallium	0.28	NYSDEC TAGM	MG/KG	1.1		1.5		0.98	J	0.9	J	0.8	J	0.26	U	0.98	U	0.94	U
Vanadium	150	NYSDEC TAGM	MG/KG	29.3		29.7		23.4		21.2		16.7		29.2		26		23.2	
Zinc	82.5	NYSDEC TAGM	MG/KG	284	J	233	J	901		468		79.5		129		93	J	139	J
HERBICIDES																			
MCPA			UG/KG											6500	U				

Table A-8
SENEDA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 Surface Soil Analytical Results

			LOC_ID:	SS17-34	SS17-35	SS17-36	SS17-37	SS17-38	SS17-39	SS17-4	SS17-5
			SAMP ID:	16079	16078	16077	16080	16076	16075	SS17-4-1	SS17-5-1
			QC CODE:	SA	SA	SA	SA	SA	SA	SA	SA
			STUDY ID:	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	ESI	ESI
			TOP:	0	0	0	0	0	0	0	0
			BOTTOM:	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
			MATRIX:	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL	SURFACE SOIL
			SAMPLE DATE:	8/22/96	8/22/96	8/22/96	8/22/96	8/22/96	8/22/96	10/21/93	10/21/93
PARAMETER	LEVEL	SOURCE	UNIT	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q
VOLATILE ORGANICS											
Acetone	200	NYSDEC TAGM	UG/KG	11 U	12 U	12 U	11 U	12 U	13 U	12 U	14 U
Benzene	60	NYSDEC TAGM	UG/KG	11 U	12 U	12 U	11 UJ	12 U	13 U	12 U	14 U
Methylene Chloride	100	NYSDEC TAGM	UG/KG	11 U	12 U	12 U	11 U	12 U	13 U	12 U	14 U
Toluene	1500	NYSDEC TAGM	UG/KG	11 UJ	12 UJ	12 U	11 UJ	12 UJ	13 U	12 U	14 U
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene			UG/KG	360 U	410 U	390 U	85 J	400 U	410 U	1400	430 U
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	360 U	410 U	390 U	350 U	400 U	410 U	70 J	430 U
2-Methylnaphthalene	36400	NYSDEC TAGM	UG/KG	360 U	410 U	390 U	350 U	400 U	410 U	410 U	430 U
3,3'-Dichlorobenzidine			UG/KG	360 UJ	410 UJ	390 UJ	350 UJ	400 UJ	410 UJ	410 U	430 U
3-Nitroaniline	500	NYSDEC TAGM	UG/KG	880 UJ	990 UJ	940 UJ	860 UJ	970 UJ	1000 UJ	990 U	1000 U
4-Nitroaniline			UG/KG	880 UJ	990 UJ	940 UJ	860 UJ	970 UJ	1000 UJ	990 U	1000 U
Anthracene	50000	NYSDEC TAGM	UG/KG	360 U	410 U	390 U	350 U	400 U	410 U	410 U	430 U
Benzo(a)anthracene	224	NYSDEC TAGM	UG/KG	360 U	410 U	390 U	37 J	400 U	410 U	22 J	430 U
Benzo(a)pyrene	61	NYSDEC TAGM	UG/KG	360 U	25 J	390 U	34 J	400 U	19 J	410 U	430 U
Benzo(b)fluoranthene	1100	NYSDEC TAGM	UG/KG	360 U	410 U	390 U	65 J	400 U	410 U	28 J	430 U
Benzo(g,h,i)perylene	50000	NYSDEC TAGM	UG/KG	360 U	410 U	390 U	44 J	400 U	410 U	28 J	430 U
Benzo(k)fluoranthene	1100	NYSDEC TAGM	UG/KG	360 U	410 U	390 U	35 J	400 U	410 U	28 J	22 J
Butylbenzylphthalate	50000	NYSDEC TAGM	UG/KG	360 U	410 U	390 U	350 U	400 U	410 U	410 U	430 U
Carbazole			UG/KG	360 UJ	410 UJ	390 UJ	350 UJ	400 UJ	410 UJ	410 U	430 U
Chrysene	400	NYSDEC TAGM	UG/KG	19 J	20 J	390 U	63 J	18 J	21 J	32 J	430 U
Di-n-butylphthalate	8100	NYSDEC TAGM	UG/KG	360 U	410 U	390 U	550	400 U	410 U	89 J	87 J
Dibenz(a,h)anthracene	14	NYSDEC TAGM	UG/KG	360 U	410 U	390 U	350 U	400 U	410 U	410 U	430 U
Fluoranthene	50000	NYSDEC TAGM	UG/KG	26 J	24 J	390 U	74 J	25 J	30 J	54 J	33 J
Indeno(1,2,3-cd)pyrene	3200	NYSDEC TAGM	UG/KG	360 U	410 U	390 U	33 J	400 U	410 U	410 U	430 U
N-Nitrosodiphenylamine (1)			UG/KG	360 U	410 U	390 U	71 J	400 U	410 U	27 J	430 U
Naphthalene	13000	NYSDEC TAGM	UG/KG	360 U	410 U	390 U	350 U	400 U	410 U	410 U	430 U
Pentachlorophenol	1000	NYSDEC TAGM	UG/KG	880 UJ	990 UJ	940 UJ	860 UJ	970 UJ	1000 UJ	990 U	1000 U
Phenanthrene	50000	NYSDEC TAGM	UG/KG	360 U	410 U	390 U	56 J	19 J	20 J	33 J	430 U
Pyrene	50000	NYSDEC TAGM	UG/KG	29 J	30 J	390 U	82 J	31 J	36 J	44 J	33 J
bis(2-Chloroisopropyl) ether			UG/KG	360 U	410 U	390 U	350 U	400 U	410 U		
bis(2-Ethylhexyl)phthalate	50000	NYSDEC TAGM	UG/KG	360 U	410 U	390 U	350 U	400 U	410 U	390 J	600

Table A-8
SENEDA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
			LOC_ID:	SS17-34		SS17-35		SS17-36		SS17-37		SS17-38		SS17-39		SS17-4		SS17-5	
			SAMP ID:	16079		16078		16077		16080		16076		16075		SS17-4-1		SS17-5-1	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		ESI		ESI	
			TOP:	0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		10/21/93		10/21/93	
PESTICIDES/PCB																			
4,4'-DDD	2900	NYSDEC TAGM	UG/KG	3.7	U	4.1	U	3.8	U	2.6	J	4	U	4.2	U	4.1	U	4.3	U
4,4'-DDE	2100	NYSDEC TAGM	UG/KG	3.7	U	4.1	U	5		27		4	U	4.2	U	22		4.3	U
4,4'-DDT	2100	NYSDEC TAGM	UG/KG	3.7	U	4.1	U	3.8	U	14	J	4	U	4.2	U	2.6	J	4.3	U
Aldrin	41	NYSDEC TAGM	UG/KG	1.9	U	2.1	U	2	U	1.8	U	2.1	U	2.1	U	2.1	U	2.2	U
Aroclor-1260	10000	NYSDEC TAGM	UG/KG	37	U	41	U	38	U	28	J	40	U	42	U	41	U	43	U
Dieldrin	44	NYSDEC TAGM	UG/KG	3.7	U	12	J	3.8	U	22		4	U	4.2	U	4.1	U	4.3	U
Endosulfan I	900	NYSDEC TAGM	UG/KG	1.9	U	2.1	U	2	U	2.4	J	2.1	U	2.1	U	2.1	U	2.2	U
Endrin	100	NYSDEC TAGM	UG/KG	3.7	U	4.1	U	3.8	U	1.8	J	4	U	4.2	U	4.1	U	4.3	U
Heptachlor epoxide	20	NYSDEC TAGM	UG/KG	1.9	U	2.1	U	2	U	1.8	U	2.1	U	2.1	U	2.1	U	2.2	U
OTHER ANALYSES																			
Nitrate/Nitrite-Nitrogen			MG/KG	0.08		0.22		0.26		0.44		0.28		0.34		0.51		0.17	
Percent Moisture (PEST/PCB)				10		20		14		7		18		21					
Percent Moisture (SVOCs)				10		20		15		7		18		21					
Percent Moisture (VOCs)				13		20		15		9		19		24					
Percent Solids (Metals)				89.7		80.3		85.5		92.9		81.9		79.2					
Total Organic Carbon			MG/KG							32700									
NITROAROMATICS																			
2,4-Dinitrotoluene			UG/KG	120	U	120	U	120	U	120	U	120	U	120	U	130	U	130	U

Table A-8
SENEDA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	SS17-34	Q	SS17-35	Q	SS17-36	Q	SS17-37	Q	SS17-38	Q	SS17-39	Q	SS17-4	Q	SS17-5	Q
			SAMP ID:	16079		16078		16077		16080		16076		16075		SS17-4-1		SS17-5-1	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		ESI		ESI	
			TOP:	0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		10/21/93		10/21/93	
			UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
METALS																			
Aluminum	14592.8	NYSDEC TAGM	MG/KG	6720	J	11700		**14900**	**J**	10200	J	11700	J	14400	J	10800		**17300**	
Antimony	3.59	NYSDEC TAGM	MG/KG	1.5	J	2.6	J	**4**	**J**	**40.1**	**J**	1.4	J	1.6	J	12.5	UR	10	UR
Arsenic	7.5	NYSDEC TAGM	MG/KG	4.2		4.2		5.5		**7.7**		4.2		4.4		6.6		7.4	
Barium	300	NYSDEC TAGM	MG/KG	90.4	J	156	J	237	J	**524**	**J**	103	J	156	J	192	R	146	R
Beryllium	0.73	NYSDEC TAGM	MG/KG	0.25		0.45		0.62		0.36		0.48		**0.83**		0.52	J	**0.81**	**J**
Cadmium	1	NYSDEC TAGM	MG/KG	**2.1**		**3.3**		**3.4**		**25.5**		0.59		0.5		**4.9**		**3.7**	
Calcium	101904	NYSDEC TAGM	MG/KG	**166000**		18900		5880		**117000**		2780		5280		**117000**		2740	
Chromium	22.13	NYSDEC TAGM	MG/KG	9.7		16.7		21.3		19.7		16.5		20.1		18.3		**23.6**	
Cobalt	30	NYSDEC TAGM	MG/KG	7.5		7.6		10.7		9.7		7.9		7.4		10.4	J	9.6	
Copper	25	NYSDEC TAGM	MG/KG	**39.3**		**62.4**		**142**		**837**		**29.7**		**46.2**		**249**		**73**	
Cyanide	0.3	NYSDEC TAGM	MG/KG	**1.5**		**0.78**	**J**	0.48	U	0.52	U	0.56	U	0.57	U	0.68	U	0.78	U
Iron	26626.7	NYSDEC TAGM	MG/KG	11800		18400		24700		18700		19200		22500		19400		25000	
Lead	21.86	NYSDEC TAGM	MG/KG	**265**		**534**		**815**		**6270**		**163**		**183**		**1680**		**577**	
Magnesium	12221.8	NYSDEC TAGM	MG/KG	8660		3380		4020		7880		3060		3820		6900		3670	
Manganese	669.38	NYSDEC TAGM	MG/KG	531	J	517	J	608	J	371	J	475	J	256	J	431		**737**	
Mercury	0.1	NYSDEC TAGM	MG/KG	0.05		0.07		0.09		0.05		0.07		0.09		0.07	J	**0.9**	**J**
Nickel	33.62	NYSDEC TAGM	MG/KG	16.2		19.2		26.3		**35.9**		17.6		23.5		28		24.9	
Potassium	1761.48	NYSDEC TAGM	MG/KG	1090		1390		1610		1750		1060		1410		1380		1520	
Selenium	2	NYSDEC TAGM	MG/KG	0.64	J	1	J	0.68	J	0.98	J	0.82	J	1.2	J	0.36	J	0.23	UJ
Silver	0.4	NYSDEC TAGM	MG/KG	**0.49**		**0.71**		**1.1**		**9**		0.31	U	**0.45**		1.6	UJ	1.3	UJ
Sodium	103.74	NYSDEC TAGM	MG/KG	53.8	U	64.1	U	58.5	U	**248**		64.7	U	64.4	U	**144**	**J**	53.1	J
Thallium	0.28	NYSDEC TAGM	MG/KG	0.84	U	1	U	0.92	U	0.8	U	1	U	1	U	0.25	U	0.25	U
Vanadium	150	NYSDEC TAGM	MG/KG	14		21.4		27.1		16.8		21.2		25.2		17.5		29.7	
Zinc	82.5	NYSDEC TAGM	MG/KG	**167**	**J**	**207**	**J**	**488**	**J**	**1470**	**J**	**84.1**	**J**	**84.8**	**J**	**324**		**237**	
HERBICIDES																			
MCPA			UG/KG													6200	U	34000	

Table A-8
SENEDA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
			LOC_ID:	SS17-6		SS17-7		SS17-8		SS17-9	
			SAMP ID:	SS17-6-1		SS17-7-1		SS17-8-1		SS17-9-1	
			QC CODE:	SA		SA		SA		SA	
			STUDY ID:	ESI		ESI		ESI		ESI	
			TOP:	0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	10/21/93		10/21/93		10/21/93		10/20/93	
VOLATILE ORGANICS											
Acetone	200	NYSDEC TAGM	UG/KG	10	U	12	U	12	U	10	UJ
Benzene	60	NYSDEC TAGM	UG/KG	10	U	12	U	12	U	10	UJ
Methylene Chloride	100	NYSDEC TAGM	UG/KG	10	U	12	U	12	U	10	UJ
Toluene	1500	NYSDEC TAGM	UG/KG	10	U	12	U	12	U	4	J
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene			UG/KG	340	U	410	U	410	U	340	U
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	340	U	410	U	410	U	340	U
2-Methylnaphthalene	36400	NYSDEC TAGM	UG/KG	340	U	410	U	410	U	340	U
3,3'-Dichlorobenzidine			UG/KG	340	U	410	U	410	U	340	U
3-Nitroaniline	500	NYSDEC TAGM	UG/KG	830	U	990	U	1000	U	830	U
4-Nitroaniline			UG/KG	830	U	990	U	1000	U	830	U
Anthracene	50000	NYSDEC TAGM	UG/KG	340	U	410	U	410	U	340	U
Benzo(a)anthracene	224	NYSDEC TAGM	UG/KG	19	J	410	U	30	J	16	J
Benzo(a)pyrene	61	NYSDEC TAGM	UG/KG	340	U	410	U	24	J	340	U
Benzo(b)fluoranthene	1100	NYSDEC TAGM	UG/KG	26	J	410	U	27	J	17	J
Benzo(g,h,i)perylene	50000	NYSDEC TAGM	UG/KG	340	U	410	U	410	U	340	U
Benzo(k)fluoranthene	1100	NYSDEC TAGM	UG/KG	18	J	410	U	23	J	17	J
Butylbenzylphthalate	50000	NYSDEC TAGM	UG/KG	37	J	410	U	410	U	340	U
Carbazole			UG/KG	340	U	410	U	410	U	340	U
Chrysene	400	NYSDEC TAGM	UG/KG	31	J	410	U	36	J	28	J
Di-n-butylphthalate	8100	NYSDEC TAGM	UG/KG	60	J	97	J	35	J	340	U
Dibenz(a,h)anthracene	14	NYSDEC TAGM	UG/KG	340	U	410	U	410	U	340	U
Fluoranthene	50000	NYSDEC TAGM	UG/KG	48	J	21	J	71	J	41	J
Indeno(1,2,3-cd)pyrene	3200	NYSDEC TAGM	UG/KG	340	U	410	U	410	U	340	U
N-Nitrosodiphenylamine (1)			UG/KG	340	U	410	U	410	U	340	U
Naphthalene	13000	NYSDEC TAGM	UG/KG	340	U	410	U	410	U	340	U
Pentachlorophenol	1000	NYSDEC TAGM	UG/KG	830	U	990	U	1000	U	830	U
Phenanthrene	50000	NYSDEC TAGM	UG/KG	36	J	410	U	46	J	31	J
Pyrene	50000	NYSDEC TAGM	UG/KG	43	J	410	U	63	J	37	J
bis(2-Chloroisopropyl) ether			UG/KG								
bis(2-Ethylhexyl)phthalate	50000	NYSDEC TAGM	UG/KG	340	U	650		410	U	340	U

Table A-8
SENEDA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	SS17-6	Q	SS17-7	Q	SS17-8	Q	SS17-9	Q
			SAMP ID:	SS17-6-1		SS17-7-1		SS17-8-1		SS17-9-1	
			QC CODE:	SA		SA		SA		SA	
			STUDY ID:	ESI		ESI		ESI		ESI	
			TOP:	0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	10/21/93		10/21/93		10/21/93		10/20/93	
				VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
PESTICIDES/PCB											
4,4'-DDD	2900	NYSDEC TAGM	UG/KG	3.4	U	4	U	4.1	U	3.4	U
4,4'-DDE	2100	NYSDEC TAGM	UG/KG	11		3.2	J	3.4	J	8.8	
4,4'-DDT	2100	NYSDEC TAGM	UG/KG	1.9	J	4	U	4.1	U	3.4	U
Aldrin	41	NYSDEC TAGM	UG/KG	1.8	U	2.1	U	2.1	U	1.8	U
Aroclor-1260	10000	NYSDEC TAGM	UG/KG	34	U	40	U	41	U	34	U
Dieldrin	44	NYSDEC TAGM	UG/KG	3.4	U	4	U	4.1	U	3.4	U
Endosulfan I	900	NYSDEC TAGM	UG/KG	1.8	U	2.1	U	2.1	U	1.8	U
Endrin	100	NYSDEC TAGM	UG/KG	3.4	U	4	U	4.1	U	3.4	U
Heptachlor epoxide	20	NYSDEC TAGM	UG/KG	1.8	U	2.1	U	2.1	U	1.8	U
OTHER ANALYSES											
Nitrate/Nitrite-Nitrogen			MG/KG	3.8		0.15		0.08		3.5	
Percent Moisture (PEST/PCB)											
Percent Moisture (SVOCs)											
Percent Moisture (VOCs)											
Percent Solids (Metals)											
Total Organic Carbon			MG/KG								
NITROAROMATICS											
2,4-Dinitrotoluene			UG/KG	170		130	U	130	U	130	U

Table A-8
SENEDA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
			LOC_ID:	SS17-6		SS17-7		SS17-8		SS17-9	
			SAMP ID:	SS17-6-1		SS17-7-1		SS17-8-1		SS17-9-1	
			QC CODE:	SA		SA		SA		SA	
			STUDY ID:	ESI		ESI		ESI		ESI	
			TOP:	0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	10/21/93		10/21/93		10/21/93		10/20/93	
METALS											
Aluminum	14592.8	NYSDEC TAGM	MG/KG	10900		**16600**		14300		3790	
Antimony	3.59	NYSDEC TAGM	MG/KG	12.9	R	8.2	JR	7.4	JR	**10.7**	
Arsenic	7.5	NYSDEC TAGM	MG/KG	**16.1**		**8.2**		**8.5**		4.8	
Barium	300	NYSDEC TAGM	MG/KG	352	R	447	R	337	R	78.7	
Beryllium	0.73	NYSDEC TAGM	MG/KG	0.5	J	**0.76**	**J**	0.69		0.18	J
Cadmium	1	NYSDEC TAGM	MG/KG	**9.9**		**7.3**		**5.1**		**6.3**	
Calcium	101904	NYSDEC TAGM	MG/KG	89300		3780		**110000**		**177000**	
Chromium	22.13	NYSDEC TAGM	MG/KG	**22.5**		**23.4**		**23.9**		10	
Cobalt	30	NYSDEC TAGM	MG/KG	11.3		14.7		13.6		4.7	J
Copper	25	NYSDEC TAGM	MG/KG	**362**		**423**		**654**		**136**	
Cyanide	0.3	NYSDEC TAGM	MG/KG	0.46	U	0.61	U	0.59	U	0.59	U
Iron	26626.7	NYSDEC TAGM	MG/KG	24300		26400		**27600**		8020	
Lead	21.86	NYSDEC TAGM	MG/KG	**3150**		**2310**		**2190**		**1340**	
Magnesium	12221.8	NYSDEC TAGM	MG/KG	8840		4520		8380		**17300**	
Manganese	669.38	NYSDEC TAGM	MG/KG	399		431		590		270	J
Mercury	0.1	NYSDEC TAGM	MG/KG	0.06	J	**0.1**	**J**	0.09	J	0.04	J
Nickel	33.62	NYSDEC TAGM	MG/KG	**37.7**		29.1		**43.7**		16.4	
Potassium	1761.48	NYSDEC TAGM	MG/KG	1420		1370		1520		1110	
Selenium	2	NYSDEC TAGM	MG/KG	0.68	J	0.25	UJ	0.16	J	0.21	J
Silver	0.4	NYSDEC TAGM	MG/KG	**2.8**	**J**	1	UJ	**4**	**J**	**5.5**	
Sodium	103.74	NYSDEC TAGM	MG/KG	**168**	**J**	66.9	J	**144**	**J**	**247**	**J**
Thallium	0.28	NYSDEC TAGM	MG/KG	2	U	0.27	U	0.22	J	0.17	U
Vanadium	150	NYSDEC TAGM	MG/KG	16.3		28.8		22.2		8.9	
Zinc	82.5	NYSDEC TAGM	MG/KG	**497**		**437**		**613**		**120**	
HERBICIDES											
MCPA			UG/KG	5200	U	12000		6200	U	5200	U

Table A-9
SENECA ARMY DEPOT
FEASIBILITY STUDY

SEAD-17 Subsurface Soil Analytical Results

PARAMETER	LEVEL	SOURCE											
			LOC_ID:	SB17-1	SB17-1	SB17-1	SB17-2	SB17-2	SB17-2	SB17-3	SB17-3	SB17-4	SB17-4
			SAMP ID:	SB17-1-1	SB17-1-2	SB17-1-3	SB17-2-1	SB17-2-10	SB17-2-2	SB17-3-1	SB17-3-2	SB17-4-1	SB17-4-2
			QC CODE:	SA	SA	SA	SA	DU	SA	SA	SA	SA	SA
			STUDY ID:	ESI	ESI	ESI	ESI	ESI	ESI	ESI	ESI	ESI	ESI
			TOP:	0	2	4	0	2	2	0	2	0	2
			BOTTOM:	2	4	6	2	4	4	2	4	2	4
			MATRIX:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			SAMPLE DATE:	12/1/93	12/1/93	12/1/93	10/27/93	10/27/93	10/27/93	11/30/93	11/30/93	11/30/93	11/30/93
			UNIT	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q
SEMIVOLATILE ORGANICS													
bis(2-Ethylhexyl)phthalate	50000	NYSDEC TAGM	UG/KG	42 J	380 U	21 J	390 U	480	490	93 J	72 J	59 J	27 J
PESTICIDES/PCB													
Aroclor-1254	10000	NYSDEC TAGM	UG/KG	42 U	61	36 U	39 U	38 U	38 U	40 U	39 U	39 U	36 U
OTHER ANALYSES													
Nitrate/Nitrite-Nitrogen			MG/KG	0.15	0.33	0.24	0.51	0.01 U	0.05	0.22	0.19	0.41	0.22
METALS													
Aluminum	14592.8	NYSDEC TAGM	MG/KG	13700	18100	8700	15900	14100	15600	19300	13200	15100	11600
Arsenic	7.5	NYSDEC TAGM	MG/KG	4.3	5.2	3.4	5.2	6.3	6.9	4.1	5.4	4.9	5.7
Barium	300	NYSDEC TAGM	MG/KG	107	114	59.4	158	71.4	68.5	104	73.7	89.2	51.6
Beryllium	0.73	NYSDEC TAGM	MG/KG	0.7 J	0.9 J	0.42 J	0.62 J	0.58 J	0.56 J	0.99	0.63 J	0.72	0.56 J
Cadmium	1	NYSDEC TAGM	MG/KG	0.73 U	0.74 U	0.56 U	2.8	0.6 U	0.74 U	0.43 U	0.74 U	0.43 U	0.38 U
Calcium	101904	NYSDEC TAGM	MG/KG	2870	20900	72800	48200	115000	44200	2620	4920	3640	18100
Chromium	22.13	NYSDEC TAGM	MG/KG	17.6	25.1	13.9	27.1	20.3	23.3	27.9	20.1	21.6	18.4
Cobalt	30	NYSDEC TAGM	MG/KG	9.9 J	13.3	8.8	10.8 J	9.6	9.4 J	21.7	9 J	9.5	11
Copper	25	NYSDEC TAGM	MG/KG	46.4	26.9	20	85.1	21.5	18.5	25.9	26.9	24	22.7
Iron	26626.7	NYSDEC TAGM	MG/KG	25100	29900	18800	38700	24900	26700	36100	25800	27700	25600
Lead	21.86	NYSDEC TAGM	MG/KG	266	11.4 J	7.5 J	686	11.2	13	24.6 J	21.2 J	12 J	11.7 J
Magnesium	12221.8	NYSDEC TAGM	MG/KG	3330	8490	18100	6630	8370	8380	5820	4600	5170	7890
Manganese	669.38	NYSDEC TAGM	MG/KG	547	487	391	673	1160	409	1080	338	274	403
Mercury	0.1	NYSDEC TAGM	MG/KG	0.05 J	0.06 J	0.03 UJ	0.04 U	0.04 J	0.04 J	0.06 J	0.04 J	0.04 U	0.03 J
Nickel	33.62	NYSDEC TAGM	MG/KG	19.1	42	25.2	34.7	27.4	30.8	37.2	31.5	28.6	30.8
Potassium	1761.48	NYSDEC TAGM	MG/KG	628 J	1560	1090	1630	1750	1720	1540	1350	1220	960
Sodium	103.74	NYSDEC TAGM	MG/KG	46.2 J	74.6 J	137 J	145 J	239 J	177 J	70.8 J	80.2 J	65.6 J	75.9 J
Vanadium	150	NYSDEC TAGM	MG/KG	23.1	27	13.9	27.3	21.8	23.9	30.7	21.1	26.1	18.6
Zinc	82.5	NYSDEC TAGM	MG/KG	93.4	80.2	57.1	172	76.7	63	69.7	69	64.2	85.1

Table A-10
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 Downwind Surface Soil Analytical Results

			LOC_ID:	1000-N		1000-S		2000-N		2000-N		2000-S		3000-N		3000-S		3500-N		3500-S	
			SAMP ID:	16083		16087		16089		16090		16085		16088		16056		16084		16055	
			QC CODE:	SA		SA		SA		DU		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/20/96		8/22/96		8/20/96	
PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
VOLATILE ORGANICS																					
Benzene	60	NYSDEC TAGM	UG/KG	11	UJ	12	U	12	U	12	U	12	U	12	U	11	U	2	J	11	U
Toluene	1500	NYSDEC TAGM	UG/KG	11	UJ	12	U	12	U	12	U	12	U	12	U	11	U	3	J	2	J
SEMIVOLATILE ORGANICS																					
2,4-Dinitrotoluene			UG/KG	370	U	380	U	390	U	390	U	410	U	380	U	380	U	880		400	
2-Methylnaphthalene	36400	NYSDEC TAGM	UG/KG	370	U	380	U	390	U	390	U	410	U	380	U	380	U	340	U	28	J
2-Methylphenol	100	NYSDEC TAGM	UG/KG	370	U	380	U	390	U	390	U	**120**	**J**	380	U	380	U	340	U	350	U
Acenaphthene	50000	NYSDEC TAGM	UG/KG	370	U	18	J	390	U	390	U	410	U	380	U	380	U	340	U	33	J
Acenaphthylene	41000	NYSDEC TAGM	UG/KG	370	U	380	U	390	U	390	U	410	U	380	U	380	U	96	J	35	J
Anthracene	50000	NYSDEC TAGM	UG/KG	370	U	380	U	390	U	390	U	410	U	380	U	380	U	110	J	130	J
Benzo(a)anthracene	224	NYSDEC TAGM	UG/KG	39	J	85	J	57	J	52	J	19	J	54	J	380	U	**720**		**480**	
Benzo(a)pyrene	61	NYSDEC TAGM	UG/KG	39	J	**110**	**J**	**69**	**J**	**62**	**J**	22	J	**73**	**J**	380	U	**940**		**640**	
Benzo(b)fluoranthene	1100	NYSDEC TAGM	UG/KG	42	J	120	J	68	J	54	J	410	U	58	J	380	U	**2200**	**J**	580	
Benzo(g,h,i)perylene	50000	NYSDEC TAGM	UG/KG	35	J	130	J	65	J	55	J	51	J	78	J	380	U	710		540	
Benzo(k)fluoranthene	1100	NYSDEC TAGM	UG/KG	47	J	94	J	65	J	61	J	38	J	73	J	380	U	340	U	530	
Carbazole			UG/KG	370	UJ	380	U	390	U	390	U	410	UJ	380	U	380	U	85	J	40	J
Chrysene	400	NYSDEC TAGM	UG/KG	55	J	110	J	70	J	62	J	25	J	69	J	380	U	**670**		**520**	
Di-n-butylphthalate	8100	NYSDEC TAGM	UG/KG	370	U	380	U	390	U	390	U	410	U	380	U	380	U	340	U	90	J
Dibenz(a,h)anthracene	14	NYSDEC TAGM	UG/KG	370	U	**54**	**J**	**34**	**J**	**30**	**J**	410	U	**39**	**J**	**18**	**J**	**470**		**200**	**J**
Dibenzofuran	6200	NYSDEC TAGM	UG/KG	370	U	380	U	390	U	390	U	410	U	380	U	380	U	340	U	36	J
Fluoranthene	50000	NYSDEC TAGM	UG/KG	70	J	160	J	110	J	93	J	36	J	100	J	380	U	1000		780	
Fluorene	50000	NYSDEC TAGM	UG/KG	370	U	380	U	390	U	390	U	410	U	380	U	380	U	340	U	38	J
Indeno(1,2,3-cd)pyrene	3200	NYSDEC TAGM	UG/KG	32	J	110	J	55	J	50	J	20	J	70	J	380	U	790		520	
N-Nitrosodiphenylamine (1)			UG/KG	370	U	380	U	390	U	390	U	410	U	380	U	380	U	95	J	47	J
Naphthalene	13000	NYSDEC TAGM	UG/KG	370	U	380	U	390	U	390	U	410	U	380	U	380	U	16	J	29	J
Phenanthrene	50000	NYSDEC TAGM	UG/KG	34	J	90	J	36	J	35	J	410	U	42	J	380	U	320	J	360	
Pyrene	50000	NYSDEC TAGM	UG/KG	76	J	160	J	92	J	81	J	38	J	90	J	380	U	1200		620	

Table A-10
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 Downwind Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT																		
			LOC_ID:	1000-N		1000-S		2000-N		2000-N		2000-S		3000-N		3000-S		3500-N		3500-S	
			SAMP ID:	16083		16087		16089		16090		16085		16088		16056		16084		16055	
			QC CODE:	SA		SA		SA		DU		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/20/96		8/22/96		8/20/96	
			UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
PESTICIDES/PCB																					
4,4'-DDE	2100	NYSDEC TAGM	UG/KG	5.2	J	1.9	J	3.9	U	3.9	U	4.1	U	3.8	U	3.7	U	8.9		140	J
4,4'-DDT	2100	NYSDEC TAGM	UG/KG	6	J	3.8	U	3.9	U	3.9	U	4.1	U	3.8	U	3.7	U	13	J	35	U
Dieldrin	44	NYSDEC TAGM	UG/KG	3.7	U	3.8	U	3.9	U	3.9	U	4.1	U	8.4	J	3.5	UJ	3.4	U	17	U
Endosulfan I	900	NYSDEC TAGM	UG/KG	1.6	J	2	U	2	U	2	U	2.1	U	2	U	1.9	U	12	J	430	J
Endosulfan sulfate	1000	NYSDEC TAGM	UG/KG	3.7	U	3.8	U	3.9	U	3.9	U	4.1	U	3.8	U	3.7	U	3.4	U	20	J
Endrin	100	NYSDEC TAGM	UG/KG	3.7	U	3.8	U	3.9	U	3.9	U	4.1	U	3.8	U	3.7	U	5.6		43	
Endrin ketone			UG/KG	3.7	U	3.8	U	3.9	U	3.9	U	4.1	U	3.8	U	3.7	U	4.8		71	
alpha-Chlordane			UG/KG	1.1	J	2	U	2	U	2	U	2.1	U	2	U	1.9	U	1.8	U	11	R
beta-BHC	200	NYSDEC TAGM	UG/KG	1.9	U	2	U	2	U	2	U	2.1	U	2	U	1.9	U	1.8	U	20	J
delta-BHC	300	NYSDEC TAGM	UG/KG	2.2		2	U	2	U	2	U	2.1	U	2	U	1.9	U	1.8	U	18	U
OTHER ANALYSES																					
Nitrate/Nitrite-Nitrogen			MG/KG	0.34		0.27		6.1		6		0.27		0.64		0.06		0.34		0.44	
Percent Moisture (PEST/PCB)				11		14		16		16		19		14		12		3		6	
Percent Moisture (SVOCs)				11		14		16		16		19		14		12		3		6	
Percent Moisture (VOCs)				11		14		17		17		20		18		11		3		8	
Percent Solids (Metals)				88.7		86.1		83.5		83.6		81.4		85.7		87.9		97.2		93.7	
NITROAROMATICS																					
2,6-Dinitrotoluene	1000	NYSDEC TAGM	UG/KG	120	U	120	UJ	120	UJ	120	UJ	120	U	120	UJ	120	U	120	U	900	J

Table A-10
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 Downwind Surface Soil Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
			LOC_ID:	1000-N		1000-S		2000-N		2000-N		2000-S		3000-N		3000-S		3500-N		3500-S	
			SAMP ID:	16083		16087		16089		16090		16085		16088		16056		16084		16055	
			QC CODE:	SA		SA		SA		DU		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0		0	
			BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2	
			MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
			SAMPLE DATE:	8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/22/96		8/20/96		8/22/96		8/20/96	
METALS																					
Aluminum	14592.8	NYSDEC TAGM	MG/KG	13900	J	11600	J	11700	J	11500	J	14100	J	12700	J	11800	J	4120	J	8620	J
Antimony	3.59	NYSDEC TAGM	MG/KG	0.7		0.8	J	0.39	U	0.45	U	0.36		0.7	J	0.37	UJ	0.56		0.74	J
Arsenic	7.5	NYSDEC TAGM	MG/KG	4.9		4.5	J	4.6	J	4.5	J	5.1		5.1	J	5.6		3.8		4.5	
Barium	300	NYSDEC TAGM	MG/KG	81.8	J	90.3	J	113	J	109	J	129	J	98.7	J	69.1	J	27.2	J	86.4	J
Beryllium	0.73	NYSDEC TAGM	MG/KG	0.54		0.48		0.41		0.44		0.57		0.43		0.51		0.16		0.32	
Cadmium	1	NYSDEC TAGM	MG/KG	0.07		0.34		0.21		0.21		0.21		0.1		0.18		0.23		0.32	
Calcium	101904	NYSDEC TAGM	MG/KG	9650		14500		3410		3420		3600		18200		10800		**229000**		**107000**	
Chromium	22.13	NYSDEC TAGM	MG/KG	**24.4**		18.5		14.8		14.8		19.5		18.4		19.9		9.3		14	
Cobalt	30	NYSDEC TAGM	MG/KG	15.7		9.2		7.2		7.1		10.7		10.3		12.3		4.7		6.8	
Copper	25	NYSDEC TAGM	MG/KG	**39**		21.2		17.9		17.7		19.9		20.4		**28.9**		14.9		**29.6**	
Iron	26626.7	NYSDEC TAGM	MG/KG	**29300**		22500		19100		19100		24000		23600		24900		9760		15800	J
Lead	21.86	NYSDEC TAGM	MG/KG	**52**		**58**		19.7		19.5		**29**		19.3		16.7		**36.7**		**36**	
Magnesium	12221.8	NYSDEC TAGM	MG/KG	6120		5330		3230		3200		3840		6820		5330		8430		6310	
Manganese	669.38	NYSDEC TAGM	MG/KG	399	J	452		663		587		**704**	**J**	**670**		550		286	J	558	
Mercury	0.1	NYSDEC TAGM	MG/KG	0.06		0.06		0.07		0.09		0.06		**0.56**		0.05		0.04	U	0.05	
Nickel	33.62	NYSDEC TAGM	MG/KG	**50.8**		26.4		16.6		16.4		25.9		27.2		**34.6**		15.8		18.1	
Potassium	1761.48	NYSDEC TAGM	MG/KG	1460		1100		1030		1060		1730		1420		1320		848		1410	
Selenium	2	NYSDEC TAGM	MG/KG	1.3	J	1.4		1.3		1.5		1.4	J	1.2		0.74		0.5	J	1.2	
Sodium	103.74	NYSDEC TAGM	MG/KG	83.1		59.2	U	51.7	U	59.9	U	49.4		57.9	U	49.5	U	**383**		68.9	
Thallium	0.28	NYSDEC TAGM	MG/KG	0.88	U	0.93	U	0.81	U	0.94	U	**0.83**		0.91	U	**1.2**		0.74	U	**1**	
Vanadium	150	NYSDEC TAGM	MG/KG	20.5		19		19.4		19.5		22.3		20.1		19		15.5		19.8	
Zinc	82.5	NYSDEC TAGM	MG/KG	**109**	**J**	**92.5**		55.8		55.8		78.7	J	68.2		**97.9**		53.2	J	**90.8**	

Table A-11
SENECA ARMY DEPOT
FEASIBILITY STUDY

SEAD-17 Sediment Analytical Results

			LOC_ID:	SW/SD17-1		SW/SD17-10		SW/SD17-2		SW/SD17-3		SW/SD17-4		SW/SD17-5		SW/SD17-6		SW/SD17-7	
			SAMP ID:	16120A		16123A		16130A		16131A		16136A		16137A		16121A		16132A	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0	
			BOTTOM:	6		6		6		6		6		6		6		6	
			MATRIX:	SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT	
			SAMPLE DATE:	9/17/96		9/17/96		9/18/96		9/18/96		9/18/96		9/18/96		9/18/96		9/18/96	
PARAMETER	LEVE	SOURCE	UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
VOLATILE ORGANICS																			
Acetone			UG/KG	15		13	U	14	U	15	U	20	U	20	U	26		13	U
Toluene			UG/KG	14	U	13	U	14	U	14	U	20	U	20	U	8	J	13	U
SEMIVOLATILE ORGANICS																			
2,4-Dimethylphenol			UG/KG	32	J	430	U	530	U	480	U	610	U	570	U	560	U	500	U
2,4-Dinitrotoluene			UG/KG	460	U	430	U	530	U	480	U	610	U	570	U	560	U	500	U
Benzo(a)anthracene	15.99	NYS HHB	UG/KG	460	U	430	U	530	U	480	U	610	U	570	U	560	U	500	U
Benzo(a)pyrene	15.99	NYS HHB	UG/KG	460	U	430	U	530	U	480	U	610	U	570	U	560	U	500	U
Benzo(b)fluoranthene	15.99	NYS HHB	UG/KG	460	U	430	U	530	U	480	U	610	U	570	U	560	U	500	U
Benzo(g,h,i)perylene			UG/KG	460	U	430	U	530	U	480	U	610	U	570	U	560	U	500	U
Benzo(k)fluoranthene	15.99	NYS HHB	UG/KG	460	U	430	U	530	U	480	U	610	U	570	U	560	U	500	U
Chrysene	15.99	NYS HHB	UG/KG	460	U	430	U	530	U	480	U	610	U	570	U	560	U	500	U
Fluoranthene	12546	NSY BALCT	UG/KG	460	U	36	J	530	U	480	U	610	U	570	U	560	U	500	U
Indeno(1,2,3-cd)pyrene	15.99	NYS HHB	UG/KG	460	U	430	U	530	U	480	U	610	U	570	U	560	U	500	U
Phenanthrene	1476	NSY BALCT	UG/KG	460	U	430	U	530	U	480	U	610	U	570	U	560	U	500	U
Pyrene			UG/KG	460	U	26	J	530	U	480	U	610	U	570	U	560	U	500	U
bis(2-Ethylhexyl)phthalate	2460	NSY BALCT	UG/KG	54	J	430	U	530	U	480	U	36	J	570	U	560	U	500	U
PESTICIDES/PCB																			
4,4'-DDD	0.123	NYS HHB	UG/KG	4.6	U	4.3	U	4.6	U	4.9	U	**7.8**		**3.2**	**J**	5.6	U	5	U
4,4'-DDE	0.123	NYS HHB	UG/KG	4.6	U	**2.8**	**J**	4.6	U	4.9	U	**28**		**13**		**6.5**		5	U
4,4'-DDT	0.123	NYS HHB	UG/KG	4.6	U	4.3	U	4.6	U	4.9	U	6.1	U	5.7	U	**3**	**J**	5	U
Dieldrin	1.23	NYS HHB	UG/KG	4.6	U	**5**		4.6	U	4.9	U	6.1	U	5.7	U	5.6	U	5	U
Endosulfan I	0.369	NSY BALCT	UG/KG	2.4	U	2.2	U	2.4	U	2.5	U	3.1	U	2.9	U	2.9	U	2.6	U
Endosulfan II	0.369	NSY BALCT	UG/KG	4.6	U	4.3	U	4.6	U	4.9	U	**3.8**	**J**	5.7	U	**3.7**	**J**	5	U

Table A-11
SENECA ARMY DEPOT
FEASIBILITY STUDY

SEAD-17 Sediment Analytical Results

PARAMETER	LEVE	SOURCE	LOC_ID:	SW/SD17-1		SW/SD17-10		SW/SD17-2		SW/SD17-3		SW/SD17-4		SW/SD17-5		SW/SD17-6		SW/SD17-7	
			SAMP ID:	16120A		16123A		16130A		16131A		16136A		16137A		16121A		16132A	
			QC CODE:	SA		SA		SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	0		0		0		0		0		0		0		0	
			BOTTOM:	6		6		6		6		6		6		6		6	
			MATRIX:	SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT	
			SAMPLE DATE:	9/17/96		9/17/96		9/18/96		9/18/96		9/18/96		9/18/96		9/18/96		9/18/96	
			UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
OTHER ANALYSES																			
Nitrate/Nitrite-Nitrogen			MG/KG	0.04		0.05		0.06		0.07		0.24		0.02		0.1		0.06	
Percent Moisture (PEST/PCB)				29		23		28		32		46		42		41		34	
Percent Moisture (SVOCs)				29		23		38		32		46		42		41		34	
Percent Moisture (VOCs)				26		23		28		26		49		51		30		25	
Percent Solids (Metals)				70.8		76.8		72		67.8		53.9		58.2		58.7		66	
Total Organic Carbon			MG/KG	141	U	10700		5650		10000		12800		7900		36100		5910	
METALS																			
Aluminum			MG/KG	18900		12100		19600		11400		16600		14800		15900		15200	
Antimony	2	NYS LEL	MG/KG	0.61	UJ	0.84	UJ	1.6	J	5.5	J	2	J	0.88	UJ	1.2	UJ	0.85	UJ
Arsenic	6	NYS LEL	MG/KG	6.2		3.3		7.3		4.5		4.1		4.8		4.2		6	
Barium			MG/KG	128		51.1		162		121		106		103		73.2		124	
Beryllium			MG/KG	0.99		0.26		0.86		0.57		0.67		0.62		0.5		0.75	
Cadmium	0.6	NYS LEL	MG/KG	0.32		0.28		1.1		4.8		2.4		2.1		1.1		0.68	
Calcium			MG/KG	4100		1950		3790		25000		6860		3070		2780		4420	
Chromium	26	NYS LEL	MG/KG	25.8		13.7		25.4		16.3		23.5		19.8		23.8		22.3	
Cobalt			MG/KG	11.5		5.8		10.7		8.4		9.9		10		11		11	
Copper	16	NYS LEL	MG/KG	38.6	J	27.1	J	42	J	98.1	J	75.3	J	46.6	J	36.4	J	26	J
Iron	20000	NYS LEL	MG/KG	30800		17400		27800		20700		24500		24200		27800		27800	
Lead	31	NYS LEL	MG/KG	68.3		72.9		166		1050		258		136		106		77.5	
Magnesium			MG/KG	4970		2250		5140		6490		5780		4210		5570		5080	
Manganese	460	NYS LEL	MG/KG	566	J	362	J	348	J	415	J	275		347		488	J	317	J
Mercury	0.15	NYS LEL	MG/KG	0.04		0.03	U	0.04	U	0.03	U	0.16		0.04	U	0.06	U	0.04	U
Nickel	16	NYS LEL	MG/KG	29.8	J	10.8	J	30	J	23.7	J	30.6	J	24.7	J	30.6	J	31.6	J
Potassium			MG/KG	1310	J	1250	J	2480	J	1450	J	2630	J	1660	J	1980	J	1810	J
Selenium			MG/KG	0.8	U	1.1	U	0.84	U	1.3	U	1.4	U	1.9		1.6	U	1.1	U
Sodium			MG/KG	79.4		76.3	U	429		338		109		98.6		112	U	452	
Thallium			MG/KG	1.3		0.95	U	0.73	U	1.2	U	1.3	U	1		1.4	U	0.97	U
Vanadium			MG/KG	32.1		24.8		33		18.8		26.4		25		21.3		22.7	
Zinc	120	NYS LEL	MG/KG	78.4		57.6		85.5		278		158		96.6		97.6		98.6	

Table A-11
SENECA ARMY DEPOT
FEASIBILITY STUDY

SEAD-17 Sediment Analytical Results

			LOC_ID:	SW/SD17-8		SW/SD17-9	
			SAMP ID:	16124A		16122A	
			QC CODE:	SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1	
			TOP:	0		0	
			BOTTOM:	6		6	
			MATRIX:	SEDIMENT		SEDIMENT	
			SAMPLE DATE:	9/17/96		9/17/96	
PARAMETER	LEVE	SOURCE	UNIT	VALUE	Q	VALUE	Q
VOLATILE ORGANICS							
Acetone			UG/KG	10	J	14	U
Toluene			UG/KG	14	U	14	U
SEMIVOLATILE ORGANICS							
2,4-Dimethylphenol			UG/KG	500	U	460	U
2,4-Dinitrotoluene			UG/KG	450	J	460	U
Benzo(a)anthracene	15.99	NYS HHB	UG/KG	25	J	460	U
Benzo(a)pyrene	15.99	NYS HHB	UG/KG	30	J	460	U
Benzo(b)fluoranthene	15.99	NYS HHB	UG/KG	43	J	460	U
Benzo(g,h,i)perylene			UG/KG	31	J	460	U
Benzo(k)fluoranthene	15.99	NYS HHB	UG/KG	33	J	460	U
Chrysene	15.99	NYS HHB	UG/KG	48	J	460	U
Fluoranthene	12546	NSY BALCT	UG/KG	70	J	460	U
Indeno(1,2,3-cd)pyrene	15.99	NYS HHB	UG/KG	24	J	460	U
Phenanthrene	1476	NSY BALCT	UG/KG	35	J	460	U
Pyrene			UG/KG	47	J	460	U
bis(2-Ethylhexyl)phthalate	2460	NSY BALCT	UG/KG	77	J	460	U
PESTICIDES/PCB							
4,4'-DDD	0.123	NYS HHB	UG/KG	13	J	4.6	U
4,4'-DDE	0.123	NYS HHB	UG/KG	62	J	2.9	J
4,4'-DDT	0.123	NYS HHB	UG/KG	12	J	4.6	U
Dieldrin	1.23	NYS HHB	UG/KG	5	UJ	4.6	U
Endosulfan I	0.369	NSY BALCT	UG/KG	1.6	J	2.4	U
Endosulfan II	0.369	NSY BALCT	UG/KG	5	UJ	4.6	U

Table A-11
SENECA ARMY DEPOT
FEASIBILITY STUDY

SEAD-17 Sediment Analytical Results

			LOC_ID:	SW/SD17-8		SW/SD17-9	
			SAMP ID:	16124A		16122A	
			QC CODE:	SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1	
			TOP:	0		0	
			BOTTOM:	6		6	
			MATRIX:	SEDIMENT		SEDIMENT	
			SAMPLE DATE:	9/17/96		9/17/96	
PARAMETER	LEVE	SOURCE	UNIT	VALUE	Q	VALUE	Q
OTHER ANALYSES							
Nitrate/Nitrite-Nitrogen			MG/KG	0.09		0.04	
Percent Moisture (PEST/PCB)				34		29	
Percent Moisture (SVOCs)				34		29	
Percent Moisture (VOCs)				29		29	
Percent Solids (Metals)				65.8		70.9	
Total Organic Carbon			MG/KG	17800		4090	
METALS							
Aluminum			MG/KG	17100		22100	
Antimony	2	NYS LEL	MG/KG	4.7	J	0.73	UJ
Arsenic	6	NYS LEL	MG/KG	5		7.5	
Barium			MG/KG	157		92.4	
Beryllium			MG/KG	0.44		0.76	
Cadmium	0.6	NYS LEL	MG/KG	2.7		0.25	
Calcium			MG/KG	6150		2190	
Chromium	26	NYS LEL	MG/KG	23.3		27.7	
Cobalt			MG/KG	12		17.8	
Copper	16	NYS LEL	MG/KG	309	J	34.1	J
Iron	20000	NYS LEL	MG/KG	29400		35000	
Lead	31	NYS LEL	MG/KG	678		90.5	
Magnesium			MG/KG	4580		4830	
Manganese	460	NYS LEL	MG/KG	768	J	565	J
Mercury	0.15	NYS LEL	MG/KG	0.07		0.04	
Nickel	16	NYS LEL	MG/KG	28.8	J	31.4	J
Potassium			MG/KG	2470	J	1950	J
Selenium			MG/KG	1.6		0.96	
Sodium			MG/KG	137		69	
Thallium			MG/KG	1.2	U	0.83	U
Vanadium			MG/KG	29.8		33.8	
Zinc	120	NYS LEL	MG/KG	242		108	

Table A-12
SENECA ARMY DEPOT
FEASIBILITY STUDY

SEAD-17 Groundwater Analytical Results

PARAMETER	LEVEL	SOURCE															
			LOC_ID:	MW17-1		MW17-1		MW17-1		MW17-1		MW17-2		MW17-2		MW17-3	
			SAMP ID:	MW17-1-1		16108		16109		16171		MW17-2-1		16163		MW17-3-1	
			QC CODE:	SA		SA		DU		SA		SA		SA		SA	
			STUDY ID:	ESI		RI ROUND1		RI ROUND1		RI ROUND2		ESI		RI ROUND2		ESI	
			TOP:	3.4		3.4		3.4		731.1		3.3		728.3		3.1	
			BOTTOM:	7.4		7.4		7.4		727.1		5.3		726.3		5.1	
			MATRIX:	Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater	
			SAMPLE DATE:	1/25/94		8/29/96		8/29/96		12/11/96		11/18/93		12/9/96		1/26/94	
			UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
SEMIVOLATILE ORGANICS																	
Benzo[a]pyrene	0.2	EPA MCL	UG/L	11	U	0.7	J	10	U	10	U	11	U	10	U	10	U
Benzo[ghi]perylene			UG/L	11	U	2	J	1	J	10	U	11	U	10	U	10	U
Dibenz[a,h]anthracene			UG/L	11	U	1	J	0.9	J	10	U	11	U	10	U	10	U
Indeno[1,2,3-cd]pyrene			UG/L	11	U	2	J	1	J	10	U	11	U	10	U	10	U
OTHER ANALYSES																	
Nitrate/Nitrite Nitrogen			MG/L	0.26		0.24		0.23		0.2		0.13		0.04		0.09	
Percent Solids (Metals)						0		0		0				0			
NITROAROMATICS																	
Tetryl	5	NYS CLASS GA STANDARD	UG/L	0.13	U	0.26	U	0.26	U	0.26	U	0.08	J	0.26	U	0.13	U
METALS																	
Aluminum	200	EPA SECONDARY MCL	UG/L	10800		90.4		54.6		386		7220		85.3	U	1070	
Arsenic	25	NYS CLASS GA STANDARD	UG/L	5.8	J	2.7	U	2.7	U	4.4	U	3.2	J	4.4	U	1.4	U
Barium	1000	NYS CLASS GA STANDARD	UG/L	147	J	85		87		90.4	U	77.9	J	66.1	U	24.4	J
Beryllium	4	EPA MCL	UG/L	0.52	J	0.26		0.21		0.2	U	0.4	J	0.2	U	0.4	U
Cadmium	5	EPA MCL	UG/L	2.1	U	0.3	U	0.31		0.6	U	3.3	U	0.6	U	2.1	U
Calcium			UG/L	170000		108000		110000		104000		149000		118000		110000	
Chromium	50	NYS CLASS GA STANDARD	UG/L	17.3		1	U	1.5		1	U	12.9		1	U	2.6	U
Cobalt			UG/L	11.4	J	1.2	U	1.4		2	U	7	J	1.3	U	4.4	U
Copper	200	NYS CLASS GA STANDARD	UG/L	18	J	3.1		4.3		1.1	U	11.7	J	2.6	U	3.1	U
Iron	300	NYS CLASS GA STANDARD	UG/L	18300		119		90.6		572	J	12200		214		1870	
Lead	15	EPA MCL	UG/L	8.7		1.7	U	1.7	U	1.5	U	32.3		1.9	U	0.52	J
Magnesium			UG/L	40200		22600		23000		22900		24400		14600		17800	
Manganese	50	EPA SECONDARY MCL	UG/L	473		21.3		20		9.7	U	459		73.8		164	
Mercury	2	NYS CLASS GA STANDARD	UG/L	0.05	J	0.1	U	0.1	U	0.1	U	0.07	UJ	0.1	U	0.04	U
Nickel	100	EPA MCL	UG/L	24.4	J	1.8		2.2		2.5	U	15.4	J	2.5	U	4	U
Potassium			UG/L	4740	J	472		574		843	U	4280	J	5320		3590	J
Selenium	10	NYS CLASS GA STANDARD	UG/L	2	J	2.4	U	2.4	U	4.7	UJ	0.79	U	4.7	UJ	0.69	U
Silver	50	NYS CLASS GA STANDARD	UG/L	4.2	U	1.3	U	2.3		1.5	U	6.6	U	1.5	U	4.2	U
Sodium	20000	NYS CLASS GA STANDARD	UG/L	8270		9290		9620		8190		44300		18700		46100	
Thallium	2	EPA MCL	UG/L	1.2	U	4.4		7.1		4.1	U	1.8	U	4.7	U	1.2	U
Vanadium			UG/L	19.9	J	1.2	U	1.4		1.6	U	12.8	J	1.6	U	3.7	U
Zinc	300	NYS CLASS GA STANDARD	UG/L	100		2.5	R	3.2	R	14.4	U	33		63.9		16.4	J

Table A-12
SENECA ARMY DEPOT
FEASIBILITY STUDY

SEAD-17 Groundwater Analytical Results

PARAMETER	LEVEL	SOURCE											
			LOC_ID:	MW17-3		MW17-4		MW17-4		MW17-5		MW17-5	
			SAMP ID:	16166		MW17-4-1		16169		16106		16170	
			QC CODE:	SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND2		ESI		RI ROUND2		RI ROUND1		RI ROUND2	
			TOP:	727.1		3.1		729.4		3.4		728.1	
			BOTTOM:	725.1		5.1		727.4		7.9		723.6	
			MATRIX:	Groundwater		Groundwater		Groundwater		Groundwater		Groundwater	
			SAMPLE DATE:	12/10/96		1/25/94		12/11/96		8/29/96		12/11/96	
			UNIT	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
SEMIVOLATILE ORGANICS													
Benzo[a]pyrene	0.2	EPA MCL	UG/L	10	U	11	U	10	U	10	U	10	U
Benzo[ghi]perylene			UG/L	10	U	11	U	10	U	10	U	10	U
Dibenz[a,h]anthracene			UG/L	10	U	11	U	10	U	10	U	10	U
Indeno[1,2,3-cd]pyrene			UG/L	10	U	11	U	10	U	10	U	10	U
OTHER ANALYSES													
Nitrate/Nitrite Nitrogen			MG/L	0.05		0.05		0.02		0.04		0.02	
Percent Solids (Metals)				0				0		0		0	
NITROAROMATICS													
Tetryl	5	NYS CLASS GA STANDARD	UG/L	0.26	U	0.13	U	0.26	U	0.26	U	0.26	U
METALS													
Aluminum	200	EPA SECONDARY MCL	UG/L	36.1	U	774		41.9	U	39.9		59	U
Arsenic	25	NYS CLASS GA STANDARD	UG/L	4.4	U	0.87	J	4.4	U	2.7	U	4.4	U
Barium	1000	NYS CLASS GA STANDARD	UG/L	27.4	U	33.4	J	27.4	U	92.5		62.6	U
Beryllium	4	EPA MCL	UG/L	0.2	U	0.4	U	0.2	U	0.23		0.2	U
Cadmium	5	EPA MCL	UG/L	0.6	U	2.1	U	0.6	U	0.3	U	0.6	U
Calcium			UG/L	108000		113000		92000		108000		81100	
Chromium	50	NYS CLASS GA STANDARD	UG/L	1	U	2.6	U	1	U	1	U	1	U
Cobalt			UG/L	1.3	U	4.4	U	1.3	U	1.2	U	1.3	U
Copper	200	NYS CLASS GA STANDARD	UG/L	1.1	U	3.1	U	1.1	U	3.3		1.3	U
Iron	300	NYS CLASS GA STANDARD	UG/L	53.1	U	1100		96.4	U	56.8		134	
Lead	15	EPA MCL	UG/L	1.5	U	1.9	J	3	U	1.7	U	1.5	U
Magnesium			UG/L	15200		17800		14200		17700		13600	
Manganese	50	EPA SECONDARY MCL	UG/L	0.7	U	550		22.5		73.2		62	
Mercury	2	NYS CLASS GA STANDARD	UG/L	0.1	U	0.07	J	0.1	U	0.1	U	0.1	U
Nickel	100	EPA MCL	UG/L	2.5	U	4	U	2.5	U	2.4		2.5	U
Potassium			UG/L	772	U	5820		1330	U	853		1070	U
Selenium	10	NYS CLASS GA STANDARD	UG/L	4.7	UJ	0.7	U	4.7	UJ	2.4	U	4.7	UJ
Silver	50	NYS CLASS GA STANDARD	UG/L	1.5	U	4.2	U	1.5	U	1.3	U	1.5	U
Sodium	20000	NYS CLASS GA STANDARD	UG/L	30100		17200		22300		11700		8970	
Thallium	2	EPA MCL	UG/L	4.4	U	1.2	U	6.2	U	4.7		8.6	U
Vanadium			UG/L	1.6	U	3.7	U	1.6	U	1.2	U	1.6	U
Zinc	300	NYS CLASS GA STANDARD	UG/L	7.7	U	13	J	8.3	U	6.2	R	4.4	U

Table A-13
SENECA ARMY DEPOT
FEASIBILITY STUDY

SEAD-17 Surface Water Analytical Results

			LOC_ID:	SW/SD17-1	SW/SD17-10	SW/SD17-2	SW/SD17-3	SW/SD17-4	SW/SD17-5
			SAMP ID:	16120	16123	16130	16131	16136	16137
			QC CODE:	SA	SA	SA	SA	SA	SA
			STUDY ID:	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1	RI ROUND1
			TOP:						
			BOTTOM:						
			MATRIX:	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER
			SAMPLE DATE:	9/17/96	9/17/96	9/18/96	9/18/96	9/18/96	9/18/96
PARAMETER	LEVEL	SOURCE	UNIT	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q	VALUE Q
SEMIVOLATILE ORGANICS									
bis(2-Ethylhexyl)phthalate	0.6	NYS AWQS CLASS C	UG/L	10 U	10 U	10 U	2 J	10 U	10 U
OTHER ANALYSES									
Percent Solids (Metals)				0	0	0	0	0	0
Total Organic Carbon			MG/L	7.3	11.6	8.4	3.9	6.1	6.8
pH			MG/L	7.87	7.44	7.81	7.81	7.43	7.52
METALS									
Antimony			UG/L	5.4 J	2 U	4.1 J	12.6 J	2 U	2 U
Arsenic	190	NYS AWQS CLASS C	UG/L	2.7 U	3.9 J	2.7 U	4.6 J	2.9 J	2.7 U
Barium			UG/L	42.6 J	30.4 J	43.6 J	91.8 J	41.7 J	40.5 J
Cadmium	1.86	NYS AWQS CLASS C	UG/L	0.32 J	0.3 U	0.47 J	0.63 J	0.44 J	0.3 U
Calcium			UG/L	46400	50100	48300	68200	73500	72900
Chromium	347.27	NYS AWQS CLASS C	UG/L	1 J	1 U	1 U	1 U	1 U	1 U
Copper	20.29	NYS AWQS CLASS C	UG/L	18.4	17.4	12.6	9.5	6.9	6.8
Iron	300	NYS AWQS CLASS C	UG/L	**322 J**	81.1 J	174 J	169 J	134 J	141 J
Lead	7.16	NYS AWQS CLASS C	UG/L	**14.9**	1.8	**9.7**	3.3	1.9	1.7 U
Magnesium			UG/L	3810	3430	6390	8730	9280	9160
Manganese			UG/L	6.6	2.7	16	8.8	13.3	19.6
Nickel	154.49	NYS AWQS CLASS C	UG/L	1.6 U	1.6 U	1.7	1.6 U	1.6 U	1.6 U
Potassium			UG/L	3270	3830	2470	4380	1980	2020
Selenium	1	NYS AWQS CLASS C	UG/L	2.4 U	2.4 U	**3.4 J**	**3.5 J**	**2.5 J**	**2.9 J**
Sodium			UG/L	3090	2990	2880	5830	9460	9260
Vanadium	14	NYS AWQS CLASS C	UG/L	1.8 J	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Zinc	141.38	NYS AWQS CLASS C	UG/L	20.9	50.5	40.8	29.1	3.6	3.3

Table A-13
SENECA ARMY DEPOT
FEASIBILITY STUDY

SEAD-17 Surface Water Analytical Results

PARAMETER	LEVEL	SOURCE	UNIT	SW/SD17-6 VALUE	Q	SW/SD17-7 VALUE	Q	SW/SD17-8 VALUE	Q	SW/SD17-9 VALUE	Q
			SAMP ID:	16121		16132		16124		16122	
			QC CODE:	SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:								
			BOTTOM:								
			MATRIX:	SURFACE WATER		SURFACE WATER		SURFACE WATER		SURFACE WATER	
			SAMPLE DATE:	9/18/96		9/18/96		9/17/96		9/17/96	
SEMIVOLATILE ORGANICS											
bis(2-Ethylhexyl)phthalate	0.6	NYS AWQS CLASS C	UG/L	10	U	1	J	10	U	10	U
OTHER ANALYSES											
Percent Solids (Metals)				0		0		0		0	
Total Organic Carbon			MG/L	3.8		5.9		11.1		10.1	
pH			MG/L	7.62		7.53		7.89		7.54	
METALS											
Antimony			UG/L	2	U	23.6	J	2	U	2	U
Arsenic	190	NYS AWQS CLASS C	UG/L	2.7	U	3.8	J	4	J	3.2	J
Barium			UG/L	38.8	J	100	J	16	J	24.7	J
Cadmium	1.86	NYS AWQS CLASS C	UG/L	0.3	U	1.3	J	0.3	U	0.3	U
Calcium			UG/L	71800		38800		29300		37100	
Chromium	347.27	NYS AWQS CLASS C	UG/L	1	U	1	U	1	U	1	U
Copper	20.29	NYS AWQS CLASS C	UG/L	6.7		**32.7**		10.5		8.9	
Iron	300	NYS AWQS CLASS C	UG/L	112	J	222	J	59.4	J	48.5	J
Lead	7.16	NYS AWQS CLASS C	UG/L	1.7	U	**37.1**		1.7	U	1.7	U
Magnesium			UG/L	8990		3730		2610		2910	
Manganese			UG/L	4.7		9.1		1.4		2.1	
Nickel	154.49	NYS AWQS CLASS C	UG/L	1.6	U	1.6	U	1.6	U	1.6	U
Potassium			UG/L	1990		3700		2630		3800	
Selenium	1	NYS AWQS CLASS C	UG/L	2.4	U	**3.4**	**J**	2.4	U	2.4	U
Sodium			UG/L	8950		6410		1600		1620	
Vanadium	14	NYS AWQS CLASS C	UG/L	1.2	U	1.2	U	1.2	U	1.2	U
Zinc	141.38	NYS AWQS CLASS C	UG/L	2.8		61.7		6.8		21.8	

APPENDIX B

RISK ASSESSMENT

ANALYSES

SUMMARY

TABLES

SEAD-16

TABLE 6-41

CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE ASSESSMENT Table Number	RISK CHARACTERIZATION Table Number	HAZARD INDEX	CANCER RISK
CURRENT SITE WORKER	Inhalation of Dust in Ambient Air	Table 6-8	Table 6-43	6.90E-02	6.94E-11
	Ingestion of Onsite Soils	Table 6-16	Table 6-45	1.45E-02	1.30E-06
	Dermal Contact to Onsite Soils	Table 6-22	Table 6-47	8.78E-04	6.50E-08
TOTAL RECEPTOR RISK (Nc & Car)				8.44E-02	1.36E-06
FUTURE INDUSTRIAL WORKER	Inhalation of Dust in Indoor Air	Table 6-14	Table 6-49	5.72E-01	0.00E+00
	Ingestion of Indoor Dust	Table 6-28	Table 6-51	8.68E+00	3.17E-05
	Dermal Contact to Indoor Dust	Table 6-30	Table 6-53	2.65E+00	8.04E-06
	Ingestion of On-Site Soils	Table 6-13	Table 6-44	1.45E-02	1.30E-06
	Dermal Contact to On-Site Soils	Table 6-14	Table 6-46	8.78E-04	6.50E-08
TOTAL RECEPTOR RISK (Nc & Car)				1.19E+01	3.98E-05
FUTURE ON-SITE CONSTRUCTION WORKERS	Inhalation of Dust in Ambient Air	Table 6-10	Table 6-55	8.62E-01	3.47E-11
	Ingestion of Onsite Soils	Table 6-18	Table 6-57	8.71E-01	3.12E-06
	Dermal Contact to Onsite Soils	Table 6-24	Table 6-59	1.10E-02	3.25E-08
TOTAL RECEPTOR RISK (Nc & Car)				1.74E+00	3.15E-06
FUTURE TRESSPASSER (Child)	Inhalation of Dust in Ambient Air	Table 6-12	Table 6-61	4.83E-02	9.72E-12
	Ingestion of Onsite Soils	Table 6-20	Table 6-63	2.03E-01	2.50E-06
	Dermal Contact to Onsite Soils	Table 6-26	Table 6-65	2.44E-03	3.61E-08
	Ingestion of Onsite Surface Water while Wading	Table 6-32	Table 6-67	2.89E-02	6.81E-08
	Dermal Contact to Surface Water while Wading	Table 6-34	Table 6-69	1.79E-03	4.58E-07
	Ingestion of Onsite Sediment	Table 6-36	Table 6-71	3.67E-01	8.98E-07
	Dermal Contact to Sediment while Wading	Table 6-38	Table 6-73	1.46E-02	3.27E-08
TOTAL RECEPTOR RISK (Nc & Car)				6.66E-01	4.00E-06

TABLE 6-41

CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE ASSESSMENT Table Number	RISK CHARACTERIZATION Table Number	HAZARD INDEX	CANCER RISK
CURRENT SITE WORKER	Inhalation of Dust in Ambient Air	Table 6-8	Table 6-43	6.90E-02	2.70E-10
	Ingestion of Onsite Soils	Table 6-16	Table 6-45	1.74E-02	1.86E-06
	Dermal Contact to Onsite Soils	Table 6-22	Table 6-47	1.58E-02	4.94E-07
TOTAL RECEPTOR RISK (Nc & Car)				1.02E-01	2.36E-06
FUTURE INDUSTRIAL WORKER	Inhalation of Dust in Indoor Air	Table 6-14	Table 6-49	5.72E-01	0.00E+00
	Ingestion of Indoor Dust	Table 6-28	Table 6-51	1.65E+01	2.89E-05
	Dermal Contact to Indoor Dust	Table 6-30	Table 6-53	2.58E+00	5.79E-06
TOTAL RECEPTOR RISK (Nc & Car)				1.96E+01	3.47E-05
FUTURE ON-SITE CONSTRUCTION WORKERS	Inhalation of Dust in Ambient Air	Table 6-10	Table 6-55	8.62E-01	1.35E-10
	Ingestion of Onsite Soils	Table 6-18	Table 6-57	1.22E+00	5.06E-06
	Dermal Contact to Onsite Soils	Table 6-24	Table 6-59	6.09E-02	4.52E-08
TOTAL RECEPTOR RISK (Nc & Car)				2.15E+00	5.10E-06
FUTURE TRESSPASSER (Child)	Inhalation of Dust in Ambient Air	Table 6-12	Table 6-61	4.83E-02	3.77E-11
	Ingestion of Onsite Soils	Table 6-20	Table 6-63	2.35E-01	3.28E-06
	Dermal Contact to Onsite Soils	Table 6-26	Table 6-65	4.38E-02	2.74E-07
	Ingestion of Onsite Surface Water while Wading	Table 6-32	Table 6-67	3.33E-02	1.03E-07
	Dermal Contact to Surface Water while Wading	Table 6-34	Table 6-69	1.80E-03	4.58E-07
	Ingestion of Onsite Sediment	Table 6-36	Table 6-71	3.28E-01	9.95E-07
	Dermal Contact to Sediment while Wading	Table 6-38	Table 6-73	1.25E-02	2.94E-08
TOTAL RECEPTOR RISK (Nc & Car)				7.02E-01	5.14E-06

TABLE 6-41

CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE ASSESSMENT Table Number	RISK CHARACTERIZATION Table Number	HAZARD INDEX	CANCER RISK
CURRENT SITE WORKER	Inhalation of Dust in Ambient Air	Table 6-8	Table 6-43	6.90E-02	2.29E-11
	Ingestion of Onsite Soils	Table 6-16	Table 6-45	2.06E-04	3.42E-06
	Dermal Contact to Onsite Soils	Table 6-22	Table 6-47	0.00E+00	1.51E-08
TOTAL RECEPTOR RISK (Nc & Car)				6.92E-02	3.43E-06
FUTURE INDUSTRIAL WORKER	Inhalation of Dust in Indoor Air	Table 6-14	Table 6-49	5.72E-01	0.00E+00
	Ingestion of Indoor Dust	Table 6-28	Table 6-51	8.68E+00	3.17E-05
	Dermal Contact to Indoor Dust	Table 6-30	Table 6-53	2.65E+00	8.04E-06
	Ingestion of On-Site Soils	Table 6-13	Table 6-44	2.06E-04	3.42E-06
	Dermal Contact to On-Site Soils	Table 6-14	Table 6-46	0.00E+00	1.51E-08
TOTAL RECEPTOR RISK (Nc & Car)				1.19E+01	3.98E-05
FUTURE ON-SITE CONSTRUCTION WORKERS	Inhalation of Dust in Ambient Air	Table 6-10	Table 6-55	8.62E-01	1.14E-11
	Ingestion of Onsite Soils	Table 6-18	Table 6-57	2.42E-01	8.21E-06
	Dermal Contact to Onsite Soils	Table 6-24	Table 6-59	0.00E+00	7.55E-09
TOTAL RECEPTOR RISK (Nc & Car)				1.10E+00	8.21E-06
FUTURE TRESSPASSER (Child)	Inhalation of Dust in Ambient Air	Table 6-12	Table 6-61	4.83E-02	3.20E-12
	Ingestion of Onsite Soils	Table 6-20	Table 6-63	2.49E-03	7.60E-06
	Dermal Contact to Onsite Soils	Table 6-26	Table 6-65	0.00E+00	8.38E-09
	Ingestion of Onsite Surface Water while Wading	Table 6-32	Table 6-67	2.89E-02	6.81E-08
	Dermal Contact to Surface Water while Wading	Table 6-34	Table 6-69	1.79E-03	4.58E-07
	Ingestion of Onsite Sediment	Table 6-36	Table 6-71	3.67E-01	8.98E-07
	Dermal Contact to Sediment while Wading	Table 6-38	Table 6-73	1.46E-02	3.27E-08
TOTAL RECEPTOR RISK (Nc & Car)				4.63E-01	9.06E-06

TABLE 6-41

CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE ASSESSMENT Table Number	RISK CHARACTERIZATION Table Number	HAZARD INDEX	CANCER RISK
CURRENT SITE WORKER	Inhalation of Dust in Ambient Air	Table 6-8	Table 6-43	6.90E-02	2.29E-11
	Ingestion of Onsite Soils	Table 6-16	Table 6-45	2.06E-04	3.42E-06
	Dermal Contact to Onsite Soils	Table 6-22	Table 6-47	0.00E+00	1.51E-08
TOTAL RECEPTOR RISK (Nc & Car)				6.92E-02	3.43E-06
FUTURE INDUSTRIAL WORKER	Inhalation of Dust in Indoor Air	Table 6-14	Table 6-49	5.72E-01	0.00E+00
	Ingestion of Indoor Dust	Table 6-28	Table 6-51	8.68E+00	3.17E-05
	Dermal Contact to Indoor Dust	Table 6-30	Table 6-53	2.65E+00	8.04E-06
	Ingestion of On-Site Soils	Table 6-13	Table 6-44	2.06E-04	3.42E-06
	Dermal Contact to On-Site Soils	Table 6-14	Table 6-46	0.00E+00	1.51E-08
TOTAL RECEPTOR RISK (Nc & Car)				1.19E+01	3.98E-05
FUTURE ON-SITE CONSTRUCTION WORKERS	Inhalation of Dust in Ambient Air	Table 6-10	Table 6-55	8.62E-01	1.14E-11
	Ingestion of Onsite Soils	Table 6-18	Table 6-57	2.42E-01	8.21E-06
	Dermal Contact to Onsite Soils	Table 6-24	Table 6-59	0.00E+00	7.55E-09
TOTAL RECEPTOR RISK (Nc & Car)				1.10E+00	8.21E-06
FUTURE TRESSPASSER (Child)	Inhalation of Dust in Ambient Air	Table 6-12	Table 6-61	4.83E-02	3.20E-12
	Ingestion of Onsite Soils	Table 6-20	Table 6-63	2.49E-03	7.60E-06
	Dermal Contact to Onsite Soils	Table 6-26	Table 6-65	0.00E+00	8.38E-09
	Ingestion of Onsite Surface Water while Wading	Table 6-32	Table 6-67	2.89E-02	6.81E-08
	Dermal Contact to Surface Water while Wading	Table 6-34	Table 6-69	1.79E-03	4.58E-07
TOTAL RECEPTOR RISK (Nc & Car)				8.15E-02	8.13E-06

TABLE 6-41

CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE ASSESSMENT Table Number	RISK CHARACTERIZATION Table Number	HAZARD INDEX	CANCER RISK
CURRENT SITE WORKER	Inhalation of Dust in Ambient Air	Table 6-8	Table 6-43	6.90E-02	1.79E-11
	Ingestion of Onsite Soils	Table 6-16	Table 6-45	1.58E-04	3.70E-06
	Dermal Contact to Onsite Soils	Table 6-22	Table 6-47	0.00E+00	1.51E-08
TOTAL RECEPTOR RISK (Nc & Car)				6.91E-02	3.71E-06
FUTURE INDUSTRIAL WORKER	Inhalation of Dust in Indoor Air	Table 6-14	Table 6-49	5.72E-01	0.00E+00
	Ingestion of Indoor Dust	Table 6-28	Table 6-51	8.68E+00	3.17E-05
	Dermal Contact to Indoor Dust	Table 6-30	Table 6-53	2.65E+00	8.04E-06
	Ingestion of On-Site Soils	Table 6-13	Table 6-44	1.58E-04	3.70E-06
	Dermal Contact to On-Site Soils	Table 6-14	Table 6-46	0.00E+00	1.51E-08
TOTAL RECEPTOR RISK (Nc & Car)				1.19E+01	3.98E-05
FUTURE ON-SITE CONSTRUCTION WORKERS	Inhalation of Dust in Ambient Air	Table 6-10	Table 6-55	8.62E-01	8.93E-12
	Ingestion of Onsite Soils	Table 6-18	Table 6-57	1.32E-01	8.88E-06
	Dermal Contact to Onsite Soils	Table 6-24	Table 6-59	0.00E+00	7.55E-09
TOTAL RECEPTOR RISK (Nc & Car)				9.94E-01	8.88E-06
FUTURE TRESSPASSER (Child)	Inhalation of Dust in Ambient Air	Table 6-12	Table 6-61	4.83E-02	2.50E-12
	Ingestion of Onsite Soils	Table 6-20	Table 6-63	1.84E-03	8.28E-06
	Dermal Contact to Onsite Soils	Table 6-26	Table 6-65	0.00E+00	8.39E-09
	Ingestion of Onsite Surface Water while Wading	Table 6-32	Table 6-67	2.89E-02	6.81E-08
	Dermal Contact to Surface Water while Wading	Table 6-34	Table 6-69	1.79E-03	4.58E-07
TOTAL RECEPTOR RISK (Nc & Car)				8.08E-02	8.81E-06

Table 2-1
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-16 SOIL AREAS FOR REMEDIATION

CASE	REMEDIAL ACTION OBJECTIVES	BASIS	CLEAN UP GOAL	DESCRIPTION OF AREA TO BE REMEDIATED[1]	AREA (ft^2)	DEPTH (in)	VOLUME (yd^3)	SAMPLING LOCATIONS REMEDIATED OR EXCAVATED[2]
1	a) Prevent ingestion/direct contact with surface soil having excess heavy metals b) Prevent surface soil migration to drainage ditches and Kendaia Creek	a) Protection of Current and Future On-site Workers b) Protection of Surface Water	Pb <500 mg/kg	East and Southeast Areas Outside S 311	36,452	6	675	SS16-2 through 5, SS16-8, SS16 11, SS16-14, SS16-16, SS16-19 through 24, SS16-26 through 28, SS16-35, SB16-1
				Cumulative Soil Volume			675	
2	a) Prevent ingestion/direct contact with sediment having excess heavy metals b) Prevent sediment migration in surface water	a) Protection of Terrestrial and Aquatic Ecology b) Protection of Surface Water	Pb <31 mg/kg	Sediment in Drainage Ditches on Southeast Corner of S-311	25,828	6	478	SS16-2 through 5, SS16-8, SS16 11, SS16-14, SS16-16, SS16-19 through 24, SS16-26 through 28, SS16-35, SB16-1, **SD/SW16-1 through 10**
				Cumulative Soil Volume			1,153	
3	a) Prevent ingestion/direct contact with subsurface soil having excess heavy metals b) Minimize potential for leaching to groundwater	a) Protection of Current and Future On-site Workers b) Protection of Ground Water	Pb <500 mg/kg	Subsurface soil on Southeast and Northeast Side of Bldg S-311	1,964	24	109	SS16-2 through 5, SS16-8, SS16 11, SS16-14, SS16-16, SS16-19 through 24, SS16-26 through 28, SS16-35, SB16-1, SD/SW16-1 through 10, **SB16-2, SB16-5**
				Cumulative Soil Volume			1,262	

Notes:
1) For Case 3, area to be remediated/excavated includes an additional 24 inches in depth within the areas considered by Case 1 (see Figure 2-1).
2) Bold items in Sampling Location Column are additional locations to be remediated/excavated when the case is considered.

SEAD-17

TABLE 7-41

Calculation Of Total Noncarcinogenic and Carcinogenic Risks
Resonable Maximum Exposure (RME)
BASECASE
SEAD 17 - Remedial Investigation
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE ASSESSMENT Table Number	RISK CHARACTERIZATION Table Number	HAZARD INDEX	CANCER RISK
CURRENT SITE WORKER	Inhalation of Dust in Ambient Air	Table 7-8	Table 7-43	7.08E-04	3.18E-08
	Ingestion of Onsite Soils	Table 7-16	Table 7-45	5.48E-03	4.47E-07
	Dermal Contact to Onsite Soils	Table 7-24	Table 7-47	1.21E-02	1.64E-08
TOTAL RECEPTOR RISK (Nc & Car)				1.83E-02	4.95E-07
FUTURE INDUSTRIAL WORKER	Inhalation of Dust in Ambient Air	Table 7-10	Table7-49	8.86E-03	3.98E-07
	Ingestion of Onsite Soils	Table 7-18	Table 7-51	2.19E-02	1.79E-06
	Dermal Contact to Onsite Soils	Table 7-26	Table 7-53	4.84E-02	6.55E-08
TOTAL RECEPTOR RISK (Nc & Car)				7.92E-02	2.25E-06
FUTURE ON-SITE CONSTRUCTION WORKERS	Inhalation of Dust in Ambient Air	Table 7-12	Table 7-55	8.86E-03	1.59E-08
	Ingestion of Onsite Soils	Table 7-20	Table 7-57	5.16E-01	1.08E-06
	Dermal Contact to Onsite Soils	Table 7-28	Table 7-59	4.30E-03	1.17E-08
TOTAL RECEPTOR RISK (Nc & Car)				5.29E-01	1.11E-06
FUTURE TRESSPASSER (Child)	Inhalation of Dust in Ambient Air	Table 7-14	Table 7-61	4.96E-04	4.45E-09
	Ingestion of Onsite Soils	Table 7-22	Table 7-63	7.67E-02	1.25E-06
	Dermal Contact to Onsite Soils	Table 7-30	Table 7-65	3.36E-02	9.09E-09
	Ingestion of Onsite Surface Water while Wading	Table 7-32	Table 7-67	1.04E-02	7.33E-08
	Dermal Contact to Surface Water while Wading	Table 7-34	Table 7-69	8.91E-06	2.34E-09
	Ingestion of Onsite Sediment	Table 7-36	Table 7-71	9.57E-02	5.61E-07
	Dermal Contact to Sediment while Wading	Table 7-38	Table 7-73	4.76E-03	0.00E+00
TOTAL RECEPTOR RISK (Nc & Car)				2.22E-01	1.90E-06

TABLE 7-41

Calculation Of Total Noncarcinogenic and Carcinogenic Risks
Resonable Maximum Exposure (RME)
CASE 1
SEAD 17 - Remedial Investigation
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE ASSESSMENT Table Number	RISK CHARACTERIZATION Table Number	HAZARD INDEX	CANCER RISK
CURRENT SITE WORKER	Inhalation of Dust in Ambient Air	Table 7-8	Table 7-43	5.22E-04	2.05E-08
	Ingestion of Onsite Soils	Table 7-16	Table 7-45	3.74E-03	4.49E-07
	Dermal Contact to Onsite Soils	Table 7-24	Table 7-47	3.12E-03	2.04E-08
TOTAL RECEPTOR RISK (Nc & Car)				7.38E-03	4.89E-07
FUTURE INDUSTRIAL WORKER	Inhalation of Dust in Ambient Air	Table 7-10	Table7-49	6.53E-03	2.56E-07
	Ingestion of Onsite Soils	Table 7-18	Table 7-51	1.50E-02	1.79E-06
	Dermal Contact to Onsite Soils	Table 7-26	Table 7-53	1.25E-02	8.15E-08
TOTAL RECEPTOR RISK (Nc & Car)				3.40E-02	2.13E-06
FUTURE ON-SITE CONSTRUCTION WORKERS	Inhalation of Dust in Ambient Air	Table 7-12	Table 7-55	6.53E-03	1.02E-08
	Ingestion of Onsite Soils	Table 7-20	Table 7-57	2.75E-01	1.08E-06
	Dermal Contact to Onsite Soils	Table 7-28	Table 7-59	0.00E+00	1.02E-08
TOTAL RECEPTOR RISK (Nc & Car)				2.82E-01	1.10E-06
FUTURE TRESSPASSER (Child)	Inhalation of Dust in Ambient Air	Table 7-14	Table 7-61	3.66E-04	2.87E-09
	Ingestion of Onsite Soils	Table 7-22	Table 7-63	5.24E-02	1.26E-06
	Dermal Contact to Onsite Soils	Table 7-30	Table 7-65	8.65E-03	1.13E-08
	Ingestion of Onsite Surface Water while Wading	Table 7-32	Table 7-67	1.04E-02	7.33E-08
	Dermal Contact to Surface Water while Wading	Table 7-34	Table 7-69	8.91E-06	2.34E-09
	Ingestion of Onsite Sediment	Table 7-36	Table 7-71	9.57E-02	5.61E-07
	Dermal Contact to Sediment while Wading	Table 7-38	Table 7-73	4.76E-03	0.00E+00
TOTAL RECEPTOR RISK (Nc & Car)				1.72E-01	1.91E-06

TABLE 7-41

Calculation Of Total Noncarcinogenic and Carcinogenic Risks
Resonable Maximum Exposure (RME)
CASE 2
SEAD 17 - Remedial Investigation
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE ASSESSMENT Table Number	RISK CHARACTERIZATION Table Number	HAZARD INDEX	CANCER RISK
CURRENT SITE WORKER	Inhalation of Dust in Ambient Air	Table 7-8	Table 7-43	5.22E-04	2.05E-08
	Ingestion of Onsite Soils	Table 7-16	Table 7-45	3.74E-03	4.49E-07
	Dermal Contact to Onsite Soils	Table 7-24	Table 7-47	3.12E-03	2.04E-08
TOTAL RECEPTOR RISK (Nc & Car)				7.38E-03	4.89E-07
FUTURE INDUSTRIAL WORKER	Inhalation of Dust in Ambient Air	Table 7-10	Table7-49	6.53E-03	2.56E-07
	Ingestion of Onsite Soils	Table 7-18	Table 7-51	1.50E-02	1.79E-06
	Dermal Contact to Onsite Soils	Table 7-26	Table 7-53	1.25E-02	8.15E-08
TOTAL RECEPTOR RISK (Nc & Car)				3.40E-02	2.13E-06
FUTURE ON-SITE CONSTRUCTION WORKERS	Inhalation of Dust in Ambient Air	Table 7-12	Table 7-55	6.53E-03	1.02E-08
	Ingestion of Onsite Soils	Table 7-20	Table 7-57	2.75E-01	1.08E-06
	Dermal Contact to Onsite Soils	Table 7-28	Table 7-59	0.00E+00	1.02E-08
TOTAL RECEPTOR RISK (Nc & Car)				2.82E-01	1.10E-06
FUTURE TRESSPASSER (Child)	Inhalation of Dust in Ambient Air	Table 7-14	Table 7-61	3.66E-04	2.87E-09
	Ingestion of Onsite Soils	Table 7-22	Table 7-63	5.24E-02	1.26E-06
	Dermal Contact to Onsite Soils	Table 7-30	Table 7-65	8.65E-03	1.13E-08
	Ingestion of Onsite Surface Water while Wading	Table 7-32	Table 7-67	1.04E-02	7.33E-08
	Dermal Contact to Surface Water while Wading	Table 7-34	Table 7-69	8.91E-06	2.34E-09
TOTAL RECEPTOR RISK (Nc & Car)				7.19E-02	1.35E-06

TABLE 7-41

Calculation Of Total Noncarcinogenic and Carcinogenic Risks
Resonable Maximum Exposure (RME)
CASE 3
SEAD 17 - Remedial Investigation
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE ASSESSMENT Table Number	RISK CHARACTERIZATION Table Number	HAZARD INDEX	CANCER RISK
CURRENT SITE WORKER	Inhalation of Dust in Ambient Air	Table 7-8	Table 7-43	5.24E-04	2.04E-08
	Ingestion of Onsite Soils	Table 7-16	Table 7-45	3.88E-03	4.54E-07
	Dermal Contact to Onsite Soils	Table 7-24	Table 7-47	3.09E-03	2.08E-08
TOTAL RECEPTOR RISK (Nc & Car)				7.49E-03	4.95E-07
FUTURE INDUSTRIAL WORKER	Inhalation of Dust in Ambient Air	Table 7-10	Table7-49	6.55E-03	2.55E-07
	Ingestion of Onsite Soils	Table 7-18	Table 7-51	1.55E-02	1.82E-06
	Dermal Contact to Onsite Soils	Table 7-26	Table 7-53	1.24E-02	8.31E-08
TOTAL RECEPTOR RISK (Nc & Car)				3.44E-02	2.15E-06
FUTURE ON-SITE CONSTRUCTION WORKERS	Inhalation of Dust in Ambient Air	Table 7-12	Table 7-55	6.55E-03	1.02E-08
	Ingestion of Onsite Soils	Table 7-20	Table 7-57	2.80E-01	1.09E-06
	Dermal Contact to Onsite Soils	Table 7-28	Table 7-59	0.00E+00	1.04E-08
TOTAL RECEPTOR RISK (Nc & Car)				2.87E-01	1.11E-06
FUTURE TRESSPASSER (Child)	Inhalation of Dust in Ambient Air	Table 7-14	Table 7-61	3.67E-04	2.85E-09
	Ingestion of Onsite Soils	Table 7-22	Table 7-63	5.43E-02	1.27E-06
	Dermal Contact to Onsite Soils	Table 7-30	Table 7-65	8.58E-03	1.15E-08
	Ingestion of Onsite Surface Water while Wading	Table 7-32	Table 7-67	1.04E-02	7.33E-08
	Dermal Contact to Surface Water while Wading	Table 7-34	Table 7-69	8.91E-06	2.34E-09
TOTAL RECEPTOR RISK (Nc & Car)				7.37E-02	1.36E-06

TABLE 7-41

Calculation Of Total Noncarcinogenic and Carcinogenic Risks
Resonable Maximum Exposure (RME)

SEAD 17 - Remedial Investigation
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE ASSESSMENT Table Number	RISK CHARACTERIZATION Table Number	HAZARD INDEX	CANCER RISK
CURRENT SITE WORKER	Inhalation of Dust in Ambient Air	Table 7-8	Table 7-43	8.23E-04	3.52E-08
	Ingestion of Onsite Soils	Table 7-16	Table 7-45	1.15E-02	5.41E-07
	Dermal Contact to Onsite Soils	Table 7-24	Table 7-47	1.65E-02	2.21E-08
TOTAL RECEPTOR RISK (Nc & Car)				2.88E-02	5.98E-07
FUTURE INDUSTRIAL WORKER	Inhalation of Dust in Ambient Air	Table 7-10	Table7-49	1.03E-02	4.40E-07
	Ingestion of Onsite Soils	Table 7-18	Table 7-51	4.62E-02	2.16E-06
	Dermal Contact to Onsite Soils	Table 7-26	Table 7-53	6.59E-02	8.84E-08
TOTAL RECEPTOR RISK (Nc & Car)				1.22E-01	2.69E-06
FUTURE ON-SITE CONSTRUCTION WORKERS	Inhalation of Dust in Ambient Air	Table 7-12	Table 7-55	1.03E-02	1.76E-08
	Ingestion of Onsite Soils	Table 7-20	Table 7-57	6.91E-01	1.30E-06
	Dermal Contact to Onsite Soils	Table 7-28	Table 7-59	1.37E-01	1.73E-08
TOTAL RECEPTOR RISK (Nc & Car)				8.39E-01	1.34E-06
FUTURE TRESSPASSER (Child)	Inhalation of Dust in Ambient Air	Table 7-14	Table 7-61	5.76E-04	4.93E-09
	Ingestion of Onsite Soils	Table 7-22	Table 7-63	1.62E-01	1.51E-06
	Dermal Contact to Onsite Soils	Table 7-30	Table 7-65	4.57E-02	1.23E-08
	Ingestion of Onsite Surface Water while Wading	Table 7-32	Table 7-67	1.07E-02	7.33E-08
	Dermal Contact to Surface Water while Wading	Table 7-34	Table 7-69	8.96E-06	2.34E-09
	Ingestion of Onsite Sediment	Table 7-36	Table 7-71	1.05E-01	5.91E-07
	Dermal Contact to Sediment while Wading	Table 7-38	Table 7-73	9.51E-03	0.00E+00
TOTAL RECEPTOR RISK (Nc & Car)				3.33E-01	2.20E-06

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	Acetone	UG/KG	55	0	3	5.5%	6.945	4.515	10.750	FALSE	FALSE	7.278	7.278
VOLATILE ORGANICS	Benzene	UG/KG	55	0	2	3.6%	5.941	0.939	2.000	FALSE	FALSE	6.305	2.000
VOLATILE ORGANICS	Methylene chloride	UG/KG	55	0	1	1.8%	6.023	0.631	4.000	FALSE	FALSE	6.175	4.000
VOLATILE ORGANICS	Toluene	UG/KG	55	0	5	9.1%	5.905	1.153	8.000	FALSE	FALSE	6.469	6.469
SEMIVOLATILE ORGANIC	2,4-Dinitrotoluene	UG/KG	55	0	6	10.9%	244.909	228.021	1400.000	FALSE	FALSE	273.213	273.213
SEMIVOLATILE ORGANIC	2,6-Dinitrotoluene	UG/KG	54	1	1	1.9%	193.519	22.895	70.000	FALSE	FALSE	201.453	70.000
SEMIVOLATILE ORGANIC	2-Methylnaphthalene	UG/KG	54	1	2	3.7%	192.556	28.530	130.000	FALSE	FALSE	209.105	130.000
SEMIVOLATILE ORGANIC	3,3`-Dichlorobenzidine	UG/KG	55	0	1	1.8%	217.091	132.195	410.000	FALSE	FALSE	225.892	225.892
SEMIVOLATILE ORGANIC	3-Nitroaniline	UG/KG	55	0	1	1.8%	525.136	315.413	990.000	FALSE	FALSE	546.431	546.431
SEMIVOLATILE ORGANIC	4-Nitroaniline	UG/KG	55	0	1	1.8%	525.136	315.413	990.000	FALSE	FALSE	546.431	546.431
SEMIVOLATILE ORGANIC	Acenaphthene	UG/KG	54	1	2	3.7%	190.204	35.893	33.000	FALSE	FALSE	218.404	33.000
SEMIVOLATILE ORGANIC	Acenaphthylene	UG/KG	54	1	2	3.7%	192.056	29.551	96.000	FALSE	FALSE	206.950	96.000
SEMIVOLATILE ORGANIC	Anthracene	UG/KG	54	1	3	5.6%	190.611	31.057	130.000	FALSE	FALSE	209.727	130.000
SEMIVOLATILE ORGANIC	Benzo[a]anthracene	UG/KG	55	0	17	30.9%	185.273	175.357	720.000	FALSE	FALSE	276.034	276.034
SEMIVOLATILE ORGANIC	Benzo[a]pyrene	UG/KG	55	0	18	32.7%	188.364	196.483	940.000	FALSE	FALSE	280.826	280.826
SEMIVOLATILE ORGANIC	Benzo[b]fluoranthene	UG/KG	55	0	17	30.9%	216.855	316.542	2200.000	FALSE	FALSE	287.067	287.067
SEMIVOLATILE ORGANIC	Benzo[ghi]perylene	UG/KG	55	0	14	25.5%	197.964	169.840	710.000	FALSE	FALSE	254.029	254.029
SEMIVOLATILE ORGANIC	Benzo[k]fluoranthene	UG/KG	55	0	14	25.5%	183.573	158.117	530.000	FALSE	FALSE	259.062	259.062
SEMIVOLATILE ORGANIC	Bis(2-Chloroisopropyl)ether	UG/KG	23	0	1	4.3%	200.870	46.968	410.000	FALSE	FALSE	213.496	213.496
SEMIVOLATILE ORGANIC	Bis(2-Ethylhexyl)phthalate	UG/KG	55	0	18	32.7%	276.345	264.694	1300.000	FALSE	FALSE	347.543	347.543
SEMIVOLATILE ORGANIC	Butylbenzylphthalate	UG/KG	54	1	2	3.7%	191.167	33.001	46.000	FALSE	FALSE	209.324	46.000
SEMIVOLATILE ORGANIC	Carbazole	UG/KG	55	0	3	5.5%	213.091	135.238	410.000	FALSE	FALSE	229.562	229.562
SEMIVOLATILE ORGANIC	Chrysene	UG/KG	55	0	27	49.1%	156.409	182.734	670.000	FALSE	TRUE	238.449	238.449
SEMIVOLATILE ORGANIC	Cresols (-o)	UG/KG	54	1	1	1.9%	194.444	18.369	120.000	FALSE	FALSE	199.192	120.000
SEMIVOLATILE ORGANIC	Di-n-butylphthalate	UG/KG	55	0	20	36.4%	216.773	186.387	1200.000	FALSE	FALSE	266.596	266.596
SEMIVOLATILE ORGANIC	Dibenz[a,h]anthracene	UG/KG	55	0	8	14.5%	202.727	144.855	470.000	FALSE	FALSE	242.255	242.255
SEMIVOLATILE ORGANIC	Dibenzofuran	UG/KG	54	1	1	1.9%	193.444	26.467	36.000	FALSE	FALSE	207.136	36.000
SEMIVOLATILE ORGANIC	Fluoranthene	UG/KG	55	0	32	58.2%	160.055	215.284	1000.000	FALSE	TRUE	223.029	223.029
SEMIVOLATILE ORGANIC	Fluorene	UG/KG	54	1	1	1.9%	193.481	26.243	38.000	FALSE	FALSE	206.634	38.000
SEMIVOLATILE ORGANIC	Indeno[1,2,3-cd]pyrene	UG/KG	55	0	11	20.0%	206.400	170.914	790.000	FALSE	FALSE	263.081	263.081
SEMIVOLATILE ORGANIC	N-Nitrosodiphenylamine	UG/KG	54	1	4	7.4%	187.037	39.556	95.000	FALSE	FALSE	209.973	95.000
SEMIVOLATILE ORGANIC	Naphthalene	UG/KG	54	1	3	5.6%	188.000	41.808	37.000	FALSE	FALSE	223.615	37.000
SEMIVOLATILE ORGANIC	Pentachlorophenol	UG/KG	55	0	2	3.6%	524.282	325.004	990.000	FALSE	FALSE	585.292	585.292
SEMIVOLATILE ORGANIC	Phenanthrene	UG/KG	55	0	19	34.5%	172.945	157.847	360.000	FALSE	FALSE	251.632	251.632
SEMIVOLATILE ORGANIC	Pyrene	UG/KG	55	0	31	56.4%	163.773	222.725	1200.000	FALSE	TRUE	217.601	217.601
PESTICIDES/PCB	4,4`-DDD	UG/KG	55	0	4	7.3%	2.546	2.727	15.000	FALSE	FALSE	2.621	2.621
PESTICIDES/PCB	4,4`-DDE	UG/KG	55	0	20	36.4%	7.475	19.553	140.000	FALSE	FALSE	7.053	7.053
PESTICIDES/PCB	4,4`-DDT	UG/KG	55	0	10	18.2%	3.335	3.652	16.000	FALSE	FALSE	3.583	3.583

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Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
PESTICIDES/PCB	Aldrin	UG/KG	55	0	1	1.8%	1.178	1.083	1.900	FALSE	FALSE	1.208	1.208
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	54	1	1	1.9%	1.017	0.077	1.100	TRUE	TRUE	1.035	1.035
PESTICIDES/PCB	Aroclor-1254	UG/KG	55	0	1	1.8%	23.273	21.621	61.000	FALSE	FALSE	23.979	23.979
PESTICIDES/PCB	Aroclor-1260	UG/KG	55	0	3	5.5%	22.818	21.010	28.000	FALSE	FALSE	23.393	23.393
PESTICIDES/PCB	Beta-BHC	UG/KG	55	0	1	1.8%	1.360	2.561	20.000	FALSE	FALSE	1.285	1.285
PESTICIDES/PCB	Delta-BHC	UG/KG	55	0	1	1.8%	1.182	1.088	2.200	FALSE	FALSE	1.215	1.215
PESTICIDES/PCB	Dieldrin	UG/KG	55	0	7	12.7%	5.644	13.443	80.000	FALSE	FALSE	5.101	5.101
PESTICIDES/PCB	Endosulfan I	UG/KG	55	0	5	9.1%	9.047	57.832	430.000	FALSE	FALSE	2.325	2.325
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	55	0	1	1.8%	2.296	2.436	20.000	FALSE	FALSE	2.331	2.331
PESTICIDES/PCB	Endrin	UG/KG	55	0	3	5.5%	2.786	5.546	43.000	FALSE	FALSE	2.615	2.615
PESTICIDES/PCB	Endrin ketone	UG/KG	55	0	2	3.6%	3.280	9.309	71.000	FALSE	FALSE	2.752	2.752
PESTICIDES/PCB	Heptachlorepoxide	UG/KG	54	1	1	1.9%	1.014	0.077	1.100	TRUE	TRUE	1.032	1.032
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	55	0	55	100.0%	0.437	0.727	3.800	FALSE	TRUE	0.537	0.537
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	55	0	4	7.3%	70.882	39.478	330.000	FALSE	FALSE	74.141	74.141
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	55	0	1	1.8%	78.182	112.893	900.000	FALSE	FALSE	76.953	76.953
METALS	Aluminum	MG/KG	55	0	55	100.0%	13215.455	3309.012	19300.000	FALSE	FALSE	14491.312	14491.312
METALS	Antimony	MG/KG	55	0	26	47.3%	6.473	9.550	52.000	FALSE	FALSE	9.516	9.516
METALS	Arsenic	MG/KG	55	0	55	100.0%	5.861	2.024	16.100	FALSE	FALSE	6.243	6.243
METALS	Barium	MG/KG	55	0	40	72.7%	133.800	95.455	524.000	FALSE	TRUE	154.126	154.126
METALS	Beryllium	MG/KG	55	0	55	100.0%	0.579	0.173	0.990	TRUE	FALSE	0.618	0.618
METALS	Cadmium	MG/KG	55	0	42	76.4%	3.262	4.737	25.500	FALSE	TRUE	6.783	6.783
METALS	Calcium	MG/KG	55	0	55	100.0%	41717.455	57950.097	229000.000	FALSE	TRUE	87148.232	87148.232
METALS	Chromium	MG/KG	55	0	55	100.0%	19.963	4.144	27.900	FALSE	FALSE	21.238	21.238
METALS	Cobalt	MG/KG	55	0	55	100.0%	10.155	3.334	21.900	FALSE	TRUE	10.955	10.955
METALS	Copper	MG/KG	55	0	55	100.0%	134.120	184.261	837.000	FALSE	TRUE	179.232	179.232
METALS	Cyanide	MG/KG	52	0	2	3.8%	0.316	0.191	1.500	FALSE	FALSE	0.355	0.355
METALS	Iron	MG/KG	55	0	55	100.0%	23087.818	5560.503	38700.000	FALSE	FALSE	24851.567	24851.567
METALS	Lead	MG/KG	55	0	54	98.2%	760.433	1164.316	6270.000	FALSE	TRUE	2498.470	2498.470
METALS	Magnesium	MG/KG	55	0	55	100.0%	5952.455	3084.811	18100.000	FALSE	TRUE	6614.990	6614.990
METALS	Manganese	MG/KG	55	0	55	100.0%	526.591	199.950	1080.000	TRUE	TRUE	571.731	571.731
METALS	Mercury	MG/KG	55	0	50	90.9%	0.108	0.184	1.000	FALSE	FALSE	0.116	0.116
METALS	Nickel	MG/KG	55	0	55	100.0%	27.825	8.641	50.800	TRUE	TRUE	29.775	29.775
METALS	Potassium	MG/KG	55	0	55	100.0%	1382.618	282.451	1960.000	TRUE	TRUE	1446.383	1446.383
METALS	Selenium	MG/KG	55	0	34	61.8%	0.573	0.493	1.700	TRUE	TRUE	0.684	0.684
METALS	Silver	MG/KG	55	0	16	29.1%	1.191	1.720	9.000	FALSE	TRUE	1.676	1.676
METALS	Sodium	MG/KG	55	0	41	74.5%	94.329	75.921	383.000	FALSE	TRUE	115.953	115.953
METALS	Thallium	MG/KG	55	0	11	20.0%	0.404	0.388	1.500	FALSE	TRUE	0.533	0.533
METALS	Vanadium	MG/KG	55	0	55	100.0%	22.510	5.193	30.700	TRUE	FALSE	23.682	23.682

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
METALS	Zinc	MG/KG	55	0	55	100.0%	253.235	300.841	1475.000	FALSE	TRUE	306.138	306.138
HERBICIDES	MCPA	UG/KG	32	0	4	12.5%	5573.438	7708.583	34000.000	FALSE	FALSE	6261.917	6261.917

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	Acetone	UG/KG	33	1	1	3.0%	6.553	2.577	8.000	FALSE	FALSE	6.976	6.976
VOLATILE ORGANICS	Benzene	UG/KG	34	0	2	5.9%	5.963	1.145	2.000	FALSE	FALSE	6.578	2.000
VOLATILE ORGANICS	Toluene	UG/KG	34	0	3	8.8%	6.066	1.100	8.000	FALSE	FALSE	6.591	6.591
SEMIVOLATILE ORGANIC	2,4-Dinitrotoluene	UG/KG	34	0	3	8.8%	248.412	202.253	880.000	FALSE	FALSE	278.937	278.937
SEMIVOLATILE ORGANIC	2,6-Dinitrotoluene	UG/KG	33	1	0	0.0%	196.212	14.845	0.000	TRUE	TRUE	200.587	0.000
SEMIVOLATILE ORGANIC	2-Methylnaphthalene	UG/KG	33	1	2	6.1%	190.545	34.248	130.000	FALSE	FALSE	218.793	130.000
SEMIVOLATILE ORGANIC	3,3`-Dichlorobenzidine	UG/KG	34	0	1	2.9%	230.294	167.232	410.000	FALSE	FALSE	247.172	247.172
SEMIVOLATILE ORGANIC	3-Nitroaniline	UG/KG	34	0	1	2.9%	556.985	399.030	990.000	FALSE	FALSE	597.864	597.864
SEMIVOLATILE ORGANIC	4-Nitroaniline	UG/KG	34	0	1	2.9%	556.985	399.030	990.000	FALSE	FALSE	597.864	597.864
SEMIVOLATILE ORGANIC	Acenaphthene	UG/KG	33	1	2	6.1%	186.697	44.007	33.000	FALSE	FALSE	236.221	33.000
SEMIVOLATILE ORGANIC	Acenaphthylene	UG/KG	33	1	2	6.1%	189.727	35.601	96.000	FALSE	FALSE	214.874	96.000
SEMIVOLATILE ORGANIC	Anthracene	UG/KG	33	1	2	6.1%	193.030	23.316	130.000	FALSE	FALSE	201.727	130.000
SEMIVOLATILE ORGANIC	Benzo[a]anthracene	UG/KG	34	0	10	29.4%	211.853	210.778	720.000	FALSE	FALSE	343.755	343.755
SEMIVOLATILE ORGANIC	Benzo[a]pyrene	UG/KG	34	0	12	35.3%	213.471	240.759	940.000	FALSE	FALSE	380.185	380.185
SEMIVOLATILE ORGANIC	Benzo[b]fluoranthene	UG/KG	34	0	10	29.4%	261.618	393.512	2200.000	FALSE	FALSE	372.032	372.032
SEMIVOLATILE ORGANIC	Benzo[ghi]perylene	UG/KG	34	0	8	23.5%	226.824	204.920	710.000	FALSE	FALSE	306.396	306.396
SEMIVOLATILE ORGANIC	Benzo[k]fluoranthene	UG/KG	34	0	8	23.5%	204.676	189.464	530.000	FALSE	FALSE	294.589	294.589
SEMIVOLATILE ORGANIC	Bis(2-Chloroisopropyl)ether	UG/KG	17	0	1	5.9%	203.235	54.571	410.000	FALSE	FALSE	221.331	221.331
SEMIVOLATILE ORGANIC	Bis(2-Ethylhexyl)phthalate	UG/KG	34	0	9	26.5%	261.353	259.112	1300.000	FALSE	FALSE	327.750	327.750
SEMIVOLATILE ORGANIC	Butylbenzylphthalate	UG/KG	33	1	1	3.0%	192.303	29.928	46.000	FALSE	FALSE	211.222	46.000
SEMIVOLATILE ORGANIC	Carbazole	UG/KG	34	0	3	8.8%	223.824	171.632	410.000	FALSE	FALSE	255.751	255.751
SEMIVOLATILE ORGANIC	Chrysene	UG/KG	34	0	18	52.9%	173.235	223.256	670.000	FALSE	FALSE	324.585	324.585
SEMIVOLATILE ORGANIC	Cresols (-o)	UG/KG	33	1	1	3.0%	193.636	19.814	120.000	FALSE	FALSE	200.523	120.000
SEMIVOLATILE ORGANIC	Di-n-butylphthalate	UG/KG	34	0	9	26.5%	238.529	215.671	1200.000	FALSE	FALSE	294.284	294.284
SEMIVOLATILE ORGANIC	Dibenz[a,h]anthracene	UG/KG	34	0	5	14.7%	220.324	178.157	470.000	FALSE	FALSE	284.260	284.260
SEMIVOLATILE ORGANIC	Dibenzofuran	UG/KG	33	1	1	3.0%	192.000	31.466	36.000	FALSE	FALSE	215.124	36.000
SEMIVOLATILE ORGANIC	Fluoranthene	UG/KG	34	0	19	55.9%	192.912	263.225	1000.000	FALSE	FALSE	325.407	325.407
SEMIVOLATILE ORGANIC	Fluorene	UG/KG	33	1	1	3.0%	192.061	31.157	38.000	FALSE	FALSE	214.211	38.000
SEMIVOLATILE ORGANIC	Indeno[1,2,3-cd]pyrene	UG/KG	34	0	8	23.5%	226.676	211.650	790.000	FALSE	FALSE	328.688	328.688
SEMIVOLATILE ORGANIC	N-Nitrosodiphenylamine	UG/KG	33	1	2	6.1%	190.061	34.083	95.000	FALSE	FALSE	210.480	95.000
SEMIVOLATILE ORGANIC	Naphthalene	UG/KG	33	1	3	9.1%	183.091	51.639	37.000	FALSE	FALSE	246.019	37.000
SEMIVOLATILE ORGANIC	Pentachlorophenol	UG/KG	34	0	2	5.9%	544.721	408.400	990.000	FALSE	FALSE	659.896	659.896
SEMIVOLATILE ORGANIC	Phenanthrene	UG/KG	34	0	10	29.4%	197.647	187.380	360.000	FALSE	FALSE	318.510	318.510
SEMIVOLATILE ORGANIC	Pyrene	UG/KG	34	0	19	55.9%	194.412	273.925	1200.000	FALSE	FALSE	301.259	301.259
PESTICIDES/PCB	4,4`-DDD	UG/KG	34	0	2	5.9%	2.810	3.427	15.000	FALSE	FALSE	3.005	3.005
PESTICIDES/PCB	4,4`-DDE	UG/KG	34	0	7	20.6%	7.407	24.205	140.000	FALSE	FALSE	5.784	5.784
PESTICIDES/PCB	4,4`-DDT	UG/KG	34	0	3	8.8%	3.132	3.474	13.000	FALSE	FALSE	3.494	3.494
PESTICIDES/PCB	Aldrin	UG/KG	34	0	1	2.9%	1.286	1.373	1.900	FALSE	FALSE	1.359	1.359

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	33	1	1	3.0%	1.027	0.076	1.100	FALSE	FALSE	1.060	1.060
PESTICIDES/PCB	Aroclor-1260	UG/KG	34	0	2	5.9%	24.544	26.661	28.000	FALSE	FALSE	25.831	25.831
PESTICIDES/PCB	Beta-BHC	UG/KG	34	0	1	2.9%	1.580	3.256	20.000	FALSE	FALSE	1.512	1.512
PESTICIDES/PCB	Delta-BHC	UG/KG	34	0	1	2.9%	1.293	1.379	2.200	FALSE	FALSE	1.371	1.371
PESTICIDES/PCB	Dieldrin	UG/KG	34	0	3	8.8%	4.416	10.424	62.000	FALSE	FALSE	4.284	4.284
PESTICIDES/PCB	Endosulfan I	UG/KG	34	0	3	8.8%	13.985	73.532	430.000	FALSE	FALSE	4.022	4.022
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	34	0	1	2.9%	2.509	3.094	20.000	FALSE	FALSE	2.611	2.611
PESTICIDES/PCB	Endrin	UG/KG	34	0	2	5.9%	3.300	7.043	43.000	FALSE	FALSE	3.159	3.159
PESTICIDES/PCB	Endrin ketone	UG/KG	34	0	2	5.9%	4.100	11.832	71.000	FALSE	FALSE	3.449	3.449
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	34	0	34	100.0%	0.335	0.415	2.400	FALSE	TRUE	0.478	0.478
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	34	0	1	2.9%	70.294	45.957	330.000	FALSE	FALSE	74.685	74.685
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	34	0	1	2.9%	87.206	143.639	900.000	FALSE	FALSE	87.405	87.405
METALS	Aluminum	MG/KG	34	0	34	100.0%	13438.235	2922.173	19300.000	FALSE	FALSE	14793.610	14793.610
METALS	Antimony	MG/KG	34	0	17	50.0%	4.735	8.647	52.000	FALSE	TRUE	7.818	7.818
METALS	Arsenic	MG/KG	34	0	34	100.0%	5.229	1.068	8.900	FALSE	TRUE	5.540	5.540
METALS	Barium	MG/KG	34	0	28	82.4%	106.394	59.652	357.000	FALSE	TRUE	125.247	125.247
METALS	Beryllium	MG/KG	34	0	34	100.0%	0.580	0.171	0.990	TRUE	FALSE	0.629	0.629
METALS	Cadmium	MG/KG	34	0	24	70.6%	1.244	1.956	3.500	FALSE	TRUE	2.060	2.060
METALS	Calcium	MG/KG	34	0	34	100.0%	28600.588	52136.981	229000.000	FALSE	FALSE	50697.394	50697.394
METALS	Chromium	MG/KG	34	0	34	100.0%	19.894	3.933	27.900	TRUE	FALSE	21.035	21.035
METALS	Cobalt	MG/KG	34	0	34	100.0%	10.265	3.719	21.900	FALSE	TRUE	11.360	11.360
METALS	Copper	MG/KG	34	0	34	100.0%	55.347	89.252	546.000	FALSE	FALSE	62.403	62.403
METALS	Cyanide	MG/KG	34	0	1	2.9%	0.315	0.220	1.500	FALSE	FALSE	0.377	0.377
METALS	Iron	MG/KG	34	0	34	100.0%	23757.647	5597.783	38700.000	TRUE	FALSE	25381.795	25381.795
METALS	Lead	MG/KG	34	0	33	97.1%	279.938	542.982	686.000	FALSE	TRUE	619.014	619.014
METALS	Magnesium	MG/KG	34	0	34	100.0%	5178.088	2028.900	9830.000	FALSE	TRUE	5854.933	5854.933
METALS	Manganese	MG/KG	34	0	34	100.0%	539.426	220.701	1080.000	TRUE	TRUE	603.461	603.461
METALS	Mercury	MG/KG	34	0	30	88.2%	0.099	0.182	1.000	FALSE	FALSE	0.111	0.111
METALS	Nickel	MG/KG	34	0	34	100.0%	27.003	9.145	50.800	FALSE	TRUE	29.987	29.987
METALS	Potassium	MG/KG	34	0	34	100.0%	1351.500	287.221	1960.000	TRUE	TRUE	1434.835	1434.835
METALS	Selenium	MG/KG	34	0	20	58.8%	0.638	0.521	1.600	FALSE	FALSE	1.158	1.158
METALS	Silver	MG/KG	34	0	4	11.8%	0.546	0.765	4.600	FALSE	FALSE	0.750	0.750
METALS	Sodium	MG/KG	34	0	23	67.6%	75.865	72.860	383.000	FALSE	FALSE	93.909	93.909
METALS	Thallium	MG/KG	34	0	7	20.6%	0.417	0.385	1.500	FALSE	FALSE	0.610	0.610
METALS	Vanadium	MG/KG	34	0	34	100.0%	23.104	4.422	30.700	TRUE	TRUE	24.387	24.387
METALS	Zinc	MG/KG	34	0	34	100.0%	132.596	107.961	620.000	FALSE	FALSE	153.822	153.822
HERBICIDES	MCPA	UG/KG	17	0	1	5.9%	4773.529	7020.486	32000.000	FALSE	FALSE	5626.631	5626.631

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VOLATILE ORGANICS	Acetone	UG/KG	31	1	1	3.2%	6.581	2.659	8.000	FALSE	FALSE	7.038	7.038
VOLATILE ORGANICS	Benzene	UG/KG	32	0	2	6.3%	5.953	1.180	2.000	FALSE	FALSE	6.610	2.000
VOLATILE ORGANICS	Toluene	UG/KG	32	0	3	9.4%	6.063	1.134	8.000	FALSE	FALSE	6.624	6.624
SEMIVOLATILE ORGANIC	2,4-Dinitrotoluene	UG/KG	32	0	3	9.4%	251.906	208.161	880.000	FALSE	FALSE	285.788	285.788
SEMIVOLATILE ORGANIC	2,6-Dinitrotoluene	UG/KG	31	1	0	0.0%	196.452	15.286	0.000	TRUE	TRUE	201.107	0.000
SEMIVOLATILE ORGANIC	2-Methylnaphthalene	UG/KG	31	1	2	6.5%	190.419	35.362	130.000	FALSE	FALSE	220.816	130.000
SEMIVOLATILE ORGANIC	3,3`-Dichlorobenzidine	UG/KG	32	0	1	3.1%	232.656	172.257	410.000	FALSE	FALSE	251.163	251.163
SEMIVOLATILE ORGANIC	3-Nitroaniline	UG/KG	32	0	1	3.1%	562.500	411.049	990.000	FALSE	FALSE	607.294	607.294
SEMIVOLATILE ORGANIC	4-Nitroaniline	UG/KG	32	0	1	3.1%	562.500	411.049	990.000	FALSE	FALSE	607.294	607.294
SEMIVOLATILE ORGANIC	Acenaphthene	UG/KG	31	1	2	6.5%	186.323	45.420	33.000	FALSE	FALSE	239.797	33.000
SEMIVOLATILE ORGANIC	Acenaphthylene	UG/KG	31	1	2	6.5%	189.548	36.756	96.000	FALSE	FALSE	216.576	96.000
SEMIVOLATILE ORGANIC	Anthracene	UG/KG	31	1	2	6.5%	193.065	24.072	130.000	FALSE	FALSE	202.377	130.000
SEMIVOLATILE ORGANIC	Benzo[a]anthracene	UG/KG	32	0	10	31.3%	213.063	217.411	720.000	FALSE	FALSE	358.367	358.367
SEMIVOLATILE ORGANIC	Benzo[a]pyrene	UG/KG	32	0	12	37.5%	214.781	248.342	940.000	FALSE	FALSE	398.693	398.693
SEMIVOLATILE ORGANIC	Benzo[b]fluoranthene	UG/KG	32	0	10	31.3%	265.938	405.604	2200.000	FALSE	FALSE	390.703	390.703
SEMIVOLATILE ORGANIC	Benzo[ghi]perylene	UG/KG	32	0	8	25.0%	228.969	211.235	710.000	FALSE	FALSE	317.024	317.024
SEMIVOLATILE ORGANIC	Benzo[k]fluoranthene	UG/KG	32	0	8	25.0%	205.438	195.453	530.000	FALSE	FALSE	303.775	303.775
SEMIVOLATILE ORGANIC	Bis(2-Chloroisopropyl)ether	UG/KG	17	0	1	5.9%	203.235	54.571	410.000	FALSE	FALSE	221.331	221.331
SEMIVOLATILE ORGANIC	Bis(2-Ethylhexyl)phthalate	UG/KG	32	0	8	25.0%	256.438	263.989	1300.000	FALSE	FALSE	323.444	323.444
SEMIVOLATILE ORGANIC	Butylbenzylphthalate	UG/KG	31	1	1	3.2%	192.290	30.902	46.000	FALSE	FALSE	212.610	46.000
SEMIVOLATILE ORGANIC	Carbazole	UG/KG	32	0	3	9.4%	225.781	176.891	410.000	FALSE	FALSE	260.800	260.800
SEMIVOLATILE ORGANIC	Chrysene	UG/KG	32	0	18	56.3%	172.031	230.290	670.000	FALSE	FALSE	330.564	330.564
SEMIVOLATILE ORGANIC	Cresols (-o)	UG/KG	31	1	1	3.2%	193.710	20.452	120.000	FALSE	FALSE	201.080	120.000
SEMIVOLATILE ORGANIC	Di-n-butylphthalate	UG/KG	32	0	9	28.1%	241.406	222.192	1200.000	FALSE	FALSE	303.389	303.389
SEMIVOLATILE ORGANIC	Dibenz[a,h]anthracene	UG/KG	32	0	5	15.6%	222.063	183.669	470.000	FALSE	FALSE	292.389	292.389
SEMIVOLATILE ORGANIC	Dibenzofuran	UG/KG	31	1	1	3.2%	191.968	32.492	36.000	FALSE	FALSE	216.839	36.000
SEMIVOLATILE ORGANIC	Fluoranthene	UG/KG	32	0	19	59.4%	192.938	271.582	1000.000	FALSE	FALSE	333.775	333.775
SEMIVOLATILE ORGANIC	Fluorene	UG/KG	31	1	1	3.2%	192.032	32.172	38.000	FALSE	FALSE	215.844	38.000
SEMIVOLATILE ORGANIC	Indeno[1,2,3-cd]pyrene	UG/KG	32	0	8	25.0%	228.813	218.186	790.000	FALSE	FALSE	341.962	341.962
SEMIVOLATILE ORGANIC	N-Nitrosodiphenylamine	UG/KG	31	1	2	6.5%	189.903	35.189	95.000	FALSE	FALSE	211.815	95.000
SEMIVOLATILE ORGANIC	Naphthalene	UG/KG	31	1	3	9.7%	182.484	53.270	37.000	FALSE	FALSE	250.492	37.000
SEMIVOLATILE ORGANIC	Pentachlorophenol	UG/KG	32	0	2	6.3%	549.469	420.895	990.000	FALSE	FALSE	675.909	675.909
SEMIVOLATILE ORGANIC	Phenanthrene	UG/KG	32	0	10	31.3%	197.969	193.325	360.000	FALSE	FALSE	329.947	329.947
SEMIVOLATILE ORGANIC	Pyrene	UG/KG	32	0	19	59.4%	194.531	282.622	1200.000	FALSE	FALSE	307.838	307.838
PESTICIDES/PCB	4,4`-DDD	UG/KG	32	0	2	6.3%	2.866	3.528	15.000	FALSE	FALSE	3.093	3.093
PESTICIDES/PCB	4,4`-DDE	UG/KG	32	0	7	21.9%	7.750	24.932	140.000	FALSE	FALSE	6.212	6.212
PESTICIDES/PCB	4,4`-DDT	UG/KG	32	0	3	9.4%	3.208	3.570	13.000	FALSE	FALSE	3.626	3.626
PESTICIDES/PCB	Aldrin	UG/KG	32	0	1	3.1%	1.305	1.415	1.900	FALSE	FALSE	1.387	1.387

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PESTICIDES/PCB	Alpha-Chlordane	UG/KG	31	1	1	3.2%	1.029	0.077	1.100	FALSE	FALSE	1.064	1.064
PESTICIDES/PCB	Aroclor-1260	UG/KG	32	0	2	6.3%	24.875	27.473	28.000	FALSE	FALSE	26.326	26.326
PESTICIDES/PCB	Beta-BHC	UG/KG	32	0	1	3.1%	1.617	3.355	20.000	FALSE	FALSE	1.555	1.555
PESTICIDES/PCB	Delta-BHC	UG/KG	32	0	1	3.1%	1.313	1.420	2.200	FALSE	FALSE	1.400	1.400
PESTICIDES/PCB	Dieldrin	UG/KG	32	0	3	9.4%	4.572	10.735	62.000	FALSE	FALSE	4.509	4.509
PESTICIDES/PCB	Endosulfan I	UG/KG	32	0	3	9.4%	14.797	75.791	430.000	FALSE	FALSE	4.431	4.431
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	32	0	1	3.1%	2.545	3.189	20.000	FALSE	FALSE	2.664	2.664
PESTICIDES/PCB	Endrin	UG/KG	32	0	2	6.3%	3.386	7.258	43.000	FALSE	FALSE	3.263	3.263
PESTICIDES/PCB	Endrin ketone	UG/KG	32	0	2	6.3%	4.236	12.194	71.000	FALSE	FALSE	3.585	3.585
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	32	0	32	100.0%	0.339	0.423	2.400	FALSE	TRUE	0.460	0.460
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	32	0	1	3.1%	70.625	47.396	330.000	FALSE	FALSE	75.387	75.387
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	32	0	1	3.1%	88.594	148.086	900.000	FALSE	FALSE	89.191	89.191
METALS	Aluminum	MG/KG	32	0	32	100.0%	13317.188	2969.022	19300.000	FALSE	FALSE	14736.484	14736.484
METALS	Antimony	MG/KG	32	0	17	53.1%	4.675	8.917	52.000	FALSE	TRUE	7.790	7.790
METALS	Arsenic	MG/KG	32	0	32	100.0%	5.188	1.074	8.900	FALSE	TRUE	5.507	5.507
METALS	Barium	MG/KG	32	0	26	81.3%	105.920	60.489	357.000	FALSE	TRUE	125.562	125.562
METALS	Beryllium	MG/KG	32	0	32	100.0%	0.579	0.176	0.990	TRUE	FALSE	0.631	0.631
METALS	Cadmium	MG/KG	32	0	23	71.9%	1.224	1.992	3.500	FALSE	TRUE	2.043	2.043
METALS	Calcium	MG/KG	32	0	32	100.0%	26394.375	52842.403	229000.000	FALSE	FALSE	41678.432	41678.432
METALS	Chromium	MG/KG	32	0	32	100.0%	19.609	3.820	27.900	TRUE	FALSE	20.754	20.754
METALS	Cobalt	MG/KG	32	0	32	100.0%	10.272	3.834	21.900	FALSE	TRUE	11.448	11.448
METALS	Copper	MG/KG	32	0	32	100.0%	55.522	91.711	546.000	FALSE	FALSE	62.476	62.476
METALS	Cyanide	MG/KG	32	0	1	3.1%	0.313	0.227	1.500	FALSE	FALSE	0.379	0.379
METALS	Iron	MG/KG	32	0	32	100.0%	23226.875	5072.381	36100.000	TRUE	FALSE	24746.207	24746.207
METALS	Lead	MG/KG	32	0	31	96.9%	275.619	553.353	496.000	FALSE	TRUE	576.842	496.000
METALS	Magnesium	MG/KG	32	0	32	100.0%	5032.813	1990.612	9830.000	FALSE	TRUE	5695.790	5695.790
METALS	Manganese	MG/KG	32	0	32	100.0%	527.594	221.797	1080.000	TRUE	TRUE	594.029	594.029
METALS	Mercury	MG/KG	32	0	29	90.6%	0.103	0.187	1.000	FALSE	FALSE	0.117	0.117
METALS	Nickel	MG/KG	32	0	32	100.0%	26.697	9.321	50.800	FALSE	TRUE	29.792	29.792
METALS	Potassium	MG/KG	32	0	32	100.0%	1330.813	283.073	1960.000	TRUE	TRUE	1415.601	1415.601
METALS	Selenium	MG/KG	32	0	20	62.5%	0.670	0.520	1.600	FALSE	FALSE	1.250	1.250
METALS	Silver	MG/KG	32	0	4	12.5%	0.536	0.788	4.600	FALSE	FALSE	0.738	0.738
METALS	Sodium	MG/KG	32	0	21	65.6%	69.575	69.949	383.000	FALSE	FALSE	84.336	84.336
METALS	Thallium	MG/KG	32	0	7	21.9%	0.435	0.390	1.500	FALSE	FALSE	0.656	0.656
METALS	Vanadium	MG/KG	32	0	32	100.0%	22.981	4.497	30.700	TRUE	TRUE	24.328	24.328
METALS	Zinc	MG/KG	32	0	32	100.0%	133.325	110.589	620.000	FALSE	FALSE	155.685	155.685
HERBICIDES	MCPA	UG/KG	15	0	1	6.7%	5016.667	7469.239	32000.000	FALSE	FALSE	6203.085	6203.085

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VOLATILE ORGANICS	Acetone	UG/KG	10	0	3	30.0%	10.550	6.025	26.000	FALSE	FALSE	14.388	14.388
VOLATILE ORGANICS	Toluene	UG/KG	10	0	1	10.0%	7.600	1.329	8.000	FALSE	FALSE	8.401	8.000
SEMIVOLATILE ORGANIC	2,4-Dimethylphenol	UG/KG	10	0	1	10.0%	235.200	76.328	32.000	FALSE	FALSE	450.613	32.000
SEMIVOLATILE ORGANIC	2,4-Dinitrotoluene	UG/KG	10	0	1	10.0%	275.000	67.700	450.000	FALSE	TRUE	314.342	314.342
SEMIVOLATILE ORGANIC	Benzo[a]anthracene	UG/KG	10	0	1	10.0%	232.500	78.218	25.000	FALSE	FALSE	504.850	25.000
SEMIVOLATILE ORGANIC	Benzo[a]pyrene	UG/KG	10	0	1	10.0%	233.000	76.746	30.000	FALSE	FALSE	459.333	30.000
SEMIVOLATILE ORGANIC	Benzo[b]fluoranthene	UG/KG	10	0	1	10.0%	234.300	72.941	43.000	FALSE	FALSE	390.528	43.000
SEMIVOLATILE ORGANIC	Benzo[ghi]perylene	UG/KG	10	0	1	10.0%	233.100	76.453	31.000	FALSE	FALSE	452.046	31.000
SEMIVOLATILE ORGANIC	Benzo[k]fluoranthene	UG/KG	10	0	1	10.0%	233.300	75.865	33.000	FALSE	FALSE	438.746	33.000
SEMIVOLATILE ORGANIC	Bis(2-Ethylhexyl)phthalate	UG/KG	10	0	3	30.0%	193.200	97.726	77.000	FALSE	FALSE	424.382	77.000
SEMIVOLATILE ORGANIC	Chrysene	UG/KG	10	0	1	10.0%	234.800	71.487	48.000	FALSE	FALSE	373.930	48.000
SEMIVOLATILE ORGANIC	Fluoranthene	UG/KG	10	0	2	20.0%	219.100	91.240	70.000	FALSE	FALSE	444.591	70.000
SEMIVOLATILE ORGANIC	Indeno[1,2,3-cd]pyrene	UG/KG	10	0	1	10.0%	232.400	78.513	24.000	FALSE	FALSE	516.219	24.000
SEMIVOLATILE ORGANIC	Phenanthrene	UG/KG	10	0	1	10.0%	233.500	75.279	35.000	FALSE	FALSE	426.909	35.000
SEMIVOLATILE ORGANIC	Pyrene	UG/KG	10	0	2	20.0%	215.800	97.732	47.000	FALSE	FALSE	567.092	47.000
PESTICIDES/PCB	4,4`-DDD	UG/KG	10	0	3	30.0%	4.080	3.562	13.000	FALSE	FALSE	6.461	6.461
PESTICIDES/PCB	4,4`-DDE	UG/KG	10	0	6	60.0%	12.475	19.212	62.000	FALSE	FALSE	48.172	48.172
PESTICIDES/PCB	4,4`-DDT	UG/KG	10	0	2	20.0%	3.490	3.007	12.000	FALSE	FALSE	4.897	4.897
PESTICIDES/PCB	Dieldrin	UG/KG	10	0	1	10.0%	2.805	0.814	5.000	FALSE	FALSE	3.255	3.255
PESTICIDES/PCB	Endosulfan I	UG/KG	10	0	1	10.0%	1.330	0.170	1.600	TRUE	TRUE	1.428	1.428
PESTICIDES/PCB	Endosulfan II	UG/KG	10	0	2	20.0%	2.685	0.592	3.800	FALSE	FALSE	3.048	3.048
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	10	0	10	100.0%	0.077	0.062	0.240	FALSE	TRUE	0.133	0.133
OTHER ANALYSES	Total Organic Carbon	MG/KG	10	0	9	90.0%	11102.050	10065.444	36100.000	FALSE	FALSE	339623.717	36100.000
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	10	0	0	0.0%	60.000	0.000	0.000	FALSE	FALSE	64.034	0.000
METALS	Aluminum	MG/KG	10	0	10	100.0%	16370.000	3287.028	22100.000	TRUE	TRUE	18253.483	18253.483
METALS	Antimony	MG/KG	10	0	4	40.0%	1.636	1.923	5.500	FALSE	FALSE	5.590	5.500
METALS	Arsenic	MG/KG	10	0	10	100.0%	5.290	1.405	7.500	TRUE	TRUE	6.095	6.095
METALS	Barium	MG/KG	10	0	10	100.0%	111.770	34.514	162.000	TRUE	TRUE	131.547	131.547
METALS	Beryllium	MG/KG	10	0	10	100.0%	0.642	0.213	0.990	TRUE	TRUE	0.764	0.764
METALS	Cadmium	MG/KG	10	0	10	100.0%	1.573	1.448	4.800	TRUE	TRUE	2.403	2.403
METALS	Calcium	MG/KG	10	0	10	100.0%	6031.000	6852.533	25000.000	FALSE	TRUE	10822.064	10822.064
METALS	Chromium	MG/KG	10	0	10	100.0%	22.160	4.368	27.700	TRUE	TRUE	24.663	24.663
METALS	Cobalt	MG/KG	10	0	10	100.0%	10.810	3.041	17.800	TRUE	TRUE	12.553	12.553
METALS	Copper	MG/KG	10	0	10	100.0%	73.320	85.855	309.000	FALSE	FALSE	133.422	133.422
METALS	Iron	MG/KG	10	0	10	100.0%	26540.000	5054.635	35000.000	TRUE	TRUE	29436.330	29436.330
METALS	Lead	MG/KG	10	0	10	100.0%	270.320	329.896	1050.000	FALSE	TRUE	683.420	683.420
METALS	Magnesium	MG/KG	10	0	10	100.0%	4890.000	1127.987	6490.000	TRUE	FALSE	5536.342	5536.342
METALS	Manganese	MG/KG	10	0	10	100.0%	445.100	151.769	768.000	TRUE	TRUE	532.064	532.064

17_sed.xls

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
METALS	Mercury	MG/KG	10	0	4	40.0%	0.043	0.044	0.160	FALSE	TRUE	0.081	0.081
METALS	Nickel	MG/KG	10	0	10	100.0%	27.200	6.366	31.600	FALSE	FALSE	34.349	31.600
METALS	Potassium	MG/KG	10	0	10	100.0%	1899.000	499.098	2630.000	TRUE	TRUE	2184.986	2184.986
METALS	Selenium	MG/KG	10	0	3	30.0%	0.853	0.507	1.900	FALSE	TRUE	1.266	1.266
METALS	Sodium	MG/KG	10	0	8	80.0%	180.615	160.693	452.000	FALSE	TRUE	427.232	427.232
METALS	Thallium	MG/KG	10	0	2	20.0%	0.659	0.288	1.300	TRUE	TRUE	0.824	0.824
METALS	Vanadium	MG/KG	10	0	10	100.0%	26.770	5.196	33.800	TRUE	TRUE	29.747	29.747
METALS	Zinc	MG/KG	10	0	10	100.0%	130.030	73.599	278.000	FALSE	TRUE	188.428	188.428

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
SEMIVOLATILE ORGANIC	Benzo[a]pyrene	UG/L	11	0	1	9.1%	4.745	1.361	0.700	FALSE	FALSE	8.018	0.700
SEMIVOLATILE ORGANIC	Benzo[ghi]perylene	UG/L	11	0	1	9.1%	4.818	1.124	1.500	FALSE	FALSE	6.273	1.500
SEMIVOLATILE ORGANIC	Dibenz[a,h]anthracene	UG/L	11	0	1	9.1%	4.768	1.287	0.950	FALSE	FALSE	7.172	0.950
SEMIVOLATILE ORGANIC	Indeno[1,2,3-cd]pyrene	UG/L	11	0	1	9.1%	4.818	1.124	1.500	FALSE	FALSE	6.273	1.500
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/L	11	0	11	100.0%	0.103	0.089	0.260	FALSE	TRUE	0.257	0.257
NITROAROMATICS	Tetryl	UG/L	6	0	1	16.7%	0.089	0.032	0.080	FALSE	FALSE	0.128	0.080
METALS	Aluminum	UG/L	10	1	7	70.0%	2043.090	3784.878	10800.000	FALSE	TRUE	692383.106	10800.000
METALS	Arsenic	UG/L	11	0	3	27.3%	2.206	1.394	5.800	FALSE	TRUE	3.440	3.440
METALS	Barium	UG/L	11	0	6	54.5%	54.377	41.600	147.000	TRUE	TRUE	76.904	76.904
METALS	Beryllium	UG/L	11	0	4	36.4%	0.208	0.139	0.520	FALSE	FALSE	0.325	0.325
METALS	Cadmium	UG/L	7	4	1	14.3%	0.269	0.058	0.230	FALSE	FALSE	0.339	0.230
METALS	Calcium	UG/L	11	0	11	100.0%	114736.364	24802.108	170000.000	TRUE	TRUE	128167.061	128167.061
METALS	Chromium	UG/L	11	0	3	27.3%	3.345	5.903	17.300	FALSE	FALSE	12.924	12.924
METALS	Cobalt	UG/L	11	0	3	27.3%	2.545	3.484	11.400	FALSE	FALSE	6.553	6.553
METALS	Copper	UG/L	11	0	4	36.4%	3.945	5.675	18.000	FALSE	TRUE	15.145	15.145
METALS	Iron	UG/L	11	0	9	81.8%	3147.850	6163.169	18300.000	FALSE	TRUE	248669.470	18300.000
METALS	Lead	UG/L	11	0	4	36.4%	4.529	9.505	32.300	FALSE	FALSE	14.168	14.168
METALS	Magnesium	UG/L	11	0	11	100.0%	20109.091	7650.419	40200.000	FALSE	TRUE	24529.529	24529.529
METALS	Manganese	UG/L	10	1	9	90.0%	189.850	215.756	550.000	FALSE	TRUE	48711.666	550.000
METALS	Mercury	UG/L	11	0	2	18.2%	0.048	0.012	0.070	FALSE	FALSE	0.059	0.059
METALS	Nickel	UG/L	11	0	4	36.4%	4.950	7.672	24.400	FALSE	FALSE	12.134	12.134
METALS	Potassium	UG/L	11	0	7	63.6%	2466.682	2257.774	5820.000	FALSE	FALSE	9340.819	5820.000
METALS	Selenium	UG/L	8	3	1	12.5%	1.274	0.874	2.000	TRUE	TRUE	1.848	1.848
METALS	Silver	UG/L	8	3	1	12.5%	0.997	0.517	1.475	FALSE	FALSE	1.423	1.423
METALS	Sodium	UG/L	11	0	11	100.0%	20480.455	14017.160	46100.000	FALSE	TRUE	34092.579	34092.579
METALS	Thallium	UG/L	11	0	2	18.2%	2.468	1.808	5.750	TRUE	TRUE	3.447	3.447
METALS	Vanadium	UG/L	11	0	3	27.3%	3.818	6.410	19.900	FALSE	FALSE	11.832	11.832
METALS	Zinc	UG/L	10	1	5	50.0%	24.103	33.081	100.000	FALSE	TRUE	221.372	100.000

17_gw.xls

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
SEMIVOLATILE ORGANIC	Bis(2-Ethylhexyl)phthalate	UG/L	10	0	2	20.0%	4.300	1.494	2.000	FALSE	FALSE	6.957	2.000
OTHER ANALYSES	Total Organic Carbon	MG/L	10	0	10	100.0%	7.500	2.770	11.600	TRUE	TRUE	9.087	9.087
OTHER ANALYSES	pH	MG/L	10	0	10	100.0%	7.646	0.181	7.890	TRUE	TRUE	7.750	7.750
METALS	Antimony	UG/L	10	0	4	40.0%	5.170	7.457	23.600	FALSE	FALSE	22.095	22.095
METALS	Arsenic	UG/L	10	0	6	60.0%	2.780	1.311	4.600	FALSE	FALSE	4.264	4.264
METALS	Barium	UG/L	10	0	10	100.0%	47.010	27.322	100.000	FALSE	TRUE	72.197	72.197
METALS	Cadmium	UG/L	10	0	5	50.0%	0.391	0.363	1.300	FALSE	FALSE	0.782	0.782
METALS	Calcium	UG/L	10	0	10	100.0%	53640.000	16622.755	73500.000	TRUE	TRUE	63164.917	63164.917
METALS	Chromium	UG/L	10	0	1	10.0%	0.550	0.158	1.000	FALSE	FALSE	0.631	0.631
METALS	Copper	UG/L	10	0	10	100.0%	13.040	8.079	32.700	FALSE	TRUE	19.253	19.253
METALS	Iron	UG/L	10	0	10	100.0%	146.300	82.062	322.000	TRUE	TRUE	193.322	193.322
METALS	Lead	UG/L	10	0	6	60.0%	7.210	11.515	37.100	FALSE	TRUE	44.167	37.100
METALS	Magnesium	UG/L	10	0	10	100.0%	5904.000	2882.727	9280.000	FALSE	FALSE	8904.835	8904.835
METALS	Manganese	UG/L	10	0	10	100.0%	8.430	6.200	19.600	TRUE	TRUE	11.983	11.983
METALS	Nickel	UG/L	10	0	1	10.0%	0.890	0.285	1.700	FALSE	FALSE	1.034	1.034
METALS	Potassium	UG/L	10	0	10	100.0%	3007.000	896.562	4380.000	TRUE	TRUE	3520.734	3520.734
METALS	Selenium	UG/L	10	0	5	50.0%	2.170	1.061	3.500	FALSE	FALSE	3.228	3.228
METALS	Sodium	UG/L	10	0	10	100.0%	5209.000	3180.651	9460.000	TRUE	TRUE	7031.528	7031.528
METALS	Vanadium	UG/L	10	0	1	10.0%	0.720	0.379	1.800	FALSE	FALSE	0.900	0.900
METALS	Zinc	UG/L	10	0	10	100.0%	24.130	21.177	61.700	TRUE	TRUE	36.264	36.264

17_sw.xls

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	Acetone	UG/KG	55	0	3	5.5%	6.945	4.515	10.750	FALSE	FALSE	7.278	7.278
VOLATILE ORGANICS	Benzene	UG/KG	55	0	2	3.6%	5.941	0.939	2.000	FALSE	FALSE	6.305	2.000
VOLATILE ORGANICS	Methylene chloride	UG/KG	55	0	1	1.8%	6.023	0.631	4.000	FALSE	FALSE	6.175	4.000
VOLATILE ORGANICS	Toluene	UG/KG	55	0	5	9.1%	5.905	1.153	8.000	FALSE	FALSE	6.469	6.469
SEMIVOLATILE ORGANIC	2,4-Dinitrotoluene	UG/KG	55	0	6	10.9%	244.909	228.021	1400.000	FALSE	FALSE	273.213	273.213
SEMIVOLATILE ORGANIC	2,6-Dinitrotoluene	UG/KG	54	1	1	1.9%	193.519	22.895	70.000	FALSE	FALSE	201.453	70.000
SEMIVOLATILE ORGANIC	2-Methylnaphthalene	UG/KG	54	1	2	3.7%	192.556	28.530	130.000	FALSE	FALSE	209.105	130.000
SEMIVOLATILE ORGANIC	3,3`-Dichlorobenzidine	UG/KG	55	0	1	1.8%	217.091	132.195	410.000	FALSE	FALSE	225.892	225.892
SEMIVOLATILE ORGANIC	3-Nitroaniline	UG/KG	55	0	1	1.8%	525.136	315.413	990.000	FALSE	FALSE	546.431	546.431
SEMIVOLATILE ORGANIC	4-Nitroaniline	UG/KG	55	0	1	1.8%	525.136	315.413	990.000	FALSE	FALSE	546.431	546.431
SEMIVOLATILE ORGANIC	Acenaphthene	UG/KG	54	1	2	3.7%	190.204	35.893	33.000	FALSE	FALSE	218.404	33.000
SEMIVOLATILE ORGANIC	Acenaphthylene	UG/KG	54	1	2	3.7%	192.056	29.551	96.000	FALSE	FALSE	206.950	96.000
SEMIVOLATILE ORGANIC	Anthracene	UG/KG	54	1	3	5.6%	190.611	31.057	130.000	FALSE	FALSE	209.727	130.000
SEMIVOLATILE ORGANIC	Benzo[a]anthracene	UG/KG	55	0	17	30.9%	185.273	175.357	720.000	FALSE	FALSE	276.034	276.034
SEMIVOLATILE ORGANIC	Benzo[a]pyrene	UG/KG	55	0	18	32.7%	188.364	196.483	940.000	FALSE	FALSE	280.826	280.826
SEMIVOLATILE ORGANIC	Benzo[b]fluoranthene	UG/KG	55	0	17	30.9%	216.855	316.542	2200.000	FALSE	FALSE	287.067	287.067
SEMIVOLATILE ORGANIC	Benzo[ghi]perylene	UG/KG	55	0	14	25.5%	197.964	169.840	710.000	FALSE	FALSE	254.029	254.029
SEMIVOLATILE ORGANIC	Benzo[k]fluoranthene	UG/KG	55	0	14	25.5%	183.573	158.117	530.000	FALSE	FALSE	259.062	259.062
SEMIVOLATILE ORGANIC	Bis(2-Chloroisopropyl)ether	UG/KG	23	0	1	4.3%	200.870	46.968	410.000	FALSE	FALSE	213.496	213.496
SEMIVOLATILE ORGANIC	Bis(2-Ethylhexyl)phthalate	UG/KG	55	0	18	32.7%	276.345	264.694	1300.000	FALSE	FALSE	347.543	347.543
SEMIVOLATILE ORGANIC	Butylbenzylphthalate	UG/KG	54	1	2	3.7%	191.167	33.001	46.000	FALSE	FALSE	209.324	46.000
SEMIVOLATILE ORGANIC	Carbazole	UG/KG	55	0	3	5.5%	213.091	135.238	410.000	FALSE	FALSE	229.562	229.562
SEMIVOLATILE ORGANIC	Chrysene	UG/KG	55	0	27	49.1%	156.409	182.734	670.000	FALSE	TRUE	238.449	238.449
SEMIVOLATILE ORGANIC	Cresols (-o)	UG/KG	54	1	1	1.9%	194.444	18.369	120.000	FALSE	FALSE	199.192	120.000
SEMIVOLATILE ORGANIC	Di-n-butylphthalate	UG/KG	55	0	20	36.4%	216.773	186.387	1200.000	FALSE	FALSE	266.596	266.596
SEMIVOLATILE ORGANIC	Dibenz[a,h]anthracene	UG/KG	55	0	8	14.5%	202.727	144.855	470.000	FALSE	FALSE	242.255	242.255
SEMIVOLATILE ORGANIC	Dibenzofuran	UG/KG	54	1	1	1.9%	193.444	26.467	36.000	FALSE	FALSE	207.136	36.000
SEMIVOLATILE ORGANIC	Fluoranthene	UG/KG	55	0	32	58.2%	160.055	215.284	1000.000	FALSE	TRUE	223.029	223.029
SEMIVOLATILE ORGANIC	Fluorene	UG/KG	54	1	1	1.9%	193.481	26.243	38.000	FALSE	FALSE	206.634	38.000
SEMIVOLATILE ORGANIC	Indeno[1,2,3-cd]pyrene	UG/KG	55	0	11	20.0%	206.400	170.914	790.000	FALSE	FALSE	263.081	263.081
SEMIVOLATILE ORGANIC	N-Nitrosodiphenylamine	UG/KG	54	1	4	7.4%	187.037	39.556	95.000	FALSE	FALSE	209.973	95.000
SEMIVOLATILE ORGANIC	Naphthalene	UG/KG	54	1	3	5.6%	188.000	41.808	37.000	FALSE	FALSE	223.615	37.000
SEMIVOLATILE ORGANIC	Pentachlorophenol	UG/KG	55	0	2	3.6%	524.282	325.004	990.000	FALSE	FALSE	585.292	585.292
SEMIVOLATILE ORGANIC	Phenanthrene	UG/KG	55	0	19	34.5%	172.945	157.847	360.000	FALSE	FALSE	251.632	251.632
SEMIVOLATILE ORGANIC	Pyrene	UG/KG	55	0	31	56.4%	163.773	222.725	1200.000	FALSE	TRUE	217.601	217.601
PESTICIDES/PCB	4,4`-DDD	UG/KG	55	0	4	7.3%	2.546	2.727	15.000	FALSE	FALSE	2.621	2.621
PESTICIDES/PCB	4,4`-DDE	UG/KG	55	0	20	36.4%	7.475	19.553	140.000	FALSE	FALSE	7.053	7.053
PESTICIDES/PCB	4,4`-DDT	UG/KG	55	0	10	18.2%	3.335	3.652	16.000	FALSE	FALSE	3.583	3.583

17_soil0.xls

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
PESTICIDES/PCB	Aldrin	UG/KG	55	0	1	1.8%	1.178	1.083	1.900	FALSE	FALSE	1.208	1.208
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	54	1	1	1.9%	1.017	0.077	1.100	TRUE	TRUE	1.035	1.035
PESTICIDES/PCB	Aroclor-1254	UG/KG	55	0	1	1.8%	23.273	21.621	61.000	FALSE	FALSE	23.979	23.979
PESTICIDES/PCB	Aroclor-1260	UG/KG	55	0	3	5.5%	22.818	21.010	28.000	FALSE	FALSE	23.393	23.393
PESTICIDES/PCB	Beta-BHC	UG/KG	55	0	1	1.8%	1.360	2.561	20.000	FALSE	FALSE	1.285	1.285
PESTICIDES/PCB	Delta-BHC	UG/KG	55	0	1	1.8%	1.182	1.088	2.200	FALSE	FALSE	1.215	1.215
PESTICIDES/PCB	Dieldrin	UG/KG	55	0	7	12.7%	5.644	13.443	80.000	FALSE	FALSE	5.101	5.101
PESTICIDES/PCB	Endosulfan I	UG/KG	55	0	5	9.1%	9.047	57.832	430.000	FALSE	FALSE	2.325	2.325
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	55	0	1	1.8%	2.296	2.436	20.000	FALSE	FALSE	2.331	2.331
PESTICIDES/PCB	Endrin	UG/KG	55	0	3	5.5%	2.786	5.546	43.000	FALSE	FALSE	2.615	2.615
PESTICIDES/PCB	Endrin ketone	UG/KG	55	0	2	3.6%	3.280	9.309	71.000	FALSE	FALSE	2.752	2.752
PESTICIDES/PCB	Heptachlorepoxide	UG/KG	54	1	1	1.9%	1.014	0.077	1.100	TRUE	TRUE	1.032	1.032
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	55	0	55	100.0%	0.437	0.727	3.800	FALSE	TRUE	0.537	0.537
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	55	0	4	7.3%	70.882	39.478	330.000	FALSE	FALSE	74.141	74.141
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	55	0	1	1.8%	78.182	112.893	900.000	FALSE	FALSE	76.953	76.953
METALS	Aluminum	MG/KG	55	0	55	100.0%	13215.455	3309.012	19300.000	FALSE	FALSE	14491.312	14491.312
METALS	Antimony	MG/KG	55	0	26	47.3%	6.473	9.550	52.000	FALSE	FALSE	9.516	9.516
METALS	Arsenic	MG/KG	55	0	55	100.0%	5.861	2.024	16.100	FALSE	FALSE	6.243	6.243
METALS	Barium	MG/KG	55	0	40	72.7%	133.800	95.455	524.000	FALSE	TRUE	154.126	154.126
METALS	Beryllium	MG/KG	55	0	55	100.0%	0.579	0.173	0.990	TRUE	FALSE	0.618	0.618
METALS	Cadmium	MG/KG	55	0	42	76.4%	3.262	4.737	25.500	FALSE	TRUE	6.783	6.783
METALS	Calcium	MG/KG	55	0	55	100.0%	41717.455	57950.097	229000.000	FALSE	TRUE	87148.232	87148.232
METALS	Chromium	MG/KG	55	0	55	100.0%	19.963	4.144	27.900	FALSE	FALSE	21.238	21.238
METALS	Cobalt	MG/KG	55	0	55	100.0%	10.155	3.334	21.900	FALSE	TRUE	10.955	10.955
METALS	Copper	MG/KG	55	0	55	100.0%	134.120	184.261	837.000	FALSE	TRUE	179.232	179.232
METALS	Cyanide	MG/KG	52	0	2	3.8%	0.316	0.191	1.500	FALSE	FALSE	0.355	0.355
METALS	Iron	MG/KG	55	0	55	100.0%	23087.818	5560.503	38700.000	FALSE	FALSE	24851.567	24851.567
METALS	Lead	MG/KG	55	0	54	98.2%	760.433	1164.316	6270.000	FALSE	TRUE	2498.470	2498.470
METALS	Magnesium	MG/KG	55	0	55	100.0%	5952.455	3084.811	18100.000	FALSE	TRUE	6614.990	6614.990
METALS	Manganese	MG/KG	55	0	55	100.0%	526.591	199.950	1080.000	TRUE	TRUE	571.731	571.731
METALS	Mercury	MG/KG	55	0	50	90.9%	0.108	0.184	1.000	FALSE	FALSE	0.116	0.116
METALS	Nickel	MG/KG	55	0	55	100.0%	27.825	8.641	50.800	TRUE	TRUE	29.775	29.775
METALS	Potassium	MG/KG	55	0	55	100.0%	1382.618	282.451	1960.000	TRUE	TRUE	1446.383	1446.383
METALS	Selenium	MG/KG	55	0	34	61.8%	0.573	0.493	1.700	TRUE	TRUE	0.684	0.684
METALS	Silver	MG/KG	55	0	16	29.1%	1.191	1.720	9.000	FALSE	TRUE	1.676	1.676
METALS	Sodium	MG/KG	55	0	41	74.5%	94.329	75.921	383.000	FALSE	TRUE	115.953	115.953
METALS	Thallium	MG/KG	55	0	11	20.0%	0.404	0.388	1.500	FALSE	TRUE	0.533	0.533
METALS	Vanadium	MG/KG	55	0	55	100.0%	22.510	5.193	30.700	TRUE	FALSE	23.682	23.682

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
METALS	Zinc	MG/KG	55	0	55	100.0%	253.235	300.841	1475.000	FALSE	TRUE	306.138	306.138
HERBICIDES	MCPA	UG/KG	32	0	4	12.5%	5573.438	7708.583	34000.000	FALSE	FALSE	6261.917	6261.917

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	Acetone	UG/KG	33	1	1	3.0%	6.553	2.577	8.000	FALSE	FALSE	6.976	6.976
VOLATILE ORGANICS	Benzene	UG/KG	34	0	2	5.9%	5.963	1.145	2.000	FALSE	FALSE	6.578	2.000
VOLATILE ORGANICS	Toluene	UG/KG	34	0	3	8.8%	6.066	1.100	8.000	FALSE	FALSE	6.591	6.591
SEMIVOLATILE ORGANIC	2,4-Dinitrotoluene	UG/KG	34	0	3	8.8%	248.412	202.253	880.000	FALSE	FALSE	278.937	278.937
SEMIVOLATILE ORGANIC	2,6-Dinitrotoluene	UG/KG	33	1	0	0.0%	196.212	14.845	0.000	TRUE	TRUE	200.587	0.000
SEMIVOLATILE ORGANIC	2-Methylnaphthalene	UG/KG	33	1	2	6.1%	190.545	34.248	130.000	FALSE	FALSE	218.793	130.000
SEMIVOLATILE ORGANIC	3,3`-Dichlorobenzidine	UG/KG	34	0	1	2.9%	230.294	167.232	410.000	FALSE	FALSE	247.172	247.172
SEMIVOLATILE ORGANIC	3-Nitroaniline	UG/KG	34	0	1	2.9%	556.985	399.030	990.000	FALSE	FALSE	597.864	597.864
SEMIVOLATILE ORGANIC	4-Nitroaniline	UG/KG	34	0	1	2.9%	556.985	399.030	990.000	FALSE	FALSE	597.864	597.864
SEMIVOLATILE ORGANIC	Acenaphthene	UG/KG	33	1	2	6.1%	186.697	44.007	33.000	FALSE	FALSE	236.221	33.000
SEMIVOLATILE ORGANIC	Acenaphthylene	UG/KG	33	1	2	6.1%	189.727	35.601	96.000	FALSE	FALSE	214.874	96.000
SEMIVOLATILE ORGANIC	Anthracene	UG/KG	33	1	2	6.1%	193.030	23.316	130.000	FALSE	FALSE	201.727	130.000
SEMIVOLATILE ORGANIC	Benzo[a]anthracene	UG/KG	34	0	10	29.4%	211.853	210.778	720.000	FALSE	FALSE	343.755	343.755
SEMIVOLATILE ORGANIC	Benzo[a]pyrene	UG/KG	34	0	12	35.3%	213.471	240.759	940.000	FALSE	FALSE	380.185	380.185
SEMIVOLATILE ORGANIC	Benzo[b]fluoranthene	UG/KG	34	0	10	29.4%	261.618	393.512	2200.000	FALSE	FALSE	372.032	372.032
SEMIVOLATILE ORGANIC	Benzo[ghi]perylene	UG/KG	34	0	8	23.5%	226.824	204.920	710.000	FALSE	FALSE	306.396	306.396
SEMIVOLATILE ORGANIC	Benzo[k]fluoranthene	UG/KG	34	0	8	23.5%	204.676	189.464	530.000	FALSE	FALSE	294.589	294.589
SEMIVOLATILE ORGANIC	Bis(2-Chloroisopropyl)ether	UG/KG	17	0	1	5.9%	203.235	54.571	410.000	FALSE	FALSE	221.331	221.331
SEMIVOLATILE ORGANIC	Bis(2-Ethylhexyl)phthalate	UG/KG	34	0	9	26.5%	261.353	259.112	1300.000	FALSE	FALSE	327.750	327.750
SEMIVOLATILE ORGANIC	Butylbenzylphthalate	UG/KG	33	1	1	3.0%	192.303	29.928	46.000	FALSE	FALSE	211.222	46.000
SEMIVOLATILE ORGANIC	Carbazole	UG/KG	34	0	3	8.8%	223.824	171.632	410.000	FALSE	FALSE	255.751	255.751
SEMIVOLATILE ORGANIC	Chrysene	UG/KG	34	0	18	52.9%	173.235	223.256	670.000	FALSE	FALSE	324.585	324.585
SEMIVOLATILE ORGANIC	Cresols (-o)	UG/KG	33	1	1	3.0%	193.636	19.814	120.000	FALSE	FALSE	200.523	120.000
SEMIVOLATILE ORGANIC	Di-n-butylphthalate	UG/KG	34	0	9	26.5%	238.529	215.671	1200.000	FALSE	FALSE	294.284	294.284
SEMIVOLATILE ORGANIC	Dibenz[a,h]anthracene	UG/KG	34	0	5	14.7%	220.324	178.157	470.000	FALSE	FALSE	284.260	284.260
SEMIVOLATILE ORGANIC	Dibenzofuran	UG/KG	33	1	1	3.0%	192.000	31.466	36.000	FALSE	FALSE	215.124	36.000
SEMIVOLATILE ORGANIC	Fluoranthene	UG/KG	34	0	19	55.9%	192.912	263.225	1000.000	FALSE	FALSE	325.407	325.407
SEMIVOLATILE ORGANIC	Fluorene	UG/KG	33	1	1	3.0%	192.061	31.157	38.000	FALSE	FALSE	214.211	38.000
SEMIVOLATILE ORGANIC	Indeno[1,2,3-cd]pyrene	UG/KG	34	0	8	23.5%	226.676	211.650	790.000	FALSE	FALSE	328.688	328.688
SEMIVOLATILE ORGANIC	N-Nitrosodiphenylamine	UG/KG	33	1	2	6.1%	190.061	34.083	95.000	FALSE	FALSE	210.480	95.000
SEMIVOLATILE ORGANIC	Naphthalene	UG/KG	33	1	3	9.1%	183.091	51.639	37.000	FALSE	FALSE	246.019	37.000
SEMIVOLATILE ORGANIC	Pentachlorophenol	UG/KG	34	0	2	5.9%	544.721	408.400	990.000	FALSE	FALSE	659.896	659.896
SEMIVOLATILE ORGANIC	Phenanthrene	UG/KG	34	0	10	29.4%	197.647	187.380	360.000	FALSE	FALSE	318.510	318.510
SEMIVOLATILE ORGANIC	Pyrene	UG/KG	34	0	19	55.9%	194.412	273.925	1200.000	FALSE	FALSE	301.259	301.259
PESTICIDES/PCB	4,4`-DDD	UG/KG	34	0	2	5.9%	2.810	3.427	15.000	FALSE	FALSE	3.005	3.005
PESTICIDES/PCB	4,4`-DDE	UG/KG	34	0	7	20.6%	7.407	24.205	140.000	FALSE	FALSE	5.784	5.784
PESTICIDES/PCB	4,4`-DDT	UG/KG	34	0	3	8.8%	3.132	3.474	13.000	FALSE	FALSE	3.494	3.494
PESTICIDES/PCB	Aldrin	UG/KG	34	0	1	2.9%	1.286	1.373	1.900	FALSE	FALSE	1.359	1.359

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Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	33	1	1	3.0%	1.027	0.076	1.100	FALSE	FALSE	1.060	1.060
PESTICIDES/PCB	Aroclor-1260	UG/KG	34	0	2	5.9%	24.544	26.661	28.000	FALSE	FALSE	25.831	25.831
PESTICIDES/PCB	Beta-BHC	UG/KG	34	0	1	2.9%	1.580	3.256	20.000	FALSE	FALSE	1.512	1.512
PESTICIDES/PCB	Delta-BHC	UG/KG	34	0	1	2.9%	1.293	1.379	2.200	FALSE	FALSE	1.371	1.371
PESTICIDES/PCB	Dieldrin	UG/KG	34	0	3	8.8%	4.416	10.424	62.000	FALSE	FALSE	4.284	4.284
PESTICIDES/PCB	Endosulfan I	UG/KG	34	0	3	8.8%	13.985	73.532	430.000	FALSE	FALSE	4.022	4.022
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	34	0	1	2.9%	2.509	3.094	20.000	FALSE	FALSE	2.611	2.611
PESTICIDES/PCB	Endrin	UG/KG	34	0	2	5.9%	3.300	7.043	43.000	FALSE	FALSE	3.159	3.159
PESTICIDES/PCB	Endrin ketone	UG/KG	34	0	2	5.9%	4.100	11.832	71.000	FALSE	FALSE	3.449	3.449
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	34	0	34	100.0%	0.335	0.415	2.400	FALSE	TRUE	0.478	0.478
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	34	0	1	2.9%	70.294	45.957	330.000	FALSE	FALSE	74.685	74.685
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	34	0	1	2.9%	87.206	143.639	900.000	FALSE	FALSE	87.405	87.405
METALS	Aluminum	MG/KG	34	0	34	100.0%	13438.235	2922.173	19300.000	FALSE	FALSE	14793.610	14793.610
METALS	Antimony	MG/KG	34	0	17	50.0%	4.735	8.647	52.000	FALSE	TRUE	7.818	7.818
METALS	Arsenic	MG/KG	34	0	34	100.0%	5.229	1.068	8.900	FALSE	TRUE	5.540	5.540
METALS	Barium	MG/KG	34	0	28	82.4%	106.394	59.652	357.000	FALSE	TRUE	125.247	125.247
METALS	Beryllium	MG/KG	34	0	34	100.0%	0.580	0.171	0.990	TRUE	FALSE	0.629	0.629
METALS	Cadmium	MG/KG	34	0	24	70.6%	1.244	1.956	3.500	FALSE	TRUE	2.060	2.060
METALS	Calcium	MG/KG	34	0	34	100.0%	28600.588	52136.981	229000.000	FALSE	FALSE	50697.394	50697.394
METALS	Chromium	MG/KG	34	0	34	100.0%	19.894	3.933	27.900	TRUE	FALSE	21.035	21.035
METALS	Cobalt	MG/KG	34	0	34	100.0%	10.265	3.719	21.900	FALSE	TRUE	11.360	11.360
METALS	Copper	MG/KG	34	0	34	100.0%	55.347	89.252	546.000	FALSE	FALSE	62.403	62.403
METALS	Cyanide	MG/KG	34	0	1	2.9%	0.315	0.220	1.500	FALSE	FALSE	0.377	0.377
METALS	Iron	MG/KG	34	0	34	100.0%	23757.647	5597.783	38700.000	TRUE	FALSE	25381.795	25381.795
METALS	Lead	MG/KG	34	0	33	97.1%	279.938	542.982	686.000	FALSE	TRUE	619.014	619.014
METALS	Magnesium	MG/KG	34	0	34	100.0%	5178.088	2028.900	9830.000	FALSE	TRUE	5854.933	5854.933
METALS	Manganese	MG/KG	34	0	34	100.0%	539.426	220.701	1080.000	TRUE	TRUE	603.461	603.461
METALS	Mercury	MG/KG	34	0	30	88.2%	0.099	0.182	1.000	FALSE	FALSE	0.111	0.111
METALS	Nickel	MG/KG	34	0	34	100.0%	27.003	9.145	50.800	FALSE	TRUE	29.987	29.987
METALS	Potassium	MG/KG	34	0	34	100.0%	1351.500	287.221	1960.000	TRUE	TRUE	1434.835	1434.835
METALS	Selenium	MG/KG	34	0	20	58.8%	0.638	0.521	1.600	FALSE	FALSE	1.158	1.158
METALS	Silver	MG/KG	34	0	4	11.8%	0.546	0.765	4.600	FALSE	FALSE	0.750	0.750
METALS	Sodium	MG/KG	34	0	23	67.6%	75.865	72.860	383.000	FALSE	FALSE	93.909	93.909
METALS	Thallium	MG/KG	34	0	7	20.6%	0.417	0.385	1.500	FALSE	FALSE	0.610	0.610
METALS	Vanadium	MG/KG	34	0	34	100.0%	23.104	4.422	30.700	TRUE	TRUE	24.387	24.387
METALS	Zinc	MG/KG	34	0	34	100.0%	132.596	107.961	620.000	FALSE	FALSE	153.822	153.822
HERBICIDES	MCPA	UG/KG	17	0	1	5.9%	4773.529	7020.486	32000.000	FALSE	FALSE	5626.631	5626.631

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	Acetone	UG/KG	31	1	1	3.2%	6.581	2.659	8.000	FALSE	FALSE	7.038	7.038
VOLATILE ORGANICS	Benzene	UG/KG	32	0	2	6.3%	5.953	1.180	2.000	FALSE	FALSE	6.610	2.000
VOLATILE ORGANICS	Toluene	UG/KG	32	0	3	9.4%	6.063	1.134	8.000	FALSE	FALSE	6.624	6.624
SEMIVOLATILE ORGANIC	2,4-Dinitrotoluene	UG/KG	32	0	3	9.4%	251.906	208.161	880.000	FALSE	FALSE	285.788	285.788
SEMIVOLATILE ORGANIC	2,6-Dinitrotoluene	UG/KG	31	1	0	0.0%	196.452	15.286	0.000	TRUE	TRUE	201.107	0.000
SEMIVOLATILE ORGANIC	2-Methylnaphthalene	UG/KG	31	1	2	6.5%	190.419	35.362	130.000	FALSE	FALSE	220.816	130.000
SEMIVOLATILE ORGANIC	3,3`-Dichlorobenzidine	UG/KG	32	0	1	3.1%	232.656	172.257	410.000	FALSE	FALSE	251.163	251.163
SEMIVOLATILE ORGANIC	3-Nitroaniline	UG/KG	32	0	1	3.1%	562.500	411.049	990.000	FALSE	FALSE	607.294	607.294
SEMIVOLATILE ORGANIC	4-Nitroaniline	UG/KG	32	0	1	3.1%	562.500	411.049	990.000	FALSE	FALSE	607.294	607.294
SEMIVOLATILE ORGANIC	Acenaphthene	UG/KG	31	1	2	6.5%	186.323	45.420	33.000	FALSE	FALSE	239.797	33.000
SEMIVOLATILE ORGANIC	Acenaphthylene	UG/KG	31	1	2	6.5%	189.548	36.756	96.000	FALSE	FALSE	216.576	96.000
SEMIVOLATILE ORGANIC	Anthracene	UG/KG	31	1	2	6.5%	193.065	24.072	130.000	FALSE	FALSE	202.377	130.000
SEMIVOLATILE ORGANIC	Benzo[a]anthracene	UG/KG	32	0	10	31.3%	213.063	217.411	720.000	FALSE	FALSE	358.367	358.367
SEMIVOLATILE ORGANIC	Benzo[a]pyrene	UG/KG	32	0	12	37.5%	214.781	248.342	940.000	FALSE	FALSE	398.693	398.693
SEMIVOLATILE ORGANIC	Benzo[b]fluoranthene	UG/KG	32	0	10	31.3%	265.938	405.604	2200.000	FALSE	FALSE	390.703	390.703
SEMIVOLATILE ORGANIC	Benzo[ghi]perylene	UG/KG	32	0	8	25.0%	228.969	211.235	710.000	FALSE	FALSE	317.024	317.024
SEMIVOLATILE ORGANIC	Benzo[k]fluoranthene	UG/KG	32	0	8	25.0%	205.438	195.453	530.000	FALSE	FALSE	303.775	303.775
SEMIVOLATILE ORGANIC	Bis(2-Chloroisopropyl)ether	UG/KG	17	0	1	5.9%	203.235	54.571	410.000	FALSE	FALSE	221.331	221.331
SEMIVOLATILE ORGANIC	Bis(2-Ethylhexyl)phthalate	UG/KG	32	0	8	25.0%	256.438	263.989	1300.000	FALSE	FALSE	323.444	323.444
SEMIVOLATILE ORGANIC	Butylbenzylphthalate	UG/KG	31	1	1	3.2%	192.290	30.902	46.000	FALSE	FALSE	212.610	46.000
SEMIVOLATILE ORGANIC	Carbazole	UG/KG	32	0	3	9.4%	225.781	176.891	410.000	FALSE	FALSE	260.800	260.800
SEMIVOLATILE ORGANIC	Chrysene	UG/KG	32	0	18	56.3%	172.031	230.290	670.000	FALSE	FALSE	330.564	330.564
SEMIVOLATILE ORGANIC	Cresols (-o)	UG/KG	31	1	1	3.2%	193.710	20.452	120.000	FALSE	FALSE	201.080	120.000
SEMIVOLATILE ORGANIC	Di-n-butylphthalate	UG/KG	32	0	9	28.1%	241.406	222.192	1200.000	FALSE	FALSE	303.389	303.389
SEMIVOLATILE ORGANIC	Dibenz[a,h]anthracene	UG/KG	32	0	5	15.6%	222.063	183.669	470.000	FALSE	FALSE	292.389	292.389
SEMIVOLATILE ORGANIC	Dibenzofuran	UG/KG	31	1	1	3.2%	191.968	32.492	36.000	FALSE	FALSE	216.839	36.000
SEMIVOLATILE ORGANIC	Fluoranthene	UG/KG	32	0	19	59.4%	192.938	271.582	1000.000	FALSE	FALSE	333.775	333.775
SEMIVOLATILE ORGANIC	Fluorene	UG/KG	31	1	1	3.2%	192.032	32.172	38.000	FALSE	FALSE	215.844	38.000
SEMIVOLATILE ORGANIC	Indeno[1,2,3-cd]pyrene	UG/KG	32	0	8	25.0%	228.813	218.186	790.000	FALSE	FALSE	341.962	341.962
SEMIVOLATILE ORGANIC	N-Nitrosodiphenylamine	UG/KG	31	1	2	6.5%	189.903	35.189	95.000	FALSE	FALSE	211.815	95.000
SEMIVOLATILE ORGANIC	Naphthalene	UG/KG	31	1	3	9.7%	182.484	53.270	37.000	FALSE	FALSE	250.492	37.000
SEMIVOLATILE ORGANIC	Pentachlorophenol	UG/KG	32	0	2	6.3%	549.469	420.895	990.000	FALSE	FALSE	675.909	675.909
SEMIVOLATILE ORGANIC	Phenanthrene	UG/KG	32	0	10	31.3%	197.969	193.325	360.000	FALSE	FALSE	329.947	329.947
SEMIVOLATILE ORGANIC	Pyrene	UG/KG	32	0	19	59.4%	194.531	282.622	1200.000	FALSE	FALSE	307.838	307.838
PESTICIDES/PCB	4,4`-DDD	UG/KG	32	0	2	6.3%	2.866	3.528	15.000	FALSE	FALSE	3.093	3.093
PESTICIDES/PCB	4,4`-DDE	UG/KG	32	0	7	21.9%	7.750	24.932	140.000	FALSE	FALSE	6.212	6.212
PESTICIDES/PCB	4,4`-DDT	UG/KG	32	0	3	9.4%	3.208	3.570	13.000	FALSE	FALSE	3.626	3.626
PESTICIDES/PCB	Aldrin	UG/KG	32	0	1	3.1%	1.305	1.415	1.900	FALSE	FALSE	1.387	1.387

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Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	31	1	1	3.2%	1.029	0.077	1.100	FALSE	FALSE	1.064	1.064
PESTICIDES/PCB	Aroclor-1260	UG/KG	32	0	2	6.3%	24.875	27.473	28.000	FALSE	FALSE	26.326	26.326
PESTICIDES/PCB	Beta-BHC	UG/KG	32	0	1	3.1%	1.617	3.355	20.000	FALSE	FALSE	1.555	1.555
PESTICIDES/PCB	Delta-BHC	UG/KG	32	0	1	3.1%	1.313	1.420	2.200	FALSE	FALSE	1.400	1.400
PESTICIDES/PCB	Dieldrin	UG/KG	32	0	3	9.4%	4.572	10.735	62.000	FALSE	FALSE	4.509	4.509
PESTICIDES/PCB	Endosulfan I	UG/KG	32	0	3	9.4%	14.797	75.791	430.000	FALSE	FALSE	4.431	4.431
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	32	0	1	3.1%	2.545	3.189	20.000	FALSE	FALSE	2.664	2.664
PESTICIDES/PCB	Endrin	UG/KG	32	0	2	6.3%	3.386	7.258	43.000	FALSE	FALSE	3.263	3.263
PESTICIDES/PCB	Endrin ketone	UG/KG	32	0	2	6.3%	4.236	12.194	71.000	FALSE	FALSE	3.585	3.585
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	32	0	32	100.0%	0.339	0.423	2.400	FALSE	TRUE	0.460	0.460
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	32	0	1	3.1%	70.625	47.396	330.000	FALSE	FALSE	75.387	75.387
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	32	0	1	3.1%	88.594	148.086	900.000	FALSE	FALSE	89.191	89.191
METALS	Aluminum	MG/KG	32	0	32	100.0%	########	2969.022	19300.000	FALSE	FALSE	########	14736.484
METALS	Antimony	MG/KG	32	0	17	53.1%	4.675	8.917	52.000	FALSE	TRUE	7.790	7.790
METALS	Arsenic	MG/KG	32	0	32	100.0%	5.188	1.074	8.900	FALSE	TRUE	5.507	5.507
METALS	Barium	MG/KG	32	0	26	81.3%	105.920	60.489	357.000	FALSE	TRUE	125.562	125.562
METALS	Beryllium	MG/KG	32	0	32	100.0%	0.579	0.176	0.990	TRUE	FALSE	0.631	0.631
METALS	Cadmium	MG/KG	32	0	23	71.9%	1.224	1.992	3.500	FALSE	TRUE	2.043	2.043
METALS	Calcium	MG/KG	32	0	32	100.0%	########	########	#########	FALSE	FALSE	########	41678.432
METALS	Chromium	MG/KG	32	0	32	100.0%	19.609	3.820	27.900	TRUE	FALSE	20.754	20.754
METALS	Cobalt	MG/KG	32	0	32	100.0%	10.272	3.834	21.900	FALSE	TRUE	11.448	11.448
METALS	Copper	MG/KG	32	0	32	100.0%	55.522	91.711	546.000	FALSE	FALSE	62.476	62.476
METALS	Cyanide	MG/KG	32	0	1	3.1%	0.313	0.227	1.500	FALSE	FALSE	0.379	0.379
METALS	Iron	MG/KG	32	0	32	100.0%	########	5072.381	36100.000	TRUE	FALSE	########	24746.207
METALS	Lead	MG/KG	32	0	31	96.9%	275.619	553.353	496.000	FALSE	TRUE	576.842	496.000
METALS	Magnesium	MG/KG	32	0	32	100.0%	5032.813	1990.612	9830.000	FALSE	TRUE	5695.790	5695.790
METALS	Manganese	MG/KG	32	0	32	100.0%	527.594	221.797	1080.000	TRUE	TRUE	594.029	594.029
METALS	Mercury	MG/KG	32	0	29	90.6%	0.103	0.187	1.000	FALSE	FALSE	0.117	0.117
METALS	Nickel	MG/KG	32	0	32	100.0%	26.697	9.321	50.800	FALSE	TRUE	29.792	29.792
METALS	Potassium	MG/KG	32	0	32	100.0%	1330.813	283.073	1960.000	TRUE	TRUE	1415.601	1415.601
METALS	Selenium	MG/KG	32	0	20	62.5%	0.670	0.520	1.600	FALSE	FALSE	1.250	1.250
METALS	Silver	MG/KG	32	0	4	12.5%	0.536	0.788	4.600	FALSE	FALSE	0.738	0.738
METALS	Sodium	MG/KG	32	0	21	65.6%	69.575	69.949	383.000	FALSE	FALSE	84.336	84.336
METALS	Thallium	MG/KG	32	0	7	21.9%	0.435	0.390	1.500	FALSE	FALSE	0.656	0.656
METALS	Vanadium	MG/KG	32	0	32	100.0%	22.981	4.497	30.700	TRUE	TRUE	24.328	24.328
METALS	Zinc	MG/KG	32	0	32	100.0%	133.325	110.589	620.000	FALSE	FALSE	155.685	155.685
HERBICIDES	MCPA	UG/KG	15	0	1	6.7%	5016.667	7469.239	32000.000	FALSE	FALSE	6203.085	6203.085

Table 2-3
SENECA ARMY DEPOT
SEAD-16 AND 17 FEASIBILITY STUDY

SEAD-17 AREAS FOR SOIL REMEDIATION

CASE	REMEDIAL ACTION OBJECTIVES	BASIS	CLEAN UP GOAL	DESCRIPTION OF AREA TO BE REMEDIATED[1]	AREA (ft^2)	DEPTH (in)	VOLUME (ft^3)	SAMPLING LOCATIONS REMEDIATED OR EXCAVATED[2]
1	a) Prevent ingestion/direct contact with surface soil having excess heavy metals b) Prevent migration of soil to drainage ditches and Kendaia Creek	a) Protection of Current and Future On-site Workers b) Protection of Surface Water	Pb <500 mg/kg	North and Northeast of Bldg 367, Southwest Corner and Southeast of Bldg 367	45,475	6	842	SS17-1, SS17-4 through 9, SS17-12 through 14, SS17-16, SS17-18, SS17-26, SS17-27, SS17-28, SS17-35, SS17-36, SS17-37
				Cumulative Soil Volume			842	
2	a) Prevent ingestion/direct contact with sediment having excess heavy metals b) Prevent sediment migration in surface water to drainage ditches and Kendaia Creek	a) Protection of Terrestrial and Aquatic Ecology b) Protection of Surface Water	Pb <31 mg/kg	North and Northeast of Bldg 367, Southwest Corner of Bldg 367, and Southeast of Bldg 367 (Extend Areas)	28,975	6	537	SS17-1, SS17-4 through 9, SS17-12 through 14, SS17-16, SS17-18, SS17-26, SS17-27, SS17-28, SS17-35, SS17-36, SS17-37, **SD/SW-17-1 through 8**
				Cumulative Soil Volume			1,379	
3	a) Prevent ingestion/direct contact with subsurface soil having excess heavy metals b) Minimize potential for leaching to groundwater	a) Protection of Current and Future On-site Workers b) Protection of Ground Water	Pb <500 mg/kg	North and Northwest of Bldg 367	750	24	56	SS17-1, SS17-4 through 9, SS17-12 through 14, SS17-16, SS17-18, SS17-26, SS17-27, SS17-28, SS17-35, SS17-36, SS17-37, SD/SW-17-1 through 8, **SB17-2**
				Cumulative Soil Volume			1,434	

Notes:
1) For Case 3, area to be remediated/excavated includes an additional 24 inches in depth within the areas considered by Case 1 (see Figure 2-1).
2) Bold items in Sampling Location Column are additional locations to be remediated/excavated when the case is considered.

TABLE 7-28

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm^2)	Adherence Factor (mg soil/cm^2)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
VOLATILE ORGANICS												
Acetone			7.28E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzene			2.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Methylene Chloride			4.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Toluene			6.47E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			2.73E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
2,6-Dinitrotoluene			7.00E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
2-Methylnaphthalene			1.30E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
2-Methylphenol				1.00E-06	5,800	1.0		250	1	70	365	25,550
3,3'-Dichlorobenzidine			2.26E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
3-Nitroaniline			5.46E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
4-Nitroaniline			5.46E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Acenaphthene			3.30E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Acenaphthylene			9.60E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Anthracene			1.30E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(a)anthracene			2.76E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(a)pyrene			2.81E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(b)fluoranthene			2.87E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(g,h,i)perylene			2.54E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(k)fluoranthene			2.59E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Butylbenzylphthalate			4.60E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Carbazole			2.30E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Chrysene			2.38E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Di-n-butylphthalate			2.67E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550

TABLE 7-28

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Dibenz(a,h)anthracene			2.42E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Dibenzofuran			3.60E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Fluoranthene			2.23E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Fluorene			3.80E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene			2.63E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
N-Nitrosodiphenylamine (1)			9.50E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Naphthalene			3.70E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pentachlorophenol			5.85E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Phenanthrene			2.52E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pyrene			2.18E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
bis(2-Chloroisopropyl) ether			2.13E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate			3.48E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
PESTICIDES/PCB												
4,4'-DDD			2.62E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
4,4'-DDE			7.05E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
4,4'-DDT			3.58E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Aldrin			1.21E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Aroclor-1254	8.165E-08	1.166E-09	2.40E-02	1.00E-06	5,800	1.0	0.06	250	1	70	365	25,550
Aroclor-1260	7.966E-08	1.138E-09	2.34E-02	1.00E-06	5,800	1.0	0.06	250	1	70	365	25,550
Dieldrin			5.10E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan I			2.33E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan sulfate			2.33E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin			2.62E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin ketone			2.75E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Heptachlor epoxide			1.03E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
alpha-Chlordane			1.03E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
beta-BHC			1.28E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
delta-BHC			1.21E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550

TABLE 7-28

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
METALS												
Antimony			9.52E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Arsenic			6.24E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Barium			1.54E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Cadmium			2.12E+01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Copper			1.79E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Lead			2.50E+03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Mercury			1.16E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Selenium			6.84E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Silver			1.16E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Zinc			3.06E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
HERBICIDES												
MCPA			6.26E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550

EQUATION:

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

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC - Soil Data (RME)	EF = Exposure Frequency (days/year)	250 (RME Construction Worker)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	1 (Upper bound limit for CW)
SA = Surface Area Contact (cm²)	5,800 (RME Adult Worker)	BW = Bodyweight (kg)	70 (Adult Male)
AF =Soil to Skin Adherence Factor (mg/cm²)	1.0 (RME - All Receptors)	AT = Averaging Time (days)	1 x 365 (Nc) 70 x 365 (Car)
ABS = Absorption Factor (unitless)	Applicable for PCBs and Cadmium (EPA, 1992b)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

SEAD-16

EPC, INTAKE AND

RISK TABLES

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
SEMIVOLATILE ORGANIC	Bis(2-Ethylhexyl)phthalate	UG/L	12	0	3	25.0%	4.375	1.334	3.000	FALSE	FALSE	6.209	3.000
SEMIVOLATILE ORGANIC	Di-n-butylphthalate	UG/L	12	0	1	8.3%	4.667	1.320	0.500	FALSE	FALSE	8.375	0.500
SEMIVOLATILE ORGANIC	Pentachlorophenol	UG/L	12	0	3	25.0%	9.975	4.940	4.000	FALSE	FALSE	34.475	4.000
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/L	12	0	10	83.3%	0.410	0.555	1.770	FALSE	TRUE	16.474	1.770
OTHER ANALYSES	Total Organic Carbon	MG/L	9	0	9	100.0%	6.211	3.692	12.500	TRUE	TRUE	8.467	8.467
OTHER ANALYSES	pH	MG/L	9	0	9	100.0%	7.548	0.164	7.800	TRUE	TRUE	7.648	7.648
METALS	Aluminum	UG/L	10	2	2	20.0%	90.630	85.982	261.000	TRUE	TRUE	139.898	139.898
METALS	Antimony	UG/L	12	0	10	83.3%	24.342	35.483	124.000	FALSE	TRUE	57.414	57.414
METALS	Arsenic	UG/L	12	0	8	66.7%	2.823	1.669	5.700	TRUE	FALSE	3.682	3.682
METALS	Barium	UG/L	12	0	12	100.0%	116.558	76.739	348.000	FALSE	FALSE	153.991	153.991
METALS	Cadmium	UG/L	12	0	7	58.3%	0.662	0.528	2.000	FALSE	TRUE	1.391	1.391
METALS	Calcium	UG/L	12	0	12	100.0%	71829.167	15602.134	89900.000	TRUE	FALSE	79855.202	79855.202
METALS	Chromium	UG/L	12	0	3	25.0%	1.117	0.875	3.000	FALSE	FALSE	1.899	1.899
METALS	Cobalt	UG/L	12	0	2	16.7%	1.325	1.170	4.100	FALSE	FALSE	2.312	2.312
METALS	Copper	UG/L	12	0	12	100.0%	61.204	115.307	424.000	FALSE	FALSE	112.117	112.117
METALS	Iron	UG/L	12	0	10	83.3%	859.867	1304.183	3650.000	FALSE	TRUE	7913.346	3650.000
METALS	Lead	UG/L	12	0	12	100.0%	115.858	224.334	813.000	FALSE	TRUE	532.192	532.192
METALS	Magnesium	UG/L	12	0	12	100.0%	8948.333	2295.529	11400.000	TRUE	FALSE	10129.197	10129.197
METALS	Manganese	UG/L	12	0	12	100.0%	52.733	75.807	252.000	FALSE	TRUE	217.104	217.104
METALS	Mercury	UG/L	12	0	3	25.0%	0.137	0.244	0.900	FALSE	FALSE	0.229	0.229
METALS	Nickel	UG/L	12	0	7	58.3%	2.942	1.829	5.500	TRUE	FALSE	3.882	3.882
METALS	Potassium	UG/L	12	0	12	100.0%	2909.167	994.507	4590.000	TRUE	TRUE	3420.760	3420.760
METALS	Selenium	UG/L	12	0	4	33.3%	1.638	1.081	4.300	FALSE	FALSE	2.583	2.583
METALS	Silver	UG/L	12	0	1	8.3%	1.150	1.342	5.200	FALSE	FALSE	1.699	1.699
METALS	Sodium	UG/L	12	0	12	100.0%	5472.917	2714.604	9220.000	TRUE	FALSE	6869.361	6869.361
METALS	Vanadium	UG/L	12	0	7	58.3%	1.954	1.708	4.900	FALSE	FALSE	4.109	4.109
METALS	Zinc	UG/L	12	0	12	100.0%	122.700	105.687	380.000	FALSE	TRUE	250.410	250.410

16_sw.xls

TABLE 6-34

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE WATER (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	Absorbed Dose/Event (mg-cm²-event)	EPC Surface W. (mg/L)	Child Skin Surface Area Contact (cm²)	Kp Permeability Coefficient (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Volumetric Conv. Factor (1 liter/1000 cm³)	B (unitless)	Tau (hours)	t*	b	c	5.2/5.21	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Semivolatile Organics																			
Di-n-butylphthalate	1.86E-08		9.46E-05	5.00E-04	2,170	3.30E-02	1	25	5	1.00E-03	1.30E+01	4.30E+00	4586.67	111.44	13.33	1	25	1,825	25,550
Pentachlorophenol	5.34E-05	3.82E-06	1.38E-02	4.00E-03	2,170	6.50E-01	1	25	5	1.00E-03	7.20E+01	3.70E+00	116152.87	3320.21	72.33	1	25	1,825	25,550
bis(2-Ethylhexyl)phthalate	2.46E-07	1.76E-08	1.25E-03	3.00E-03	2,170	3.30E-02	1	25	5	1.00E-03	1.30E+01	2.10E+01	22400.00	111.44	13.33	1	25	1,825	25,550
Metals																			
Aluminum			1.40E-04	1.40E-01	2,170	1.00E-03	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Antimony	3.41E-10		5.74E-05	5.74E-02	2,170	1.00E-03	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Arsenic	2.19E-11	1.56E-12	3.68E-06	3.68E-03	2,170	1.00E-03	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Barium	9.16E-10		1.54E-04	1.54E-01	2,170	1.00E-03	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Cadmium	8.27E-12		1.39E-06	1.39E-03	2,170	1.00E-03	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Calcium			7.99E-02	7.99E+01	2,170	1.00E-03	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Chromium	4.52E-11		3.80E-06	1.90E-03	2,170	2.00E-03	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Cobalt			9.25E-07	2.31E-03	2,170	4.00E-04	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Copper	6.67E-10		1.12E-04	1.12E-01	2,170	1.00E-03	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Iron			3.65E-03	3.65E+00	2,170	1.00E-03	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Lead			2.13E-06	5.32E-01	2,170	4.00E-06	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Magnesium			1.01E-02	1.01E+01	2,170	1.00E-03	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Manganese	1.29E-09		2.17E-04	2.17E-01	2,170	1.00E-03	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Mercury	1.36E-12		2.29E-07	2.29E-04	2,170	1.00E-03	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Nickel	2.31E-11		3.88E-06	3.88E-03	2,170	1.00E-03	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Potassium			3.42E-03	3.42E+00	2,170	1.00E-03	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Selenium	1.54E-11		2.58E-06	2.58E-03	2,170	1.00E-03	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Silver	3.64E-12		1.02E-06	1.70E-03	2,170	6.00E-04	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Sodium			6.87E-03	6.87E+00	2,170	1.00E-03	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Vanadium	2.44E-11		4.11E-06	4.11E-03	2,170	1.00E-03	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550
Zinc	5.36E-10		1.50E-04	2.50E-01	2,170	6.00E-04	1	25	5	1.00E-03	NA	NA		0.30	0.33	2	25	1,825	25,550

EQUATION: Absorbed Dose (mg/kg-day) = $\frac{DA \times SA \times Kp \times ET \times EF \times ED \times CF}{BW \times AT}$

Variables:	Assumptions:	Variables:	Assumptions:
DA = Absorbed Dose per Event (mg-cm²/event)	Calculated from EPA, 1992	EF = Exposure Frequency (days/year)	25
SA = Surface Area Contact (cm²)	2,170 (RME Child)	ED = Exposure Duration (years)	5 (RME at 1 Residence)
Kp = Permeability Coefficient (cm/hour)	Compound Specific, EPA, 1992	CF = Vol. Conv. Factor (1 L/1000 cm³)	0.001
ET = Exposure Time (hours/day)	1 RME	BW = Bodyweight (kg)	25 (Child)
Tao = Lag time (hours)	Compound Specific, EPA, 1992	B = Bunge Model Value	Compound Specific, EPA, 1992

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-69

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SURFACE WATER (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg)	Child CDI (Car) (mg/kg)	Dermal RfD (mg/kg/day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Semivolatile Organics						
Di-n-butylphthalate	1.86E-08		8.50E-02	NA	2.18E-07	
Pentachlorophenol	5.34E-05	3.82E-06	3.00E-02	1.20E-01	1.78E-03	4.58E-07
bis(2-Ethylhexyl)phthalate	2.46E-07	1.76E-08	2.00E-02	1.40E-02	1.23E-05	2.46E-10
Metals						
Aluminum			NA	NA		
Antimony	3.41E-10		4.00E-04	NA	8.53E-07	
Arsenic	2.19E-11	1.56E-12	2.94E-04	1.79E+00	7.44E-08	2.80E-12
Barium	9.16E-10		7.00E-03	NA	1.31E-07	
Cadmium	8.27E-12		3.00E-05	NA	2.76E-07	
Calcium			NA	NA		
Chromium	4.52E-11		2.50E-04	NA	1.81E-07	
Cobalt			NA	NA		
Copper	6.67E-10		2.00E-02	NA	3.33E-08	
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese	1.29E-09		5.00E-03	NA	2.58E-07	
Mercury	1.36E-12		4.50E-05	NA	3.03E-08	
Nickel	2.31E-11		1.00E-03	NA	2.31E-08	
Potassium			NA	NA		
Selenium	1.54E-11		3.00E-03	NA	5.12E-09	
Silver	3.64E-12		5.00E-03	NA	7.27E-10	
Sodium			NA	NA		
Vanadium	2.44E-11		7.00E-03	NA	3.49E-09	
Zinc	5.36E-10		1.50E-01	NA	3.57E-09	
Totals - HQ & CR					**1.79E-03**	**4.58E-07**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-32

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SURFACE WATER (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Surface W. (mg/L)	Contact Rate (L/hr)	Exposure Time (hr/day)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
									Nc	Car
Semivolatile Organics										
Di-n-butylphthalate	6.85E-08		5.00E-04	0.05	1	25	5	25	1,825	25,550
Pentachlorophenol	5.48E-07	3.91E-08	4.00E-03	0.05	1	25	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate	4.11E-07	2.94E-08	3.00E-03	0.05	1	25	5	25	1,825	25,550
Metals										
Aluminum			1.40E-01	0.05	1	25	5	25	1,825	25,550
Antimony	7.86E-06		5.74E-02	0.05	1	25	5	25	1,825	25,550
Arsenic	5.04E-07	3.60E-08	3.68E-03	0.05	1	25	5	25	1,825	25,550
Barium	2.11E-05		1.54E-01	0.05	1	25	5	25	1,825	25,550
Cadmium	1.90E-07		1.39E-03	0.05	1	25	5	25	1,825	25,550
Calcium			7.99E+01	0.05	1	25	5	25	1,825	25,550
Chromium	2.60E-07		1.90E-03	0.05	1	25	5	25	1,825	25,550
Cobalt			2.31E-03	0.05	1	25	5	25	1,825	25,550
Copper	1.54E-05		1.12E-01	0.05	1	25	5	25	1,825	25,550
Iron			3.65E+00	0.05	1	25	5	25	1,825	25,550
Lead			5.32E-01	0.05	1	25	5	25	1,825	25,550
Magnesium			1.01E+01	0.05	1	25	5	25	1,825	25,550
Manganese	2.97E-05		2.17E-01	0.05	1	25	5	25	1,825	25,550
Mercury	3.14E-08		2.29E-04	0.05	1	25	5	25	1,825	25,550
Nickel	5.32E-07		3.88E-03	0.05	1	25	5	25	1,825	25,550
Potassium			3.42E+00	0.05	1	25	5	25	1,825	25,550
Selenium	3.54E-07		2.58E-03	0.05	1	25	5	25	1,825	25,550
Silver	2.33E-07		1.70E-03	0.05	1	25	5	25	1,825	25,550
Sodium			6.87E+00	0.05	1	25	5	25	1,825	25,550
Vanadium	5.63E-07		4.11E-03	0.05	1	25	5	25	1,825	25,550
Zinc	3.43E-05		2.50E-01	0.05	1	25	5	25	1,825	25,550

EQUATION: Intake (mg/kg-day) = $$\frac{CS \times CR \times ET \times EF \times ED}{BW \times AT}$$

Variables:	Assumptions:
CS = Chemical Concentration in Surface Water (mg/L)	EPC - Surface Water Data - RME
CR = Contact Rate (Liters/hour)	0.05 (all recreators)
ET = Exposure Time (hours/day)	1 (RME - all recreators)
EF = Exposure Frequency (days/year)	25
ED = Exposure Duration (years)	5 (RME)
BW = Bodyweight (kg)	25 (Child)
AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-67

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SURFACE WATER
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Semivolatile Organics						
Di-n-butylphthalate	6.85E-08		1.00E-01	NA	6.85E-07	
Pentachlorophenol	5.48E-07	3.91E-08	3.00E-02	1.20E-01	1.83E-05	4.70E-09
bis(2-Ethylhexyl)phthalate	4.11E-07	2.94E-08	2.00E-02	1.40E-02	2.05E-05	4.11E-10
Metals						
Aluminum			NA	NA		
Antimony	7.86E-06		4.00E-04	NA	1.97E-02	
Arsenic	5.04E-07	3.60E-08	3.00E-04	1.75E+00	1.68E-03	6.30E-08
Barium	2.11E-05		7.00E-02	NA	3.01E-04	
Cadmium	1.90E-07		5.00E-04	NA	3.81E-04	
Calcium			NA	NA		
Chromium	2.60E-07		5.00E-03	NA	5.20E-05	
Cobalt			NA	NA		
Copper	1.54E-05		4.00E-02	NA	3.84E-04	
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese	2.97E-05		5.00E-03	NA	5.95E-03	
Mercury	3.14E-08		3.00E-04	NA	1.05E-04	
Nickel	5.32E-07		2.00E-02	NA	2.66E-05	
Potassium			NA	NA		
Selenium	3.54E-07		5.00E-03	NA	7.08E-05	
Silver	2.33E-07		5.00E-03	NA	4.65E-05	
Sodium			NA	NA		
Vanadium	5.63E-07		7.00E-03	NA	8.04E-05	
Zinc	3.43E-05		3.00E-01	NA	1.14E-04	
Totals - HQ & CR					**2.89E-02**	**6.81E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-12

CALCULATION OF INTAKE (ONSITE)
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Volatile Organics									
1,1,2,2-Tetrachloroethane		1.88E-13	2.40E-10	2	50	5	25	1,825	25,550
Acetone			2.78E-10	2	50	5	25	1,825	25,550
Benzene		2.17E-13	2.78E-10	2	50	5	25	1,825	25,550
Carbon Disulfide	2.08E-12		1.90E-10	2	50	5	25	1,825	25,550
Chloroform		5.95E-14	7.60E-11	2	50	5	25	1,825	25,550
Methylene Chloride	8.33E-13	5.95E-14	7.60E-11	2	50	5	25	1,825	25,550
Toluene	1.25E-12		1.14E-10	2	50	5	25	1,825	25,550
Xylene (total)			2.32E-10	2	50	5	25	1,825	25,550
Semivolatile Organics									
2,4-Dinitrotoluene			1.53E-07	2	50	5	25	1,825	25,550
2,6-Dinitrotoluene			4.20E-08	2	50	5	25	1,825	25,550
2-Methylnaphthalene			4.20E-08	2	50	5	25	1,825	25,550
3,3'-Dichlorobenzidine			2.83E-08	2	50	5	25	1,825	25,550
3-nitroaniline			6.89E-08	2	50	5	25	1,825	25,550
Acenaphthene			5.26E-08	2	50	5	25	1,825	25,550
Acenaphthylene			1.12E-08	2	50	5	25	1,825	25,550
Anthracene			5.46E-08	2	50	5	25	1,825	25,550
Benzo(a)anthracene			9.77E-08	2	50	5	25	1,825	25,550
Benzo(a)pyrene			1.32E-07	2	50	5	25	1,825	25,550
Benzo(b)fluoranthene			1.35E-07	2	50	5	25	1,825	25,550
Benzo(g,h,i)perylene			1.07E-07	2	50	5	25	1,825	25,550
Benzo(k)fluoranthene			8.95E-08	2	50	5	25	1,825	25,550
Carbazole			1.12E-07	2	50	5	25	1,825	25,550
Chrysene			5.95E-08	2	50	5	25	1,825	25,550
Di-n-butylphthalate			5.79E-08	2	50	5	25	1,825	25,550
Dibenz(a,h)anthracene			4.63E-08	2	50	5	25	1,825	25,550
Dibenzofuran			ERR	2	50	5	25	1,825	25,550
Diethylphthalate			7.22E-10	2	50	5	25	1,825	25,550
Fluoranthene			1.49E-07	2	50	5	25	1,825	25,550
Fluorene			4.80E-08	2	50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene			1.04E-07	2	50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			6.29E-08	2	50	5	25	1,825	25,550
Naphthalene			5.32E-08	2	50	5	25	1,825	25,550
Pentachlorophenol			4.30E-08	2	50	5	25	1,825	25,550
Phenanthrene			1.09E-07	2	50	5	25	1,825	25,550
Pyrene			1.51E-07	2	50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			7.03E-08	2	50	5	25	1,825	25,550

TABLE 6-12

CALCULATION OF INTAKE (ONSITE)
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Pesticides									
4,4'-DDD			2.03E-10	2	50	5	25	1,825	25,550
4,4'-DDE			3.38E-09	2	50	5	25	1,825	25,550
4,4'-DDT		1.28E-12	1.63E-09	2	50	5	25	1,825	25,550
Aldrin	9.42E-13	6.73E-14	8.59E-11	2	50	5	25	1,825	25,550
Aroclor-1254		1.82E-12	2.33E-09	2	50	5	25	1,825	25,550
Aroclor-1260			2.52E-09	2	50	5	25	1,825	25,550
Dieldrin		1.41E-13	1.80E-10	2	50	5	25	1,825	25,550
Endosulfan I			3.40E-10	2	50	5	25	1,825	25,550
Endosulfan II			1.67E-10	2	50	5	25	1,825	25,550
Endosulfan sulfate			1.63E-10	2	50	5	25	1,825	25,550
Endrin			2.02E-10	2	50	5	25	1,825	25,550
Endrin aldehyde			1.85E-10	2	50	5	25	1,825	25,550
Endrin ketone			1.91E-10	2	50	5	25	1,825	25,550
Heptachlor		3.69E-14	4.72E-11	2	50	5	25	1,825	25,550
Heptachlor epoxide		7.24E-14	9.24E-11	2	50	5	25	1,825	25,550
Toxaphene		3.69E-12	4.72E-09	2	50	5	25	1,825	25,550
alpha-Chlordane			2.17E-10	2	50	5	25	1,825	25,550
beta-BHC		7.11E-14	9.08E-11	2	50	5	25	1,825	25,550
gamma-BHC (Lindane)			8.50E-11	2	50	5	25	1,825	25,550
gamma-Chlordane			2.18E-10	2	50	5	25	1,825	25,550
Nitroaromatics									
2-amino-4,6-Dinitrotoluene			3.36E-09	2	50	5	25	1,825	25,550
Tetryl			3.23E-09	2	50	5	25	1,825	25,550
Metals									
Antimony			1.97E-06	2	50	5	25	1,825	25,550
Barium	1.58E-07		1.44E-05	2	50	5	25	1,825	25,550
Copper			3.42E-04	2	50	5	25	1,825	25,550
Lead			1.31E-05	2	50	5	25	1,825	25,550
Mercury	4.04E-06		3.69E-04	2	50	5	25	1,825	25,550
Selenium			4.62E-06	2	50	5	25	1,825	25,550
Thallium			5.17E-08	2	50	5	25	1,825	25,550
Zinc			1.37E-05	2	50	5	25	1,825	25,550
Herbicides									
2,4,5-T			1.53E-10	2	50	5	25	1,825	25,550
MCPP			1.65E-07	2	50	5	25	1,825	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:	**Assumptions:**
CA = Chemical Concentration in Air (mg/m³)	**Calculated Air EPC Data - RME**
IR = Inhalation Rate (m³/day)	**2 (RME Child)**
EF = Exposure Frequency (days/yr)	**50**
ED = Exposure Duration (years)	**5 (RME)**
BW = Bodyweight (kg)	**25 (Child)**
AT = Averaging Time (days)	**5 x 365 (Nc), 70 x 365 (Car)**

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-61

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2-Tetrachloroethane		1.88E-13	NA	2.03E-01		3.81E-14
Acetone			NA	NA		
Benzene		2.17E-13	NA	2.91E-02		6.31E-15
Carbon Disulfide	2.08E-12		2.86E-03	NA	7.29E-10	
Chloroform		5.95E-14	NA	8.05E-02		4.79E-15
Methylene Chloride	8.33E-13	5.95E-14	8.57E-01	1.65E-03	9.72E-13	9.82E-17
Toluene	1.25E-12		1.14E-01	NA	1.09E-11	
Xylene (total)			NA	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Diethylphthalate			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Ethylhexyl)phthalate			NA	NA		

TABLE 6-61

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		1.28E-12	NA	3.40E-01		4.34E-13
Aldrin	9.42E-13	6.73E-14	1.70E+01	1.72E+01	5.54E-14	1.15E-12
Aroclor-1254		1.82E-12	NA	4.00E-01		7.28E-13
Aroclor-1260			NA	NA		
Dieldrin		1.41E-13	NA	1.61E+01		2.26E-12
Endosulfan I			NA	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor		3.69E-14	NA	4.55E+00		1.68E-13
Heptachlor epoxide		7.24E-14	NA	9.10E+00		6.58E-13
Toxaphene		3.69E-12	NA	1.12E+00		4.14E-12
alpha-Chlordane			NA	NA		
beta-BHC		7.11E-14	NA	1.86E+00		1.32E-13
gamma-BHC (Lindane)			NA	NA		
gamma-Chlordane			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			NA	NA		
Metals						
Antimony			NA	NA		
Barium	1.58E-07		1.43E-04	NA	1.10E-03	
Copper			NA	NA		
Lead			NA	NA		
Mercury	4.04E-06		8.57E-05	NA	4.72E-02	
Selenium			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
Herbicides						
2,4,5-T			NA	NA		
MCPP			NA	NA		
Total HQ & CR					**4.83E-02**	**9.72E-12**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-7A

AMBIENT AIR EXPOSURE POINT CONCENTRATIONS
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

COMPOUND	SURFACE SOIL EPC Data mg/kg	AVERAGE TSP (ug/m³)	CONVERSION FACTOR (kg/ug)	AMBIENT AIR CALCULATED EPC (mg/m³)	MEASURED AIR SAMPLES (mg/m³)		AMBIENT AIR EPC (mg/m³)
Volatile Organics							
1,1,2,2-Tetrachloroethane	6.31E-03	3.80E+01	1.00E-09	2.40E-10			2.40E-10
Acetone	7.30E-03	3.80E+01	1.00E-09	2.78E-10			2.78E-10
Benzene	5.00E-03	3.80E+01	1.00E-09	2.78E-10			2.78E-10
Carbon Disulfide	2.00E-03	3.80E+01	1.00E-09	1.90E-10			1.90E-10
Chloroform	2.00E-03	3.80E+01	1.00E-09	7.60E-11			7.60E-11
Methylene Chloride	3.00E-03	3.80E+01	1.00E-09	7.60E-11			7.60E-11
Toluene	6.11E-03	3.80E+01	1.00E-09	1.14E-10			1.14E-10
Xylene (total)	4.25E-03	3.80E+01	1.00E-09	2.32E-10			2.32E-10
Semivolatile Organics							
2,4-Dinitrotoluene	4.02E+00	3.80E+01	1.00E-09	1.53E-07			1.53E-07
2,6-Dinitrotoluene	1.11E+00	3.80E+01	1.00E-09	4.20E-08			4.20E-08
2-Methylnaphthalene	1.11E+00	3.80E+01	1.00E-09	4.20E-08	7.84E-05	U	4.20E-08
3,3'-Dichlorobenzidine	7.44E-01	3.80E+01	1.00E-09	2.83E-08			2.83E-08
3-nitroaniline	1.81E+00	3.80E+01	1.00E-09	6.89E-08			6.89E-08
Acenaphthene	1.39E+00	3.80E+01	1.00E-09	5.26E-08	7.84E-05	U	5.26E-08
Acenaphthylene	2.94E-01	3.80E+01	1.00E-09	1.12E-08			1.12E-08
Anthracene	1.44E+00	3.80E+01	1.00E-09	5.46E-08	7.84E-05	U	5.46E-08
Benzo(a)anthracene	2.57E+00	3.80E+01	1.00E-09	9.77E-08			9.77E-08
Benzo(a)pyrene	3.49E+00	3.80E+01	1.00E-09	1.32E-07			1.32E-07
Benzo(b)fluoranthene	3.56E+00	3.80E+01	1.00E-09	1.35E-07			1.35E-07
Benzo(g,h,i)perylene	2.82E+00	3.80E+01	1.00E-09	1.07E-07			1.07E-07
Benzo(k)fluoranthene	2.35E+00	3.80E+01	1.00E-09	8.95E-08			8.95E-08
Carbazole	1.41E+00	3.80E+01	1.00E-09	1.12E-07			1.12E-07
Chrysene	2.94E+00	3.80E+01	1.00E-09	5.95E-08			5.95E-08
Di-n-butylphthalate	1.57E+00	3.80E+01	1.00E-09	5.79E-08	7.84E-05	U	5.79E-08
Dibenz(a,h)anthracene	1.52E+00	3.80E+01	1.00E-09	4.63E-08			4.63E-08
Dibenzofuran	1.22E+00	3.80E+01	1.00E-09	ERR	7.84E-05	U	ERR
Diethylphthalate	1.90E-02	3.80E+01	1.00E-09	7.22E-10	7.84E-05	U	7.22E-10
Fluoranthene	3.92E+00	3.80E+01	1.00E-09	1.49E-07			1.49E-07
Fluorene	1.26E+00	3.80E+01	1.00E-09	4.80E-08	7.84E-05	U	4.80E-08
Indeno(1,2,3-cd)pyrene	2.75E+00	3.80E+01	1.00E-09	1.04E-07			1.04E-07
N-Nitrosodiphenylamine (1)	1.65E+00	3.80E+01	1.00E-09	6.29E-08			6.29E-08
Naphthalene	1.40E+00	3.80E+01	1.00E-09	5.32E-08			5.32E-08
Pentachlorophenol	1.13E+00	3.80E+01	1.00E-09	4.30E-08			4.30E-08
Phenanthrene	2.86E+00	3.80E+01	1.00E-09	1.09E-07	7.84E-05	U	1.09E-07
Pyrene	3.98E+00	3.80E+01	1.00E-09	1.51E-07			1.51E-07
bis(2-Ethylhexyl)phthalate	1.85E+00	3.80E+01	1.00E-09	7.03E-08	7.84E-05	U	7.03E-08

TABLE 6-7A

AMBIENT AIR EXPOSURE POINT CONCENTRATIONS
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

COMPOUND	SURFACE SOIL EPC Data mg/kg	AVERAGE TSP (ug/m³)	CONVERSION FACTOR (kg/ug)	AMBIENT AIR CALCULATED EPC (mg/m³)	MEASURED AIR SAMPLES (mg/m³)	AMBIENT AIR EPC (mg/m³)
Pesticides						
4,4'-DDD	5.35E-03	3.80E+01	1.00E-09	2.03E-10		2.03E-10
4,4'-DDE	8.90E-02	3.80E+01	1.00E-09	3.38E-09		3.38E-09
4,4'-DDT	4.30E-02	3.80E+01	1.00E-09	1.63E-09		1.63E-09
Aldrin	2.26E-03	3.80E+01	1.00E-09	8.59E-11		8.59E-11
Aroclor-1254	6.12E-02	3.80E+01	1.00E-09	2.33E-09		2.33E-09
Aroclor-1260	6.64E-02	3.80E+01	1.00E-09	2.52E-09		2.52E-09
Dieldrin	4.72E-03	3.80E+01	1.00E-09	1.80E-10		1.80E-10
Endosulfan I	8.94E-03	3.80E+01	1.00E-09	3.40E-10		3.40E-10
Endosulfan II	4.40E-03	3.80E+01	1.00E-09	1.67E-10		1.67E-10
Endosulfan sulfate	4.28E-03	3.80E+01	1.00E-09	1.63E-10		1.63E-10
Endrin	5.32E-03	3.80E+01	1.00E-09	2.02E-10		2.02E-10
Endrin aldehyde	4.86E-03	3.80E+01	1.00E-09	1.85E-10		1.85E-10
Endrin ketone	5.04E-03	3.80E+01	1.00E-09	1.91E-10		1.91E-10
Heptachlor	1.24E-03	3.80E+01	1.00E-09	4.72E-11		4.72E-11
Heptachlor epoxide	2.43E-03	3.80E+01	1.00E-09	9.24E-11		9.24E-11
Toxaphene	1.24E-01	3.80E+01	1.00E-09	4.72E-09		4.72E-09
alpha-Chlordane	5.72E-03	3.80E+01	1.00E-09	2.17E-10		2.17E-10
beta-BHC	2.39E-03	3.80E+01	1.00E-09	9.08E-11		9.08E-11
gamma-BHC (Lindane)	2.24E-03	3.80E+01	1.00E-09	8.50E-11		8.50E-11
gamma-Chlordane	5.73E-03	3.80E+01	1.00E-09	2.18E-10		2.18E-10
Nitroaromatics						
2-amino-4,6-Dinitrotoluene	8.86E-02	3.80E+01	1.00E-09	3.36E-09		3.36E-09
Tetryl	8.50E-02	3.80E+01	1.00E-09	3.23E-09		3.23E-09
Metals						
Antimony	5.18E+01	3.80E+01	1.00E-09	1.97E-06	9.80E-06 U	1.97E-06
Barium	3.79E+02	3.80E+01	1.00E-09	1.44E-05	1.44E-05	1.44E-05
Copper	5.47E+02	3.80E+01	1.00E-09	2.08E-05	3.42E-04	3.42E-04
Lead	7.45E+03	3.80E+01	1.00E-09	2.83E-04	1.31E-05	1.31E-05
Mercury	1.34E+00	3.80E+01	1.00E-09	5.10E-08	3.69E-04	3.69E-04
Selenium	6.38E-01	3.80E+01	1.00E-09	2.42E-08	4.62E-06	4.62E-06
Thallium	1.36E+00	3.80E+01	1.00E-09	5.17E-08	6.50E-06 U	5.17E-08
Zinc	3.61E+02	3.80E+01	1.00E-09	1.37E-05	6.52E-05 U	1.37E-05
Herbicides						
2,4,5-T	4.03E-03	3.80E+01	1.00E-09	1.53E-10		1.53E-10
MCPP	4.33E+00	3.80E+01	1.00E-09	1.65E-07		1.65E-07

EQUATION: **Calculated Air EPC (mg/m3) = Soil EPC x TSP x CF**

Variables:
TSP = Total Suspended Particulates
CF = Conversion Factor

Assumptions:
Average value - 38 ug/m3
10-9 kg/ug

U = Compound was not detected above the detection limit shown

TABLE 6-8

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Volatile Organics									
1,1,2,2-Tetrachloroethane		1.34E-12	2.40E-10	20	20	25	70	9,125	25,550
Acetone			2.78E-10	20	20	25	70	9,125	25,550
Benzene		1.55E-12	2.78E-10	20	20	25	70	9,125	25,550
Carbon Disulfide	2.97E-12		1.90E-10	20	20	25	70	9,125	25,550
Chloroform		4.25E-13	7.60E-11	20	20	25	70	9,125	25,550
Methylene Chloride	1.19E-12	4.25E-13	7.60E-11	20	20	25	70	9,125	25,550
Toluene	1.78E-12		1.14E-10	20	20	25	70	9,125	25,550
Xylene (total)			2.32E-10	20	20	25	70	9,125	25,550
Semivolatile Organics									
2,4-Dinitrotoluene			1.53E-07	20	20	25	70	9,125	25,550
2,6-Dinitrotoluene			4.20E-08	20	20	25	70	9,125	25,550
2-Methylnaphthalene			4.20E-08	20	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine			2.83E-08	20	20	25	70	9,125	25,550
3-nitroaniline			6.89E-08	20	20	25	70	9,125	25,550
Acenaphthene			5.26E-08	20	20	25	70	9,125	25,550
Acenaphthylene			1.12E-08	20	20	25	70	9,125	25,550
Anthracene			5.46E-08	20	20	25	70	9,125	25,550
Benzo(a)anthracene			9.77E-08	20	20	25	70	9,125	25,550
Benzo(a)pyrene			1.32E-07	20	20	25	70	9,125	25,550
Benzo(b)fluoranthene			1.35E-07	20	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			1.07E-07	20	20	25	70	9,125	25,550
Benzo(k)fluoranthene			8.95E-08	20	20	25	70	9,125	25,550
Carbazole			1.12E-07	20	20	25	70	9,125	25,550
Chrysene			5.95E-08	20	20	25	70	9,125	25,550
Di-n-butylphthalate			5.79E-08	20	20	25	70	9,125	25,550
Dibenz(a,h)anthracene			4.63E-08	20	20	25	70	9,125	25,550
Dibenzofuran			ERR	20	20	25	70	9,125	25,550
Diethylphthalate			7.22E-10	20	20	25	70	9,125	25,550
Fluoranthene			1.49E-07	20	20	25	70	9,125	25,550
Fluorene			4.80E-08	20	20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			1.04E-07	20	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			6.29E-08	20	20	25	70	9,125	25,550
Naphthalene			5.32E-08	20	20	25	70	9,125	25,550
Pentachlorophenol			4.30E-08	20	20	25	70	9,125	25,550
Phenanthrene			1.09E-07	20	20	25	70	9,125	25,550
Pyrene			1.51E-07	20	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			7.03E-08	20	20	25	70	9,125	25,550

TABLE 6-8

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Pesticides									
4,4'-DDD			2.03E-10	20	20	25	70	9,125	25,550
4,4'-DDE			3.38E-09	20	20	25	70	9,125	25,550
4,4'-DDT		9.13E-12	1.63E-09	20	20	25	70	9,125	25,550
Aldrin	1.35E-12	4.80E-13	8.59E-11	20	20	25	70	9,125	25,550
Aroclor-1254		1.30E-11	2.33E-09	20	20	25	70	9,125	25,550
Aroclor-1260			2.52E-09	20	20	25	70	9,125	25,550
Dieldrin		1.00E-12	1.80E-10	20	20	25	70	9,125	25,550
Endosulfan I			3.40E-10	20	20	25	70	9,125	25,550
Endosulfan II			1.67E-10	20	20	25	70	9,125	25,550
Endosulfan sulfate			1.63E-10	20	20	25	70	9,125	25,550
Endrin			2.02E-10	20	20	25	70	9,125	25,550
Endrin aldehyde			1.85E-10	20	20	25	70	9,125	25,550
Endrin ketone			1.91E-10	20	20	25	70	9,125	25,550
Heptachlor		2.64E-13	4.72E-11	20	20	25	70	9,125	25,550
Heptachlor epoxide		5.17E-13	9.24E-11	20	20	25	70	9,125	25,550
Toxaphene		2.64E-11	4.72E-09	20	20	25	70	9,125	25,550
alpha-Chlordane			2.17E-10	20	20	25	70	9,125	25,550
beta-BHC		5.08E-13	9.08E-11	20	20	25	70	9,125	25,550
gamma-BHC (Lindane)			8.50E-11	20	20	25	70	9,125	25,550
gamma-Chlordane			2.18E-10	20	20	25	70	9,125	25,550
Nitroaromatics									
2-amino-4,6-Dinitrotoluene			3.36E-09	20	20	25	70	9,125	25,550
Tetryl			3.23E-09	20	20	25	70	9,125	25,550
Metals									
Antimony			1.97E-06	20	20	25	70	9,125	25,550
Barium	2.25E-07		1.44E-05	20	20	25	70	9,125	25,550
Copper			3.42E-04	20	20	25	70	9,125	25,550
Lead			1.31E-05	20	20	25	70	9,125	25,550
Mercury	5.78E-06		3.69E-04	20	20	25	70	9,125	25,550
Selenium			4.62E-06	20	20	25	70	9,125	25,550
Thallium			5.17E-08	20	20	25	70	9,125	25,550
Zinc			1.37E-05	20	20	25	70	9,125	25,550
Herbicides									
2,4,5-T			1.53E-10	20	20	25	70	9,125	25,550
MCPP			1.65E-07	20	20	25	70	9,125	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:	**Assumptions:**
CA = Chemical Concentration in Air (mg/m³)	**Calculated Air EPC Data - RME**
IR = Inhalation Rate (m³/day)	**20 (RME All Receptors)**
EF = Exposure Frequency (days/yr)	**20 (RME Site Worker)**
ED = Exposure Duration (years)	**25 (RME Site Worker)**
BW = Bodyweight (kg)	**70 (Adult Male)**
AT = Averaging Time (days)	**25 x 365 (Nc), 70 x 365 (Car)**

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-43

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2-Tetrachloroethane		1.34E-12	NA	2.03E-01		2.72E-13
Acetone			NA	NA		
Benzene		1.55E-12	NA	2.91E-02		4.51E-14
Carbon Disulfide	2.97E-12		2.86E-03	NA	1.04E-09	
Chloroform		4.25E-13	NA	8.05E-02		3.42E-14
Methylene Chloride	1.19E-12	4.25E-13	8.57E-01	1.65E-03	1.39E-12	7.01E-16
Toluene	1.78E-12		1.14E-01	NA	1.56E-11	
Xylene (total)			NA	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Diethylphthalate			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Ethylhexyl)phthalate			NA	NA		

TABLE 6-43

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		9.13E-12	NA	3.40E-01		3.10E-12
Aldrin	1.35E-12	4.80E-13	1.70E+01	1.72E+01	7.91E-14	8.24E-12
Aroclor-1254		1.30E-11	NA	4.00E-01		5.20E-12
Aroclor-1260			NA	NA		
Dieldrin		1.00E-12	NA	1.61E+01		1.62E-11
Endosulfan I			NA	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor		2.64E-13	NA	4.55E+00		1.20E-12
Heptachlor epoxide		5.17E-13	NA	9.10E+00		4.70E-12
Toxaphene		2.64E-11	NA	1.12E+00		2.95E-11
alpha-Chlordane			NA	NA		
beta-BHC		5.08E-13	NA	1.86E+00		9.42E-13
gamma-BHC (Lindane)			NA	NA		
gamma-Chlordane			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			NA	NA		
Metals						
Antimony			NA	NA		
Barium	2.25E-07		1.43E-04	NA	1.58E-03	
Copper			NA	NA		
Lead			NA	NA		
Mercury	5.78E-06		8.57E-05	NA	6.74E-02	
Selenium			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
Herbicides						
2,4,5-T			NA	NA		
MCPP			NA	NA		
Total HQ & CR					**6.90E-02**	**6.94E-11**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-10

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Volatile Organics									
1,1,2,2-Tetrachloroethane		6.70E-13	2.40E-10	20	250	1	70	365	25,550
Acetone			2.78E-10	20	250	1	70	365	25,550
Benzene		7.76E-13	2.78E-10	20	250	1	70	365	25,550
Carbon Disulfide	3.72E-11		1.90E-10	20	250	1	70	365	25,550
Chloroform		2.12E-13	7.60E-11	20	250	1	70	365	25,550
Methylene Chloride	1.49E-11	2.12E-13	7.60E-11	20	250	1	70	365	25,550
Toluene	2.23E-11		1.14E-10	20	250	1	70	365	25,550
Xylene (total)			2.32E-10	20	250	1	70	365	25,550
Semivolatile Organics									
2,4-Dinitrotoluene			1.53E-07	20	250	1	70	365	25,550
2,6-Dinitrotoluene			4.20E-08	20	250	1	70	365	25,550
2-Methylnaphthalene			4.20E-08	20	250	1	70	365	25,550
3,3'-Dichlorobenzidine			2.83E-08	20	250	1	70	365	25,550
3-nitroaniline			6.89E-08	20	250	1	70	365	25,550
Acenaphthene			5.26E-08	20	250	1	70	365	25,550
Acenaphthylene			1.12E-08	20	250	1	70	365	25,550
Anthracene			5.46E-08	20	250	1	70	365	25,550
Benzo(a)anthracene			9.77E-08	20	250	1	70	365	25,550
Benzo(a)pyrene			1.32E-07	20	250	1	70	365	25,550
Benzo(b)fluoranthene			1.35E-07	20	250	1	70	365	25,550
Benzo(g,h,i)perylene			1.07E-07	20	250	1	70	365	25,550
Benzo(k)fluoranthene			8.95E-08	20	250	1	70	365	25,550
Carbazole			1.12E-07	20	250	1	70	365	25,550
Chrysene			5.95E-08	20	250	1	70	365	25,550
Di-n-butylphthalate			5.79E-08	20	250	1	70	365	25,550
Dibenz(a,h)anthracene			4.63E-08	20	250	1	70	365	25,550
Dibenzofuran			ERR	20	250	1	70	365	25,550
Diethylphthalate			7.22E-10	20	250	1	70	365	25,550
Fluoranthene			1.49E-07	20	250	1	70	365	25,550
Fluorene			4.80E-08	20	250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene			1.04E-07	20	250	1	70	365	25,550
N-Nitrosodiphenylamine (1)			6.29E-08	20	250	1	70	365	25,550
Naphthalene			5.32E-08	20	250	1	70	365	25,550
Pentachlorophenol			4.30E-08	20	250	1	70	365	25,550
Phenanthrene			1.09E-07	20	250	1	70	365	25,550
Pyrene			1.51E-07	20	250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate			7.03E-08	20	250	1	70	365	25,550

TABLE 6-10

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Pesticides									
4,4'-DDD			2.03E-10	20	250	1	70	365	25,550
4,4'-DDE			3.38E-09	20	250	1	70	365	25,550
4,4'-DDT		4.56E-12	1.63E-09	20	250	1	70	365	25,550
Aldrin	1.68E-11	2.40E-13	8.59E-11	20	250	1	70	365	25,550
Aroclor-1254		6.50E-12	2.33E-09	20	250	1	70	365	25,550
Aroclor-1260			2.52E-09	20	250	1	70	365	25,550
Dieldrin		5.02E-13	1.80E-10	20	250	1	70	365	25,550
Endosulfan I			3.40E-10	20	250	1	70	365	25,550
Endosulfan II			1.67E-10	20	250	1	70	365	25,550
Endosulfan sulfate			1.63E-10	20	250	1	70	365	25,550
Endrin			2.02E-10	20	250	1	70	365	25,550
Endrin aldehyde			1.85E-10	20	250	1	70	365	25,550
Endrin ketone			1.91E-10	20	250	1	70	365	25,550
Heptachlor		1.32E-13	4.72E-11	20	250	1	70	365	25,550
Heptachlor epoxide		2.58E-13	9.24E-11	20	250	1	70	365	25,550
Toxaphene		1.32E-11	4.72E-09	20	250	1	70	365	25,550
alpha-Chlordane			2.17E-10	20	250	1	70	365	25,550
beta-BHC		2.54E-13	9.08E-11	20	250	1	70	365	25,550
gamma-BHC (Lindane)			8.50E-11	20	250	1	70	365	25,550
gamma-Chlordane			2.18E-10	20	250	1	70	365	25,550
Nitroaromatics									
2-amino-4,6-Dinitrotoluene			3.36E-09	20	250	1	70	365	25,550
Tetryl			3.23E-09	20	250	1	70	365	25,550
Metals									
Antimony			1.97E-06	20	250	1	70	365	25,550
Barium	2.82E-06		1.44E-05	20	250	1	70	365	25,550
Copper			3.42E-04	20	250	1	70	365	25,550
Lead			1.31E-05	20	250	1	70	365	25,550
Mercury	7.22E-05		3.69E-04	20	250	1	70	365	25,550
Selenium			4.62E-06	20	250	1	70	365	25,550
Thallium			5.17E-08	20	250	1	70	365	25,550
Zinc			1.37E-05	20	250	1	70	365	25,550
Herbicides									
2,4,5-T			1.53E-10	20	250	1	70	365	25,550
MCPP			1.65E-07	20	250	1	70	365	25,550

EQUATION: Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:

CA = Chemical Concentration in Air (mg/m³)
IR = Inhalation Rate (m³/day)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

Calculated Air EPC Data - RME
20 (all receptors)
250 (RME Construction Workers)
1 (Upper bound period of Construction Worker)
70 (Adult Male)
1 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-55

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2-Tetrachloroethane		6.70E-13	NA	2.03E-01		1.36E-13
Acetone			NA	NA		
Benzene		7.76E-13	NA	2.91E-02		2.25E-14
Carbon Disulfide	3.72E-11		2.86E-03	NA	1.30E-08	
Chloroform		2.12E-13	NA	8.05E-02		1.71E-14
Methylene Chloride	1.49E-11	2.12E-13	8.57E-01	1.65E-03	1.74E-11	3.51E-16
Toluene	2.23E-11		1.14E-01	NA	1.95E-10	
Xylene (total)			NA	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Diethylphthalate			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Ethylhexyl)phthalate			NA	NA		

TABLE 6-55

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
BASE CASE
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		4.56E-12	NA	3.40E-01		1.55E-12
Aldrin	1.68E-11	2.40E-13	1.70E+01	1.72E+01	9.89E-13	4.12E-12
Aroclor-1254		6.50E-12	NA	4.00E-01		2.60E-12
Aroclor-1260			NA	NA		
Dieldrin		5.02E-13	NA	1.61E+01		8.08E-12
Endosulfan I			NA	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor		1.32E-13	NA	4.55E+00		6.00E-13
Heptachlor epoxide		2.58E-13	NA	9.10E+00		2.35E-12
Toxaphene		1.32E-11	NA	1.12E+00		1.48E-11
alpha-Chlordane			NA	NA		
beta-BHC		2.54E-13	NA	1.86E+00		4.71E-13
gamma-BHC (Lindane)			NA	NA		
gamma-Chlordane			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			NA	NA		
Metals						
Antimony			NA	NA		
Barium	2.82E-06		1.43E-04	NA	1.97E-02	
Copper			NA	NA		
Lead			NA	NA		
Mercury	7.22E-05		8.57E-05	NA	8.42E-01	
Selenium			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
Herbicides						
2,4,5-T			NA	NA		
MCPP			NA	NA		
Total HQ & CR					**8.62E-01**	**3.47E-11**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-20

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Volatile Organics											
1,1,2,2,-Tetrachloroethane		4.94E-10	6.31E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Acetone	8.00E-09		7.30E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Benzene		3.91E-10	5.00E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Carbon Disulfide	2.19E-09		2.00E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Chloroform	2.19E-09	1.57E-10	2.00E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Methylene Chloride	3.29E-09	2.35E-10	3.00E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Toluene	6.70E-09		6.11E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Xylene (total)	4.66E-09		4.25E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Semivolatile Organics											
2,4-Dinitrotoluene	4.41E-06		4.02E+00	200	1.00E-06	1	50	5	25	1,825	25,550
2,6-Dinitrotoluene	1.21E-06		1.11E+00	200	1.00E-06	1	50	5	25	1,825	25,550
2-methylnaphthalene			1.11E+00	200	1.00E-06	1	50	5	25	1,825	25,550
3,3'-Dichlorobenzidine			7.44E-01	200	1.00E-06	1	50	5	25	1,825	25,550
3-nitroaniline	1.99E-06		1.81E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Acenaphthene			1.39E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Acenaphthylene	3.22E-07		2.94E-01	200	1.00E-06	1	50	5	25	1,825	25,550
Anthracene		1.12E-07	1.44E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(a)anthracene		2.01E-07	2.57E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(a)pyrene		2.73E-07	3.49E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(b)fluoranthene			3.56E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(g,h,i)perylene		2.21E-07	2.82E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(k)fluoranthene		1.84E-07	2.35E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Carbazole		1.11E-07	1.41E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Chrysene	3.23E-06		2.94E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Di-n-butylphthalate		1.23E-07	1.57E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Dibenz(a,h)anthracene			1.52E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Dibenzofuran	1.34E-06		1.22E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Diethylphthalate	2.08E-08		1.90E-02	200	1.00E-06	1	50	5	25	1,825	25,550
Fluoranthene	4.29E-06		3.92E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Fluorene		9.89E-08	1.26E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene		2.15E-07	2.75E+00	200	1.00E-06	1	50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			1.65E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Naphthalene	1.54E-06	1.10E-07	1.40E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Pentachlorophenol			1.13E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Phenanthrene	3.13E-06		2.86E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Pyrene	4.36E-06	3.11E-07	3.98E+00	200	1.00E-06	1	50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate	2.03E-06	1.45E-07	1.85E+00	200	1.00E-06	1	50	5	25	1,825	25,550

TABLE 6-20

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Pesticides											
4,4'-DDD			5.35E-03	200	1.00E-06	1	50	5	25	1,825	25,550
4,4'-DDE	9.75E-08	6.97E-09	8.90E-02	200	1.00E-06	1	50	5	25	1,825	25,550
4,4'-DDT	4.71E-08	3.36E-09	4.30E-02	200	1.00E-06	1	50	5	25	1,825	25,550
Aldrin	2.48E-09	1.77E-10	2.26E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Aroclor-1254		4.79E-09	6.12E-02	200	1.00E-06	1	50	5	25	1,825	25,550
Aroclor-1260	7.28E-08	5.20E-09	6.64E-02	200	1.00E-06	1	50	5	25	1,825	25,550
Dieldrin	5.18E-09		4.72E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endosulfan I			8.94E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endosulfan II	4.82E-09		4.40E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endosulfan sulfate	4.70E-09		4.28E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endrin			5.32E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endrin aldehyde			4.86E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endrin ketone	5.52E-09	3.94E-10	5.04E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Heptachlor	1.36E-09	9.72E-11	1.24E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Heptachlor epoxide		1.90E-10	2.43E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Toxaphene	1.36E-07	9.72E-09	1.24E-01	200	1.00E-06	1	50	5	25	1,825	25,550
alpha-Chlordane		4.48E-10	5.72E-03	200	1.00E-06	1	50	5	25	1,825	25,550
beta-BHC	2.62E-09		2.39E-03	200	1.00E-06	1	50	5	25	1,825	25,550
gamma-BHC (Lindane)			2.24E-03	200	1.00E-06	1	50	5	25	1,825	25,550
gamma-Chlordane			5.73E-03	200	1.00E-06	1	50	5	25	1,825	25,550
delta-BHC	2.26E-09	1.61E-10	2.06E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Nitroaromatics											
2-amino-4,6-Dinitrotoluene	9.70E-08		8.86E-02	200	1.00E-06	1	50	5	25	1,825	25,550
Tetryl	9.31E-08	6.65E-09	8.50E-02	200	1.00E-06	1	50	5	25	1,825	25,550
Metals											
Antimony	5.68E-05		5.18E+01	200	1.00E-06	1	50	5	25	1,825	25,550
Barium	4.15E-04		3.79E+02	200	1.00E-06	1	50	5	25	1,825	25,550
Copper			5.47E+02	200	1.00E-06	1	50	5	25	1,825	25,550
Lead	8.16E-03		7.45E+03	200	1.00E-06	1	50	5	25	1,825	25,550
Mercury	1.47E-06		1.34E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Selenium	6.99E-07		6.38E-01	200	1.00E-06	1	50	5	25	1,825	25,550
Thallium	1.49E-06		1.36E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Zinc	3.96E-04	2.83E-05	3.61E+02	200	1.00E-06	1	50	5	25	1,825	25,550
Herbicides											
2,4,5-T	2.21E-08		4.03E-03	200	1.00E-06	1	250	5	25	1,825	25,550
MCPP	2.37E-05	1.69E-06	4.33E+00	200	1.00E-06	1	250	5	25	1,825	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC Soil Data - RME
IR = Ingestion Rate (mg soil/day)	200 (RME Child)
CF = Conversion Factor (10-6 kg/mg)	10-6
FI = Fraction Ingested (unitless)	1
EF = Exposure Frequency (days/years)	50 (RME)
ED = Exposure Duration (years)	5 (RME)
BW = Bodyweight (kg)	25 (Child)
AT = Averaging Time (days)	5 x 365 (NC), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-63

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane		4.94E-10	NA	2.00E-01		9.87E-11
Acetone	8.00E-09		1.00E-01	NA	8.00E-08	
Benzene		3.91E-10	NA	2.90E-02		1.14E-11
Carbon Disulfide	2.19E-09		1.00E-01	NA	2.19E-08	
Chloroform	2.19E-09	1.57E-10	1.00E-02	6.10E-03	2.19E-07	9.55E-13
Methylene Chloride	3.29E-09	2.35E-10	6.00E-02	7.50E-03	5.48E-08	1.76E-12
Toluene	6.70E-09		2.00E-01	NA	3.35E-08	
Xylene (total)	4.66E-09		2.00E+00	NA	2.33E-09	
Semivolatile Organics						
2,4-Dinitrotoluene	4.41E-06		2.00E-03	NA	2.20E-03	
2,6-Dinitrotoluene	1.21E-06		1.00E-03	NA	1.21E-03	
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline	1.99E-06		NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene	3.22E-07		NA	NA		
Anthracene		1.12E-07	3.00E-01	NA		
Benzo(a)anthracene		2.01E-07	NA	7.30E-01		1.47E-07
Benzo(a)pyrene		2.73E-07	NA	7.30E+00		1.99E-06
Benzo(b)fluoranthene			NA	7.30E-01		
Benzo(g,h,i)perylene		2.21E-07	NA	NA		
Benzo(k)fluoranthene		1.84E-07	NA	7.30E-01		1.35E-07
Carbazole		1.11E-07	NA	2.00E-02		2.21E-09
Chrysene	3.23E-06		NA	7.30E-02		
Di-n-butylphthalate		1.23E-07	1.00E-01	NA		
Dibenz(a,h)anthracene			NA	7.30E+00		
Dibenzofuran	1.34E-06		NA	NA		
Diethylphthalate	2.08E-08		8.00E+00	NA	2.60E-09	
Fluoranthene	4.29E-06		4.00E-02	NA	1.07E-04	
Fluorene		9.89E-08	4.00E-02	NA		
Indeno(1,2,3-cd)pyrene		2.15E-07	NA	7.30E-01		1.57E-07
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene	1.54E-06	1.10E-07	NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene	3.13E-06		NA	NA		
Pyrene	4.36E-06	3.11E-07	3.00E-02	NA	1.45E-04	
bis(2-Ethylhexyl)phthalate	2.03E-06	1.45E-07	2.00E-02	1.40E-02	1.01E-04	2.03E-09

TABLE 6-63

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE	9.75E-08	6.97E-09	NA	NA		
4,4'-DDT	4.71E-08	3.36E-09	5.00E-04	3.40E-01	9.41E-05	1.14E-09
Aldrin	2.48E-09	1.77E-10	3.00E-05	1.70E+01	8.26E-05	3.01E-09
Aroclor-1254		4.79E-09	2.00E-05	2.00E+00		9.58E-09
Aroclor-1260	7.28E-08	5.20E-09	NA	7.70E+00		4.00E-08
Dieldrin	5.18E-09		5.00E-05	1.60E+01	1.04E-04	
Endosulfan I			6.00E-03	NA		
Endosulfan II	4.82E-09		NA	NA		
Endosulfan sulfate	4.70E-09		5.00E-05	NA	9.39E-05	
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone	5.52E-09	3.94E-10	NA	NA		
Heptachlor	1.36E-09	9.72E-11	5.00E-04	4.50E+00	2.72E-06	4.37E-10
Heptachlor epoxide		1.90E-10	1.30E-05	9.10E+00		1.73E-09
Toxaphene	1.36E-07	9.72E-09	NA	1.10E+00		1.07E-08
alpha-Chlordane		4.48E-10	6.00E-05	1.30E+00		5.82E-10
beta-BHC	2.62E-09		NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
delta-BHC	2.26E-09	1.61E-10	NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene	9.70E-08		NA	NA		
Tetryl	9.31E-08	6.65E-09	1.00E-02	NA	9.31E-06	
Metals						
Antimony	5.68E-05		4.00E-04	NA	1.42E-01	
Barium	4.15E-04		7.00E-02	NA	5.93E-03	
Copper			4.00E-02	NA		
Lead	8.16E-03		NA	NA		
Mercury	1.47E-06		3.00E-04	NA	4.90E-03	
Selenium	6.99E-07		5.00E-03	NA	1.40E-04	
Thallium	1.49E-06		7.00E-05	NA	2.13E-02	
Zinc	3.96E-04	2.83E-05	3.00E-01	NA	1.32E-03	
Herbicides						
2,4,5-T	2.21E-08		1.00E-02	NA	2.21E-06	
MCPP	2.37E-05	1.69E-06	1.00E-03	NA	2.37E-02	
Totals - HQ & CR					**2.03E-01**	**2.50E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Volatile Organics												
1,1,2,2,-Tetrachloroethane			6.31E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acetone			7.30E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzene			5.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Carbon Disulfide			2.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Chloroform			2.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Methylene Chloride			3.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Toluene			6.11E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Xylene (total)			4.25E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Semivolatile Organics												
2,4-Dinitrotoluene			4.02E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2,6-Dinitrotoluene			1.11E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2-methylnaphthalene			1.11E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
3,3'-Dichlorobenzidine			7.44E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
3-nitroaniline			1.81E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acenaphthene			1.39E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acenaphthylene			2.94E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Anthracene			1.44E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(a)anthracene			2.57E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(a)pyrene			3.49E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(b)fluoranthene			3.56E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(g,h,i)perylene			2.82E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(k)fluoranthene			2.35E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Carbazole			1.41E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Chrysene			2.94E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Di-n-butylphthalate			1.57E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Dibenz(a,h)anthracene			1.52E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Dibenzofuran			1.22E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Diethylphthalate			1.90E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Fluoranthene			3.92E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Fluorene			1.26E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene			2.75E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			1.65E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Naphthalene			1.40E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pentachlorophenol			1.13E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Phenanthrene			2.86E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pyrene			3.98E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			1.85E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pesticides												
4,4'-DDD			5.35E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4,4'-DDE			8.90E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4,4'-DDT			4.30E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Aldrin			2.26E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Aroclor-1254	4.63E-08	3.31E-09	6.12E-02	1.00E-06	2,300	1.0	0.06	50	5	25	1,825	25,550
Aroclor-1260		3.59E-09	6.64E-02	1.00E-06	2,300	1.0	0.06	50	5	25	1,825	25,550
Dieldrin			4.72E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan I			8.94E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan II			4.40E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan sulfate			4.28E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin			5.32E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin aldehyde			4.86E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin ketone			5.04E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Heptachlor			1.24E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Heptachlor epoxide			2.43E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Toxaphene			1.24E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
alpha-Chlordane			5.72E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
beta-BHC			2.39E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
gamma-BHC (Lindane)			2.24E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
gamma-Chlordane			5.73E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
delta-BHC			2.06E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Nitroaromatics												
2-amino-4,6-Dinitrotoluene			8.86E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Tetryl			8.50E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550

TABLE 6-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
											Nc	Car
Metals												
Antimony			5.18E+01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Barium			3.79E+02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Copper			5.47E+02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Lead			7.45E+03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Mercury			1.34E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Selenium			6.38E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Thallium			1.36E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Zinc			3.61E+02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Herbicides												
2,4,5-T			4.03E-03	1.00E-06	2,300	1.0		250	5	25	1,825	25,550
MCPP			4.33E+00	1.00E-06	2,300	1.0		250	5	25	1,825	25,550

EQUATION:

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

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC Soil Data - RME	EF = Exposure Frequency (events/year)	50 (RME)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	5 (RME)
SA = Surface Area Contact (cm²)	2,300 (RME Child)	BW = Bodyweight (kg)	25 kg (child)
AF = Soil to Skin Adherence Factor (mg/cm²)	1.0 (RME all receptors)	AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (Car)
ABS = Absorption Factor (unitless)	Compound Specific PCBs and Cd (EPA, 1992b) (Default Assumption 0% = 0.0)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-65

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane			NA	2.00E-01		
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Carbon Disulfide			1.00E-01	NA		
Chloroform			1.00E-02	6.10E-03		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
Xylene (total)			2.00E+00	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Diethylphthalate			8.00E+00	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 6-65

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254	4.63E-08	3.31E-09	1.90E-05	2.11E+00	2.44E-03	6.98E-09
Aroclor-1260		3.59E-09	NA	8.11E+00		2.91E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor			5.00E-04	4.50E+00		
Heptachlor epoxide			1.30E-05	9.10E+00		
Toxaphene			NA	1.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			1.00E-02	NA		
Metals						
Antimony			4.00E-04	NA		
Barium			7.00E-03	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			1.50E-01	NA		
Herbicides						
2,4,5-T			1.00E-02	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR					**2.44E-03**	**3.61E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

Toxicity Values
Soil Medium
REASONABLE MAXIMUM EXPOSURE (RME)
Seneca Army Depot, Romulus, New York - SEAD 16

Analyte	Oral RfD mg/kg/day	Carc. Slope Oral (mg/kg-day)-1	Dermal RfD mg/kg/day	Carc. Slope Dermal (mg/kg-day)-1
Volatile Organics				
1,1,2,2,-Tetrachloroethane	NA	2.00E-01	NA	2.00E-01
Acetone	1.00E-01	NA	1.00E-01	NA
Benzene	NA	2.90E-02	NA	2.90E-02
Carbon Disulfide	1.00E-01	NA	1.00E-01	NA
Chloroform	1.00E-02	6.10E-03	1.00E-02	6.10E-03
Methylene Chloride	6.00E-02	7.50E-03	6.00E-02	6.00E-02
Toluene	2.00E-01	NA	1.20E-01	NA
Xylene (total)	2.00E+00	NA	2.00E+00	NA
Semivolatile Organics				
2,4-Dinitrotoluene	2.00E-03	NA	2.00E-03	NA
2,6-Dinitrotoluene	1.00E-03	NA	1.00E-03	NA
2-methylnaphthalene	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	4.50E-01	NA	4.50E-01
3-nitroaniline	NA	NA	NA	NA
Acenaphthene	6.00E-02	NA	6.00E-02	NA
Acenaphthylene	NA	NA	NA	NA
Anthracene	3.00E-01	NA	3.00E-01	NA
Benzo(a)anthracene	NA	7.30E-01	NA	1.46E+00
Benzo(a)pyrene	NA	7.30E+00	NA	1.46E+01
Benzo(b)fluoranthene	NA	7.30E-01	NA	1.46E+00
Benzo(g,h,i)perylene	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	7.30E-01	NA	1.46E+00
Carbazole	NA	2.00E-02	NA	2.00E-02
Chrysene	NA	7.30E-02	NA	1.46E-01
Di-n-butylphthalate	1.00E-01	NA	8.50E-02	NA
Dibenz(a,h)anthracene	NA	7.30E+00	NA	1.46E+01
Dibenzofuran	NA	NA	NA	NA
Diethylphthalate	8.00E+00	NA	8.00E+00	NA
Fluoranthene	4.00E-02	NA	4.00E-02	NA
Fluorene	4.00E-02	NA	4.00E-02	NA
Indeno(1,2,3-cd)pyrene	NA	7.30E-01	NA	1.46E+00
N-Nitrosodiphenylamine (1)	NA	4.90E-03	NA	4.90E-03
Naphthalene	NA	NA	NA	NA
Pentachlorophenol	3.00E-02	1.20E-01	3.00E-02	1.20E-01
Phenanthrene	NA	NA	NA	NA
Pyrene	3.00E-02	NA	3.00E-02	NA
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	2.00E-02	1.40E-02
Pesticides				
4,4'-DDD	5.00E-04	2.40E-01	5.00E-04	2.40E-01
4,4'-DDE	NA	NA	NA	NA
4,4'-DDT	5.00E-04	3.40E-01	5.00E-04	3.40E-01
Aldrin	3.00E-05	1.70E+01	3.00E-05	1.70E+01
Aroclor-1254	2.00E-05	2.00E+00	1.90E-05	2.11E+00
Aroclor-1260	NA	7.70E+00	NA	8.11E+00
Dieldrin	5.00E-05	1.60E+01	5.00E-05	1.60E+01
Endosulfan I	6.00E-03	NA	6.00E-03	NA
Endosulfan II	NA	NA	NA	NA
Endosulfan sulfate	5.00E-05	NA	5.00E-05	NA
Endrin	3.00E-04	NA	3.00E-04	NA
Endrin aldehyde	NA	NA	NA	NA
Endrin ketone	NA	NA	NA	NA
Heptachlor	5.00E-04	4.50E+00	5.00E-04	4.50E+00
Heptachlor epoxide	1.30E-05	9.10E+00	1.30E-05	9.10E+00
Toxaphene	NA	1.10E+00	NA	1.10E+00
alpha-Chlordane	6.00E-05	1.30E+00	6.00E-05	1.30E+00
beta-BHC	NA	1.80E+00	NA	1.80E+00
gamma-BHC (Lindane)	3.00E-04	NA	3.00E-04	NA
gamma-Chlordane	NA	NA	NA	NA
delta-BHC	NA	NA	NA	NA
Nitroaromatics				
2-amino-4,6-Dinitrotoluene	NA	NA	NA	NA
Tetryl	1.00E-02	NA	1.00E-02	NA
Metals				
Antimony	4.00E-04	NA	4.00E-04	NA
Barium	7.00E-02	NA	7.00E-03	NA
Copper	4.00E-02	NA	2.00E-02	NA
Lead	NA	NA	NA	NA
Mercury	3.00E-04	NA	4.50E-05	NA
Selenium	5.00E-03	NA	3.00E-03	NA
Thallium	7.00E-05	NA	7.00E-05	NA
Zinc	3.00E-01	NA	1.50E-01	NA
Herbicides				
2,4,5-T	1.00E-02	NA	1.00E-02	NA
MCPP	1.00E-03	NA	1.00E-03	NA

TABLE 6-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Volatile Organics											
1,1,2,2,-Tetrachloroethane		1.76E-10	6.31E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Acetone	5.72E-10		7.30E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Benzene		1.40E-10	5.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Carbon Disulfide	1.57E-10		2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Chloroform	1.57E-10	5.59E-11	2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Methylene Chloride	2.35E-10	8.39E-11	3.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Toluene	4.78E-10		6.11E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Xylene (total)	3.33E-10		4.25E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Semivolatile Organics											
2,4-Dinitrotoluene	3.15E-07		4.02E+00	100	1.00E-06	1	20	25	70	9,125	25,550
2,6-Dinitrotoluene	8.66E-08		1.11E+00	100	1.00E-06	1	20	25	70	9,125	25,550
2-methylnaphthalene			1.11E+00	100	1.00E-06	1	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine		2.08E-08	7.44E-01	100	1.00E-06	1	20	25	70	9,125	25,550
3-nitroaniline			1.81E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthene	1.08E-07		1.39E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthylene			2.94E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Anthracene	1.12E-07		1.44E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)anthracene		7.19E-08	2.57E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)pyrene		9.75E-08	3.49E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(b)fluoranthene		9.94E-08	3.56E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			2.82E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(k)fluoranthene		6.58E-08	2.35E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Carbazole		3.95E-08	1.41E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Chrysene		8.23E-08	2.94E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Di-n-butylphthalate	1.23E-07		1.57E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenz(a,h)anthracene		4.26E-08	1.52E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenzofuran			1.22E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Diethylphthalate	1.49E-09		1.90E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Fluoranthene	3.06E-07		3.92E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Fluorene	9.89E-08		1.26E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene		7.68E-08	2.75E+00	100	1.00E-06	1	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)		4.63E-08	1.65E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Naphthalene			1.40E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pentachlorophenol	8.86E-08	3.16E-08	1.13E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Phenanthrene			2.86E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pyrene	3.11E-07		3.98E+00	100	1.00E-06	1	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate	1.45E-07	5.17E-08	1.85E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pesticides											
4,4'-DDD	4.19E-10	1.50E-10	5.35E-03	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDE			8.90E-02	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDT	3.36E-09	1.20E-09	4.30E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Aldrin	1.77E-10	6.32E-11	2.26E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1254	4.79E-09	1.71E-09	6.12E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1260		1.86E-09	6.64E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Dieldrin	3.70E-10	1.32E-10	4.72E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan I	7.00E-10		8.94E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan II			4.40E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan sulfate	3.35E-10		4.28E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin	4.16E-10		5.32E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin aldehyde			4.86E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin ketone			5.04E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor	9.72E-11	3.47E-11	1.24E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor epoxide	1.90E-10	6.80E-11	2.43E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Toxaphene		3.47E-09	1.24E-01	100	1.00E-06	1	20	25	70	9,125	25,550
alpha-Chlordane	4.48E-10	1.60E-10	5.72E-03	100	1.00E-06	1	20	25	70	9,125	25,550
beta-BHC		6.68E-11	2.39E-03	100	1.00E-06	1	20	25	70	9,125	25,550
gamma-BHC (Lindane)	1.75E-10		2.24E-03	100	1.00E-06	1	20	25	70	9,125	25,550
gamma-Chlordane			5.73E-03	100	1.00E-06	1	20	25	70	9,125	25,550
delta-BHC			2.06E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Nitroaromatics											
2-amino-4,6-Dinitrotoluene			8.86E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Tetryl	6.65E-09		8.50E-02	100	1.00E-06	1	20	25	70	9,125	25,550

TABLE 6-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Metals											
Antimony	4.06E-06		5.18E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Barium	2.97E-05		3.79E+02	100	1.00E-06	1	20	25	70	9,125	25,550
Copper	4.28E-05		5.47E+02	100	1.00E-06	1	20	25	70	9,125	25,550
Lead			7.45E+03	100	1.00E-06	1	20	25	70	9,125	25,550
Mercury	1.05E-07		1.34E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Selenium	4.99E-08		6.38E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Thallium	1.07E-07		1.36E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Zinc	2.83E-05		3.61E+02	100	1.00E-06	1	20	25	70	9,125	25,550
Herbicides											
2,4,5-T	3.16E-10		4.03E-03	100	1.00E-06	1	20	25	70	9,125	25,550
MCPP	3.39E-07		4.33E+00	100	1.00E-06	1	20	25	70	9,125	25,550

EQUATION: **Intake (mg/kg-day) =**

$$\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC Soil Data - RME
100 (RME Site Worker)
10-6
1 (All Receptors)
20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-45

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS FROM THE INGESTION OF ONSITE SOILS (DAILY) SITE WORKER EXPOSURE (CURRENT LAND USE) REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane		1.76E-10	NA	2.00E-01		3.53E-11
Acetone	5.72E-10		1.00E-01	NA	5.72E-09	
Benzene		1.40E-10	NA	2.90E-02		4.05E-12
Carbon Disulfide	1.57E-10		1.00E-01	NA	1.57E-09	
Chloroform	1.57E-10	5.59E-11	1.00E-02	6.10E-03	1.57E-08	3.41E-13
Methylene Chloride	2.35E-10	8.39E-11	6.00E-02	7.50E-03	3.91E-09	6.29E-13
Toluene	4.78E-10		2.00E-01	NA	2.39E-09	
Xylene (total)	3.33E-10		2.00E+00	NA	1.66E-10	
Semivolatile Organics						
2,4-Dinitrotoluene	3.15E-07		2.00E-03	NA	1.57E-04	
2,6-Dinitrotoluene	8.66E-08		1.00E-03	NA	8.66E-05	
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine		2.08E-08	NA	4.50E-01		9.36E-09
3-nitroaniline			NA	NA		
Acenaphthene	1.08E-07		6.00E-02	NA	1.81E-06	
Acenaphthylene			NA	NA		
Anthracene	1.12E-07		3.00E-01	NA	3.75E-07	
Benzo(a)anthracene		7.19E-08	NA	7.30E-01		5.25E-08
Benzo(a)pyrene		9.75E-08	NA	7.30E+00		7.12E-07
Benzo(b)fluoranthene		9.94E-08	NA	7.30E-01		7.26E-08
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		6.58E-08	NA	7.30E-01		4.80E-08
Carbazole		3.95E-08	NA	2.00E-02		7.90E-10
Chrysene		8.23E-08	NA	7.30E-02		6.01E-09
Di-n-butylphthalate	1.23E-07		1.00E-01	NA	1.23E-06	
Dibenz(a,h)anthracene		4.26E-08	NA	7.30E+00		3.11E-07
Dibenzofuran			NA	NA		
Diethylphthalate	1.49E-09		8.00E+00	NA	1.86E-10	
Fluoranthene	3.06E-07		4.00E-02	NA	7.66E-06	
Fluorene	9.89E-08		4.00E-02	NA	2.47E-06	
Indeno(1,2,3-cd)pyrene		7.68E-08	NA	7.30E-01		5.61E-08
N-Nitrosodiphenylamine (1)		4.63E-08	NA	4.90E-03		2.27E-10
Naphthalene			NA	NA		
Pentachlorophenol	8.86E-08	3.16E-08	3.00E-02	1.20E-01	2.95E-06	3.80E-09
Phenanthrene			NA	NA		
Pyrene	3.11E-07		3.00E-02	NA	1.04E-05	
bis(2-Ethylhexyl)phthalate	1.45E-07	5.17E-08	2.00E-02	1.40E-02	7.24E-06	7.24E-10

TABLE 6-45

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS (DAILY)
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD	4.19E-10	1.50E-10	5.00E-04	2.40E-01	8.38E-07	3.59E-11
4,4'-DDE			NA	NA		
4,4'-DDT	3.36E-09	1.20E-09	5.00E-04	3.40E-01	6.72E-06	4.08E-10
Aldrin	1.77E-10	6.32E-11	3.00E-05	1.70E+01	5.90E-06	1.07E-09
Aroclor-1254	4.79E-09	1.71E-09	2.00E-05	2.00E+00	2.40E-04	3.42E-09
Aroclor-1260		1.86E-09	NA	7.70E+00		1.43E-08
Dieldrin	3.70E-10	1.32E-10	5.00E-05	1.60E+01	7.40E-06	2.11E-09
Endosulfan I	7.00E-10		6.00E-03	NA	1.17E-07	
Endosulfan II			NA	NA		
Endosulfan sulfate	3.35E-10		5.00E-05	NA	6.71E-06	
Endrin	4.16E-10		3.00E-04	NA	1.39E-06	
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor	9.72E-11	3.47E-11	5.00E-04	4.50E+00	1.94E-07	1.56E-10
Heptachlor epoxide	1.90E-10	6.80E-11	1.30E-05	9.10E+00	1.46E-05	6.19E-10
Toxaphene		3.47E-09	NA	1.10E+00		3.82E-09
alpha-Chlordane	4.48E-10	1.60E-10	6.00E-05	1.30E+00	7.46E-06	2.08E-10
beta-BHC		6.68E-11	NA	1.80E+00		1.20E-10
gamma-BHC (Lindane)	1.75E-10		3.00E-04	NA	5.83E-07	
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl	6.65E-09		1.00E-02	NA	6.65E-07	
Metals						
Antimony	4.06E-06		4.00E-04	NA	1.01E-02	
Barium	2.97E-05		7.00E-02	NA	4.24E-04	
Copper	4.28E-05		4.00E-02	NA	1.07E-03	
Lead			NA	NA		
Mercury	1.05E-07		3.00E-04	NA	3.50E-04	
Selenium	4.99E-08		5.00E-03	NA	9.99E-06	
Thallium	1.07E-07		7.00E-05	NA	1.52E-03	
Zinc	2.83E-05		3.00E-01	NA	9.43E-05	
Herbicides						
2,4,5-T	3.16E-10		1.00E-02	NA	3.16E-08	
MCPP	3.39E-07		1.00E-03	NA	3.39E-04	
Totals - HQ & CR					**1.45E-02**	**1.30E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-22

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Volatile Organics												
1,1,2,2,-Tetrachloroethane			6.31E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acetone			7.30E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzene			5.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbon Disulfide			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chloroform			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Methylene Chloride			3.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toluene			6.11E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Xylene (total)			4.25E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Semivolatile Organics												
2,4-Dinitrotoluene			4.02E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2,6-Dinitrotoluene			1.11E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2-methylnaphthalene			1.11E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3,3'-Dichlorobenzidine			7.44E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3-nitroaniline			1.81E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthene			1.39E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthylene			2.94E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Anthracene			1.44E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)anthracene			2.57E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)pyrene			3.49E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(b)fluoranthene			3.56E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(g,h,i)perylene			2.82E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(k)fluoranthene			2.35E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbazole			1.41E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chrysene			2.94E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Di-n-butylphthalate			1.57E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenz(a,h)anthracene			1.52E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenzofuran			1.22E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Diethylphthalate			1.90E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluoranthene			3.92E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluorene			1.26E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			2.75E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			1.65E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Naphthalene			1.40E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pentachlorophenol			1.13E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Phenanthrene			2.86E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pyrene			3.98E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			1.85E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pesticides												
4,4'-DDD			5.35E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDE			8.90E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDT			4.30E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aldrin			2.26E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aroclor-1254	1.67E-08	5.96E-09	6.12E-02	1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Aroclor-1260		6.46E-09	6.64E-02	1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Dieldrin			4.72E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan I			8.94E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan II			4.40E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan sulfate			4.28E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin			5.32E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin aldehyde			4.86E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin ketone			5.04E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor			1.24E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor epoxide			2.43E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toxaphene			1.24E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
alpha-Chlordane			5.72E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
beta-BHC			2.39E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
gamma-BHC (Lindane)			2.24E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
gamma-Chlordane			5.73E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
delta-BHC			2.06E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Nitroaromatics												
2-amino-4,6-Dinitrotoluene			8.86E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Tetryl			8.50E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550

TABLE 6-22

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Metals												
Antimony			5.18E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Barium			3.79E+02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Copper			5.47E+02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Lead			7.45E+03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Mercury			1.34E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Selenium			6.38E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Thallium			1.36E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Zinc			3.61E+02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Herbicides												
2,4,5-T			4.03E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
MCPP			4.33E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550

EQUATION:

$$\text{Absorbed dose (mg/kg-day)} = \frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC Soil Data - RME	EF = Exposure Frequency (events/year)	20 (RME Site Worker)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	25 (RME Site Worker)
SA = Surface Area Contact (cm²)	5,800 cm² (RME Site Worker)	BW = Bodyweight (kg)	70 (Adult Male)
AF =Soil to Skin Adherence Factor (mg/cm²)	1.0 (RME all receptors)	AT = Averaging Time (days)	25 x 365 (Nc) 70 x 365 Adult (Car)
ABS = Absorption Factor (unitless)	Compound Specific for PCBs and Cd EPA, 1992b (Default Assumption 0% = 0.0)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-47

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL (DAILY)
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane			NA	2.00E-01		
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Carbon Disulfide			1.00E-01	NA		
Chloroform			1.00E-02	6.10E-03		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
Xylene (total)			2.00E+00	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Diethylphthalate			8.00E+00	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 6-47

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL (DAILY)
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254	1.67E-08	5.96E-09	1.90E-05	2.11E+00	8.78E-04	1.26E-08
Aroclor-1260		6.46E-09	NA	8.11E+00		5.24E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor			5.00E-04	4.50E+00		
Heptachlor epoxide			1.30E-05	9.10E+00		
Toxaphene			NA	1.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			1.00E-02	NA		
Metals						
Antimony			4.00E-04	NA		
Barium			7.00E-03	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			1.50E-01	NA		
Herbicides						
2,4,5-T			1.00E-02	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR					**8.78E-04**	**6.50E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-13
CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Volatile Organics											
1,1,2,2,-Tetrachloroethane		1.76E-10	6.31E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Acetone	5.72E-10		7.30E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Benzene		1.40E-10	5.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Carbon Disulfide	1.57E-10		2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Chloroform	1.57E-10	5.59E-11	2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Methylene Chloride	2.35E-10	8.39E-11	3.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Toluene	4.78E-10		6.11E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Xylene (total)	3.33E-10		4.25E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Semivolatile Organics											
2,4-Dinitrotoluene	3.15E-07		4.02E+00	100	1.00E-06	1	20	25	70	9,125	25,550
2,6-Dinitrotoluene	8.66E-08		1.11E+00	100	1.00E-06	1	20	25	70	9,125	25,550
2-methylnaphthalene			1.11E+00	100	1.00E-06	1	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine		2.08E-08	7.44E-01	100	1.00E-06	1	20	25	70	9,125	25,550
3-nitroaniline			1.81E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthene	1.08E-07		1.39E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthylene			2.94E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Anthracene	1.12E-07		1.44E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)anthracene		7.19E-08	2.57E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)pyrene		9.75E-08	3.49E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(b)fluoranthene		9.94E-08	3.56E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			2.82E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(k)fluoranthene		6.58E-08	2.35E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Carbazole		3.95E-08	1.41E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Chrysene		8.23E-08	2.94E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Di-n-butylphthalate	1.23E-07		1.57E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenz(a,h)anthracene		4.26E-08	1.52E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenzofuran			1.22E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Diethylphthalate	1.49E-09		1.90E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Fluoranthene	3.06E-07		3.92E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Fluorene	9.89E-08		1.26E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene		7.68E-08	2.75E+00	100	1.00E-06	1	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)		4.63E-08	1.65E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Naphthalene			1.40E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pentachlorophenol	8.86E-08	3.16E-08	1.13E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Phenanthrene			2.86E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pyrene	3.11E-07		3.98E+00	100	1.00E-06	1	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate	1.45E-07	5.17E-08	1.85E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pesticides											
4,4'-DDD	4.19E-10	1.50E-10	5.35E-03	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDE			8.90E-02	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDT	3.36E-09	1.20E-09	4.30E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Aldrin	1.77E-10	6.32E-11	2.26E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1254	4.79E-09	1.71E-09	6.12E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1260		1.86E-09	6.64E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Dieldrin	3.70E-10	1.32E-10	4.72E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan I	7.00E-10		8.94E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan II			4.40E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan sulfate	3.35E-10		4.28E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin	4.16E-10		5.32E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin aldehyde			4.86E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin ketone			5.04E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor	9.72E-11	3.47E-11	1.24E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor epoxide	1.90E-10	6.80E-11	2.43E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Toxaphene		3.47E-09	1.24E-01	100	1.00E-06	1	20	25	70	9,125	25,550
alpha-Chlordane	4.48E-10	1.60E-10	5.72E-03	100	1.00E-06	1	20	25	70	9,125	25,550
beta-BHC		6.68E-11	2.39E-03	100	1.00E-06	1	20	25	70	9,125	25,550
gamma-BHC (Lindane)	1.75E-10		2.24E-03	100	1.00E-06	1	20	25	70	9,125	25,550
gamma-Chlordane			5.73E-03	100	1.00E-06	1	20	25	70	9,125	25,550
delta-BHC			2.06E-03	100	1.00E-06	1	20	25	70	9,125	25,550

TABLE 6-13
CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Nitroaromatics											
2-amino-4,6-Dinitrotoluene			8.86E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Tetryl	6.65E-09		8.50E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Metals											
Antimony	4.06E-06		5.18E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Barium	2.97E-05		3.79E+02	100	1.00E-06	1	20	25	70	9,125	25,550
Copper	4.28E-05		5.47E+02	100	1.00E-06	1	20	25	70	9,125	25,550
Lead			7.45E+03	100	1.00E-06	1	20	25	70	9,125	25,550
Mercury	1.05E-07		1.34E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Selenium	4.99E-08		6.38E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Thallium	1.07E-07		1.36E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Zinc	2.83E-05		3.61E+02	100	1.00E-06	1	20	25	70	9,125	25,550
Herbicides											
2,4,5-T	3.16E-10		4.03E-03	100	1.00E-06	1	20	25	70	9,125	25,550
MCPP	3.39E-07		4.33E+00	100	1.00E-06	1	20	25	70	9,125	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC Soil Data - RME
100 (RME Site Worker)
10-6
1 (All Receptors)
20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-44
CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane		1.76E-10	NA	2.00E-01		3.53E-11
Acetone	5.72E-10		1.00E-01	NA	5.72E-09	
Benzene		1.40E-10	NA	2.90E-02		4.05E-12
Carbon Disulfide	1.57E-10		1.00E-01	NA	1.57E-09	
Chloroform	1.57E-10	5.59E-11	1.00E-02	6.10E-03	1.57E-08	3.41E-13
Methylene Chloride	2.35E-10	8.39E-11	6.00E-02	7.50E-03	3.91E-09	6.29E-13
Toluene	4.78E-10		2.00E-01	NA	2.39E-09	
Xylene (total)	3.33E-10		2.00E+00	NA	1.66E-10	
Semivolatile Organics						
2,4-Dinitrotoluene	3.15E-07		2.00E-03	NA	1.57E-04	
2,6-Dinitrotoluene	8.66E-08		1.00E-03	NA	8.66E-05	
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine		2.08E-08	NA	4.50E-01		9.36E-09
3-nitroaniline			NA	NA		
Acenaphthene	1.08E-07		6.00E-02	NA	1.81E-06	
Acenaphthylene			NA	NA		
Anthracene	1.12E-07		3.00E-01	NA	3.75E-07	
Benzo(a)anthracene		7.19E-08	NA	7.30E-01		5.25E-08
Benzo(a)pyrene		9.75E-08	NA	7.30E+00		7.12E-07
Benzo(b)fluoranthene		9.94E-08	NA	7.30E-01		7.26E-08
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		6.58E-08	NA	7.30E-01		4.80E-08
Carbazole		3.95E-08	NA	2.00E-02		7.90E-10
Chrysene		8.23E-08	NA	7.30E-02		6.01E-09
Di-n-butylphthalate	1.23E-07		1.00E-01	NA	1.23E-06	
Dibenz(a,h)anthracene		4.26E-08	NA	7.30E+00		3.11E-07
Dibenzofuran			NA	NA		
Diethylphthalate	1.49E-09		8.00E+00	NA	1.86E-10	
Fluoranthene	3.06E-07		4.00E-02	NA	7.66E-06	
Fluorene	9.89E-08		4.00E-02	NA	2.47E-06	
Indeno(1,2,3-cd)pyrene		7.68E-08	NA	7.30E-01		5.61E-08
N-Nitrosodiphenylamine (1)		4.63E-08	NA	4.90E-03		2.27E-10
Naphthalene			NA	NA		
Pentachlorophenol	8.86E-08	3.16E-08	3.00E-02	1.20E-01	2.95E-06	3.80E-09
Phenanthrene			NA	NA		
Pyrene	3.11E-07		3.00E-02	NA	1.04E-05	
bis(2-Ethylhexyl)phthalate	1.45E-07	5.17E-08	2.00E-02	1.40E-02	7.24E-06	7.24E-10
Pesticides						
4,4'-DDD	4.19E-10	1.50E-10	5.00E-04	2.40E-01	8.38E-07	3.59E-11
4,4'-DDE			NA	NA		
4,4'-DDT	3.36E-09	1.20E-09	5.00E-04	3.40E-01	6.72E-06	4.08E-10
Aldrin	1.77E-10	6.32E-11	3.00E-05	1.70E+01	5.90E-06	1.07E-09
Aroclor-1254	4.79E-09	1.71E-09	2.00E-05	2.00E+00	2.40E-04	3.42E-09
Aroclor-1260		1.86E-09	NA	7.70E+00		1.43E-08
Dieldrin	3.70E-10	1.32E-10	5.00E-05	1.60E+01	7.40E-06	2.11E-09
Endosulfan I	7.00E-10		6.00E-03	NA	1.17E-07	
Endosulfan II			NA	NA		
Endosulfan sulfate	3.35E-10		5.00E-05	NA	6.71E-06	
Endrin	4.16E-10		3.00E-04	NA	1.39E-06	
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor	9.72E-11	3.47E-11	5.00E-04	4.50E+00	1.94E-07	1.56E-10
Heptachlor epoxide	1.90E-10	6.80E-11	1.30E-05	9.10E+00	1.46E-05	6.19E-10
Toxaphene		3.47E-09	NA	1.10E+00		3.82E-09
alpha-Chlordane	4.48E-10	1.60E-10	6.00E-05	1.30E+00	7.46E-06	2.08E-10
beta-BHC		6.68E-11	NA	1.80E+00		1.20E-10
gamma-BHC (Lindane)	1.75E-10		3.00E-04	NA	5.83E-07	
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		

TABLE 6-44
CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl	6.65E-09		1.00E-02	NA	6.65E-07	
Metals						
Antimony	4.06E-06		4.00E-04	NA	1.01E-02	
Barium	2.97E-05		7.00E-02	NA	4.24E-04	
Copper	4.28E-05		4.00E-02	NA	1.07E-03	
Lead			NA	NA		
Mercury	1.05E-07		3.00E-04	NA	3.50E-04	
Selenium	4.99E-08		5.00E-03	NA	9.99E-06	
Thallium	1.07E-07		7.00E-05	NA	1.52E-03	
Zinc	2.83E-05		3.00E-01	NA	9.43E-05	
Herbicides						
2,4,5-T	3.16E-10		1.00E-02	NA	3.16E-08	
MCPP	3.39E-07		1.00E-03	NA	3.39E-04	
Totals - HQ & CR					**1.45E-02**	**1.30E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose (Oral)
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor (Oral)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-19
CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
Volatile Organics												
1,1,2,2,-Tetrachloroethane			6.31E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acetone			7.30E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzene			5.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbon Disulfide			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chloroform			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Methylene Chloride			3.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toluene			6.11E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Xylene (total)			4.25E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Semivolatile Organics												
2,4-Dinitrotoluene			4.02E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2,6-Dinitrotoluene			1.11E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2-methylnaphthalene			1.11E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3,3'-Dichlorobenzidine			7.44E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3-nitroaniline			1.81E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthene			1.39E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthylene			2.94E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Anthracene			1.44E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)anthracene			2.57E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)pyrene			3.49E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(b)fluoranthene			3.56E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(g,h,i)perylene			2.82E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(k)fluoranthene			2.35E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbazole			1.41E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chrysene			2.94E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Di-n-butylphthalate			1.57E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenz(a,h)anthracene			1.52E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenzofuran			1.22E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Diethylphthalate			1.90E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluoranthene			3.92E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluorene			1.26E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			2.75E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			1.65E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Naphthalene			1.40E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pentachlorophenol			1.13E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Phenanthrene			2.86E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pyrene			3.98E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			1.85E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pesticides												
4,4'-DDD			5.35E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDE			8.90E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDT			4.30E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aldrin			2.26E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aroclor-1254	1.67E-08	5.96E-09	6.12E-02	1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Aroclor-1260		6.46E-09	6.64E-02	1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Dieldrin			4.72E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan I			8.94E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan II			4.40E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan sulfate			4.28E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin			5.32E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin aldehyde			4.86E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin ketone			5.04E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor			1.24E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor epoxide			2.43E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toxaphene			1.24E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
alpha-Chlordane			5.72E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
beta-BHC			2.39E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
gamma-BHC (Lindane)			2.24E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
gamma-Chlordane			5.73E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
delta-BHC			2.06E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550

TABLE 6-19
CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
Nitroaromatics												
2-amino-4,6-Dinitrotoluene			8.86E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Tetryl			8.50E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Metals												
Antimony			5.18E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Barium			3.79E+02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Copper			5.47E+02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Lead			7.45E+03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Mercury			1.34E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Selenium			6.38E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Thallium			1.36E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Zinc			3.61E+02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Herbicides												
2,4,5-T			4.03E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
MCPP			4.33E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550

EQUATION: **Absorbed dose (mg/kg-day) =**

$$\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
CF = Conversion Factor (10-6 kg/mg)
SA = Surface Area Contact (cm²)
AF =Soil to Skin Adherence Factor (mg/cm²)
ABS = Absorption Factor (unitless)

Assumptions:

EPC Soil Data - RME
10-6
5,800 cm² (RME Site Worker)
1.0 (RME all receptors)
Compound Specific for PCBs and Cd
EPA, 1992b (Default Assumption 0% = 0.0)

Variables:

EF = Exposure Frequency (events/year)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult Male)
25 x 365 (Nc) 70 x 365 Adult (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-46
CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL (DAILY)
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane			NA	2.00E-01		
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Carbon Disulfide			1.00E-01	NA		
Chloroform			1.00E-02	6.10E-03		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
Xylene (total)			2.00E+00	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Diethylphthalate			8.00E+00	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 6-46
CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL (DAILY)
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254	1.67E-08	5.96E-09	1.90E-05	2.11E+00	8.78E-04	1.26E-08
Aroclor-1260		6.46E-09	NA	8.11E+00		5.24E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor			5.00E-04	4.50E+00		
Heptachlor epoxide			1.30E-05	9.10E+00		
Toxaphene			NA	1.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			1.00E-02	NA		
Metals						
Antimony			4.00E-04	NA		
Barium			7.00E-03	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			1.50E-01	NA		
Herbicides						
2,4,5-T			1.00E-02	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR					**8.78E-04**	**6.50E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose (Oral)
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor (Oral)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	1,1,2,2-Tetrachloroethane	UG/KG	56	0	1	1.8%	6.049	2.917	7.750	FALSE	FALSE	6.305	6.305
VOLATILE ORGANICS	2-Butanone	UG/KG	54	2	1	1.9%	5.449	0.803	5.000	FALSE	FALSE	5.842	5.000
VOLATILE ORGANICS	Acetone	UG/KG	56	0	4	7.1%	6.915	6.289	46.000	FALSE	FALSE	7.304	7.304
VOLATILE ORGANICS	Benzene	UG/KG	54	2	7	13.0%	5.181	1.237	5.000	FALSE	FALSE	5.691	5.000
VOLATILE ORGANICS	Carbon disulfide	UG/KG	54	2	3	5.6%	5.333	1.032	2.000	FALSE	FALSE	5.834	2.000
VOLATILE ORGANICS	Chloroform	UG/KG	53	3	2	3.8%	4.127	1.451	2.000	FALSE	FALSE	4.558	2.000
VOLATILE ORGANICS	Methylene chloride	UG/KG	54	2	3	5.6%	5.384	0.845	3.000	FALSE	FALSE	5.660	3.000
VOLATILE ORGANICS	Toluene	UG/KG	56	0	23	41.1%	5.223	3.575	10.000	FALSE	FALSE	6.110	6.110
VOLATILE ORGANICS	Total Xylenes	UG/KG	54	2	1	1.9%	5.523	0.537	4.250	FALSE	FALSE	5.656	4.250
SEMIVOLATILE ORGANIC	2,4-Dinitrotoluene	UG/KG	56	0	20	35.7%	3709.179	12855.584	85000.000	FALSE	FALSE	4022.334	4022.334
SEMIVOLATILE ORGANIC	2,6-Dinitrotoluene	UG/KG	56	0	11	19.6%	1492.714	6156.951	8000.000	FALSE	FALSE	1106.520	1106.520
SEMIVOLATILE ORGANIC	2-Methylnaphthalene	UG/KG	56	0	11	19.6%	989.929	2796.613	19000.000	FALSE	FALSE	1106.051	1106.051
SEMIVOLATILE ORGANIC	3,3`-Dichlorobenzidine	UG/KG	55	1	1	1.8%	693.455	1351.647	850.000	FALSE	FALSE	744.377	744.377
SEMIVOLATILE ORGANIC	3-Nitroaniline	UG/KG	55	1	1	1.8%	1694.727	3336.224	2100.000	FALSE	FALSE	1811.851	1811.851
SEMIVOLATILE ORGANIC	Acenaphthene	UG/KG	56	0	11	19.6%	1927.107	9629.674	72000.000	FALSE	FALSE	1385.519	1385.519
SEMIVOLATILE ORGANIC	Acenaphthylene	UG/KG	44	12	10	22.7%	216.977	140.483	310.000	FALSE	FALSE	293.571	293.571
SEMIVOLATILE ORGANIC	Anthracene	UG/KG	56	0	17	30.4%	2791.964	16005.507	120000.000	FALSE	FALSE	1436.881	1436.881
SEMIVOLATILE ORGANIC	Benzo[a]anthracene	UG/KG	56	0	30	53.6%	4640.357	29332.373	220000.000	FALSE	FALSE	2571.989	2571.989
SEMIVOLATILE ORGANIC	Benzo[a]pyrene	UG/KG	56	0	33	58.9%	4368.036	26654.500	200000.000	FALSE	TRUE	3486.601	3486.601
SEMIVOLATILE ORGANIC	Benzo[b]fluoranthene	UG/KG	56	0	32	57.1%	4416.071	26648.605	200000.000	FALSE	TRUE	3556.043	3556.043
SEMIVOLATILE ORGANIC	Benzo[ghi]perylene	UG/KG	56	0	25	44.6%	2814.554	13390.161	100000.000	FALSE	FALSE	2818.185	2818.185
SEMIVOLATILE ORGANIC	Benzo[k]fluoranthene	UG/KG	56	0	29	51.8%	3718.339	22660.158	170000.000	FALSE	FALSE	2354.159	2354.159
SEMIVOLATILE ORGANIC	Bis(2-Ethylhexyl)phthalate	UG/KG	56	0	12	21.4%	1502.134	6139.030	2100.000	FALSE	FALSE	1850.607	1850.607
SEMIVOLATILE ORGANIC	Butylbenzylphthalate	UG/KG	34	22	1	2.9%	184.059	34.961	18.000	FALSE	FALSE	218.738	18.000
SEMIVOLATILE ORGANIC	Carbazole	UG/KG	56	0	14	25.0%	2225.429	11883.693	89000.000	FALSE	FALSE	1413.426	1413.426
SEMIVOLATILE ORGANIC	Chrysene	UG/KG	56	0	38	67.9%	4629.625	29335.747	220000.000	FALSE	TRUE	2944.084	2944.084
SEMIVOLATILE ORGANIC	Cresols (-o)	UG/KG	34	22	1	2.9%	186.029	22.353	120.000	FALSE	FALSE	192.955	120.000
SEMIVOLATILE ORGANIC	Di-n-butylphthalate	UG/KG	56	0	20	35.7%	1691.464	6393.990	16000.000	FALSE	FALSE	1566.136	1566.136
SEMIVOLATILE ORGANIC	Dibenz[a,h]anthracene	UG/KG	56	0	17	30.4%	1454.652	6557.910	49000.000	FALSE	FALSE	1522.538	1522.538
SEMIVOLATILE ORGANIC	Dibenzofuran	UG/KG	56	0	12	21.4%	1518.161	6733.791	50000.000	FALSE	FALSE	1218.485	1218.485
SEMIVOLATILE ORGANIC	Diethyl phthalate	UG/KG	34	22	2	5.9%	178.382	44.883	19.000	FALSE	FALSE	234.682	19.000
SEMIVOLATILE ORGANIC	Fluoranthene	UG/KG	56	0	39	69.6%	10372.196	70729.168	530000.000	FALSE	FALSE	3915.112	3915.112
SEMIVOLATILE ORGANIC	Fluorene	UG/KG	56	0	7	12.5%	2048.875	10421.132	78000.000	FALSE	FALSE	1263.767	1263.767
SEMIVOLATILE ORGANIC	Indeno[1,2,3-cd]pyrene	UG/KG	56	0	22	39.3%	2712.589	13348.287	100000.000	FALSE	FALSE	2748.480	2748.480
SEMIVOLATILE ORGANIC	N-Nitrosodiphenylamine	UG/KG	56	0	20	35.7%	1831.768	6857.734	25000.000	FALSE	FALSE	1654.969	1654.969
SEMIVOLATILE ORGANIC	Naphthalene	UG/KG	56	0	10	17.9%	1827.625	8834.729	66000.000	FALSE	FALSE	1400.836	1400.836
SEMIVOLATILE ORGANIC	Pentachlorophenol	UG/KG	52	4	2	3.8%	940.962	820.090	1200.000	FALSE	FALSE	1131.904	1131.904
SEMIVOLATILE ORGANIC	Phenanthrene	UG/KG	56	0	33	58.9%	9431.054	65401.770	490000.000	FALSE	FALSE	2860.425	2860.425

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Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
SEMIVOLATILE ORGANIC	Pyrene	UG/KG	56	0	40	71.4%	7299.857	48022.040	360000.000	FALSE	TRUE	3979.219	3979.219
PESTICIDES/PCB	4,4`-DDD	UG/KG	56	0	8	14.3%	4.700	5.902	23.000	FALSE	FALSE	5.352	5.352
PESTICIDES/PCB	4,4`-DDE	UG/KG	56	0	37	66.1%	57.245	191.515	1400.000	FALSE	TRUE	89.001	89.001
PESTICIDES/PCB	4,4`-DDT	UG/KG	56	0	37	66.1%	32.082	77.568	340.000	FALSE	FALSE	42.950	42.950
PESTICIDES/PCB	Aldrin	UG/KG	56	0	2	3.6%	2.075	2.661	5.000	FALSE	FALSE	2.261	2.261
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	56	0	14	25.0%	6.242	22.625	170.000	FALSE	FALSE	5.717	5.717
PESTICIDES/PCB	Aroclor-1254	UG/KG	56	0	2	3.6%	63.116	153.358	1100.000	FALSE	FALSE	61.211	61.211
PESTICIDES/PCB	Aroclor-1260	UG/KG	56	0	9	16.1%	56.330	74.975	340.000	FALSE	FALSE	66.397	66.397
PESTICIDES/PCB	Beta-BHC	UG/KG	56	0	3	5.4%	2.261	3.456	20.000	FALSE	FALSE	2.390	2.390
PESTICIDES/PCB	Delta-BHC	UG/KG	55	1	1	1.8%	1.903	2.446	2.200	FALSE	FALSE	2.059	2.059
PESTICIDES/PCB	Dieldrin	UG/KG	56	0	4	7.1%	4.239	5.464	26.000	FALSE	FALSE	4.724	4.724
PESTICIDES/PCB	Endosulfan I	UG/KG	56	0	22	39.3%	12.057	57.230	430.000	FALSE	FALSE	8.939	8.939
PESTICIDES/PCB	Endosulfan II	UG/KG	56	0	5	8.9%	4.023	5.027	5.000	FALSE	FALSE	4.401	4.401
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	56	0	2	3.6%	3.971	5.230	20.000	FALSE	FALSE	4.285	4.285
PESTICIDES/PCB	Endrin	UG/KG	56	0	7	12.5%	4.797	7.110	43.000	FALSE	FALSE	5.316	5.316
PESTICIDES/PCB	Endrin aldehyde	UG/KG	56	0	6	10.7%	4.311	5.220	14.000	FALSE	FALSE	4.861	4.861
PESTICIDES/PCB	Endrin ketone	UG/KG	56	0	6	10.7%	5.020	10.146	71.000	FALSE	FALSE	5.036	5.036
PESTICIDES/PCB	Gamma-BHC/Lindane	UG/KG	56	0	1	1.8%	2.059	2.649	2.300	FALSE	FALSE	2.236	2.236
PESTICIDES/PCB	Gamma-Chlordane	UG/KG	56	0	13	23.2%	6.744	26.588	200.000	FALSE	FALSE	5.730	5.730
PESTICIDES/PCB	Heptachlor	UG/KG	50	6	1	2.0%	1.167	0.761	1.350	FALSE	FALSE	1.242	1.242
PESTICIDES/PCB	Heptachlorepoxide	UG/KG	56	0	6	10.7%	2.185	2.708	6.700	FALSE	FALSE	2.432	2.432
PESTICIDES/PCB	Toxaphene	UG/KG	50	6	1	2.0%	116.700	76.108	135.000	FALSE	FALSE	124.152	124.152
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	56	0	55	98.2%	0.363	0.712	4.800	FALSE	TRUE	0.593	0.593
OTHER ANALYSES	Total Organic Carbon	MG/KG	5	0	5	100.0%	15265.600	23371.008	56400.000	FALSE	TRUE	62102742.802	56400.000
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	56	0	28	50.0%	2018.839	9919.629	74000.000	FALSE	FALSE	1568.636	1568.636
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	56	0	4	7.1%	106.384	194.609	900.000	FALSE	FALSE	101.711	101.711
NITROAROMATICS	2-amino-4,6-Dinitrotoluene	UG/KG	56	0	1	1.8%	92.098	165.430	430.000	FALSE	FALSE	88.551	88.551
NITROAROMATICS	Tetryl	UG/KG	56	0	1	1.8%	88.348	159.919	220.000	FALSE	FALSE	84.963	84.963
METALS	Aluminum	MG/KG	56	0	48	85.7%	9896.071	3319.115	17200.000	TRUE	TRUE	10638.372	10638.372
METALS	Antimony	MG/KG	56	0	36	64.3%	45.899	257.641	1930.000	FALSE	TRUE	51.811	51.811
METALS	Arsenic	MG/KG	56	0	56	100.0%	6.885	5.303	32.200	FALSE	FALSE	7.512	7.512
METALS	Barium	MG/KG	56	0	55	98.2%	435.921	1405.293	9340.000	FALSE	FALSE	378.785	378.785
METALS	Beryllium	MG/KG	56	0	55	98.2%	0.409	0.160	0.910	TRUE	FALSE	0.445	0.445
METALS	Cadmium	MG/KG	56	0	38	67.9%	0.915	2.454	16.600	FALSE	FALSE	1.097	1.097
METALS	Calcium	MG/KG	56	0	56	100.0%	52970.714	54382.684	260000.000	FALSE	TRUE	76967.114	76967.114
METALS	Chromium	MG/KG	56	0	55	98.2%	21.024	8.666	47.500	FALSE	TRUE	23.248	23.248
METALS	Cobalt	MG/KG	56	0	56	100.0%	10.227	2.959	17.800	TRUE	TRUE	10.889	10.889
METALS	Copper	MG/KG	56	0	56	100.0%	904.905	5058.042	37900.000	FALSE	FALSE	546.768	546.768

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
METALS	Cyanide	MG/KG	56	0	2	3.6%	0.303	0.169	1.500	FALSE	FALSE	0.316	0.316
METALS	Iron	MG/KG	56	0	56	100.0%	22653.214	5683.665	36500.000	TRUE	FALSE	23924.333	23924.333
METALS	Lead	MG/KG	56	0	56	100.0%	4105.800	19172.840	140000.000	FALSE	TRUE	7449.772	7449.772
METALS	Magnesium	MG/KG	56	0	56	100.0%	9757.411	8642.033	56000.000	FALSE	FALSE	10856.316	10856.316
METALS	Manganese	MG/KG	56	0	56	100.0%	505.625	521.145	4140.000	FALSE	FALSE	537.853	537.853
METALS	Mercury	MG/KG	56	0	44	78.6%	0.654	1.653	11.400	FALSE	TRUE	1.341	1.341
METALS	Nickel	MG/KG	56	0	56	100.0%	33.113	18.455	148.000	FALSE	FALSE	35.864	35.864
METALS	Potassium	MG/KG	56	0	56	100.0%	1326.804	400.972	2300.000	TRUE	TRUE	1416.479	1416.479
METALS	Selenium	MG/KG	56	0	30	53.6%	0.540	0.439	1.600	TRUE	TRUE	0.638	0.638
METALS	Silver	MG/KG	56	0	19	33.9%	0.547	1.467	11.100	FALSE	FALSE	0.538	0.538
METALS	Sodium	MG/KG	56	0	43	76.8%	129.401	242.135	1830.000	FALSE	FALSE	145.172	145.172
METALS	Thallium	MG/KG	56	0	17	30.4%	1.594	6.182	16.600	FALSE	FALSE	1.361	1.361
METALS	Vanadium	MG/KG	56	0	56	100.0%	22.121	8.388	61.900	FALSE	FALSE	23.919	23.919
METALS	Zinc	MG/KG	56	0	56	100.0%	483.144	1950.545	14600.000	FALSE	FALSE	361.371	361.371
HERBICIDES	2,4,5-T	UG/KG	16	0	2	12.5%	3.425	1.711	8.300	FALSE	FALSE	4.033	4.033
HERBICIDES	MCPP	UG/KG	16	0	1	6.3%	3640.625	3301.576	16000.000	FALSE	FALSE	4329.209	4329.209

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	2-Butanone	UG/KG	10	0	1	10.0%	9.000	2.000	12.000	TRUE	TRUE	10.146	10.146
VOLATILE ORGANICS	Acetone	UG/KG	10	0	5	50.0%	18.050	10.073	36.000	TRUE	TRUE	23.822	23.822
SEMIVOLATILE ORGANIC	2,4-Dinitrotoluene	UG/KG	10	0	3	30.0%	824.050	1620.145	5400.000	FALSE	TRUE	3040.437	3040.437
SEMIVOLATILE ORGANIC	2-Methylnaphthalene	UG/KG	10	0	2	20.0%	242.250	120.269	55.000	TRUE	FALSE	311.164	55.000
SEMIVOLATILE ORGANIC	Acenaphthene	UG/KG	10	0	1	10.0%	267.450	106.385	32.000	TRUE	FALSE	328.409	32.000
SEMIVOLATILE ORGANIC	Acenaphthylene	UG/KG	10	0	3	30.0%	203.950	117.576	54.000	TRUE	FALSE	271.321	54.000
SEMIVOLATILE ORGANIC	Anthracene	UG/KG	10	0	4	40.0%	189.550	107.408	100.000	TRUE	TRUE	251.095	100.000
SEMIVOLATILE ORGANIC	Benzo[a]anthracene	UG/KG	10	0	7	70.0%	247.650	158.596	570.000	TRUE	TRUE	338.526	338.526
SEMIVOLATILE ORGANIC	Benzo[a]pyrene	UG/KG	10	0	6	60.0%	294.750	150.215	600.000	TRUE	TRUE	380.824	380.824
SEMIVOLATILE ORGANIC	Benzo[b]fluoranthene	UG/KG	10	0	6	60.0%	418.750	322.618	1200.000	FALSE	TRUE	742.850	742.850
SEMIVOLATILE ORGANIC	Benzo[ghi]perylene	UG/KG	10	0	7	70.0%	251.850	149.277	530.000	TRUE	TRUE	337.387	337.387
SEMIVOLATILE ORGANIC	Benzo[k]fluoranthene	UG/KG	10	0	6	60.0%	328.750	198.743	780.000	TRUE	TRUE	442.631	442.631
SEMIVOLATILE ORGANIC	Bis(2-Ethylhexyl)phthalate	UG/KG	10	0	7	70.0%	174.750	96.923	270.000	TRUE	TRUE	230.287	230.287
SEMIVOLATILE ORGANIC	Carbazole	UG/KG	10	0	3	30.0%	217.350	112.159	110.000	TRUE	FALSE	281.617	110.000
SEMIVOLATILE ORGANIC	Chrysene	UG/KG	10	0	7	70.0%	390.850	334.147	1200.000	FALSE	TRUE	1161.799	1161.799
SEMIVOLATILE ORGANIC	Di-n-butylphthalate	UG/KG	10	0	4	40.0%	247.250	70.044	250.000	TRUE	TRUE	287.386	250.000
SEMIVOLATILE ORGANIC	Dibenz[a,h]anthracene	UG/KG	10	0	5	50.0%	191.250	113.404	170.000	TRUE	TRUE	256.231	170.000
SEMIVOLATILE ORGANIC	Fluoranthene	UG/KG	10	0	8	80.0%	427.650	453.585	1600.000	FALSE	TRUE	2081.192	1600.000
SEMIVOLATILE ORGANIC	Indeno[1,2,3-cd]pyrene	UG/KG	10	0	7	70.0%	240.550	143.186	500.000	TRUE	TRUE	322.596	322.596
SEMIVOLATILE ORGANIC	N-Nitrosodiphenylamine	UG/KG	10	0	1	10.0%	312.750	112.290	600.000	FALSE	TRUE	380.633	380.633
SEMIVOLATILE ORGANIC	Phenanthrene	UG/KG	10	0	8	80.0%	207.750	140.660	420.000	TRUE	TRUE	288.349	288.349
SEMIVOLATILE ORGANIC	Pyrene	UG/KG	10	0	8	80.0%	426.350	407.249	1400.000	TRUE	TRUE	659.706	659.706
PESTICIDES/PCB	4,4`-DDD	UG/KG	10	0	8	80.0%	93.613	225.952	730.000	FALSE	TRUE	2478.491	730.000
PESTICIDES/PCB	4,4`-DDE	UG/KG	10	0	10	100.0%	112.730	170.475	570.000	FALSE	TRUE	1360.140	570.000
PESTICIDES/PCB	4,4`-DDT	UG/KG	10	0	8	80.0%	67.193	128.064	420.000	FALSE	TRUE	1831.268	420.000
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	10	0	3	30.0%	3.635	4.041	12.100	FALSE	FALSE	8.436	8.436
PESTICIDES/PCB	Aroclor-1254	UG/KG	10	0	7	70.0%	121.525	196.527	670.000	FALSE	TRUE	299.777	299.777
PESTICIDES/PCB	Aroclor-1260	UG/KG	10	0	5	50.0%	48.975	33.503	130.000	FALSE	TRUE	80.047	80.047
PESTICIDES/PCB	Endosulfan I	UG/KG	10	0	7	70.0%	7.415	7.671	26.000	FALSE	TRUE	25.904	25.904
PESTICIDES/PCB	Endosulfan II	UG/KG	10	0	2	20.0%	3.355	1.357	6.300	FALSE	TRUE	4.310	4.310
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	10	0	2	20.0%	4.268	4.929	18.000	FALSE	TRUE	7.576	7.576
PESTICIDES/PCB	Endrin aldehyde	UG/KG	10	0	1	10.0%	2.928	0.784	3.200	TRUE	TRUE	3.377	3.200
PESTICIDES/PCB	Gamma-Chlordane	UG/KG	10	0	2	20.0%	1.845	0.928	3.800	TRUE	TRUE	2.377	2.377
PESTICIDES/PCB	Heptachlorepoxide	UG/KG	10	0	1	10.0%	1.600	0.542	2.800	FALSE	TRUE	1.956	1.956
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	10	0	8	80.0%	0.156	0.197	0.670	FALSE	TRUE	1.781	0.670
OTHER ANALYSES	Total Organic Carbon	MG/KG	9	0	9	100.0%	37475.556	20738.862	62500.000	TRUE	FALSE	50147.000	50147.000
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	10	0	2	20.0%	158.000	267.366	910.000	FALSE	FALSE	313.259	313.259
METALS	Aluminum	MG/KG	10	0	10	100.0%	13925.500	5129.580	22900.000	TRUE	TRUE	16864.774	16864.774

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Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
METALS	Antimony	MG/KG	10	0	9	90.0%	13.264	15.961	50.300	FALSE	TRUE	114.635	50.300
METALS	Arsenic	MG/KG	10	0	10	100.0%	6.055	2.321	9.600	TRUE	TRUE	7.385	7.385
METALS	Barium	MG/KG	10	0	10	100.0%	605.350	1200.139	3980.000	FALSE	TRUE	2529.397	2529.397
METALS	Beryllium	MG/KG	10	0	10	100.0%	0.583	0.196	0.930	TRUE	TRUE	0.695	0.695
METALS	Cadmium	MG/KG	10	0	10	100.0%	1.543	2.200	7.600	FALSE	TRUE	4.549	4.549
METALS	Calcium	MG/KG	10	0	10	100.0%	37913.000	23551.313	75700.000	TRUE	TRUE	51408.013	51408.013
METALS	Chromium	MG/KG	10	0	10	100.0%	28.205	9.995	43.500	TRUE	TRUE	33.932	33.932
METALS	Cobalt	MG/KG	10	0	10	100.0%	10.165	2.939	15.600	TRUE	TRUE	11.849	11.849
METALS	Copper	MG/KG	10	0	10	100.0%	1948.170	5466.879	17500.000	FALSE	FALSE	14047.074	14047.074
METALS	Iron	MG/KG	10	0	10	100.0%	28375.000	9479.605	46400.000	TRUE	TRUE	33806.859	33806.859
METALS	Lead	MG/KG	10	0	10	100.0%	1459.550	1334.535	4480.000	TRUE	TRUE	2224.245	2224.245
METALS	Magnesium	MG/KG	10	0	10	100.0%	8216.000	3393.900	15100.000	TRUE	TRUE	10160.721	10160.721
METALS	Manganese	MG/KG	10	0	10	100.0%	278.350	91.984	447.000	TRUE	TRUE	331.057	331.057
METALS	Mercury	MG/KG	10	0	10	100.0%	0.606	0.885	2.500	FALSE	TRUE	3.471	2.500
METALS	Nickel	MG/KG	10	0	10	100.0%	34.690	9.881	50.900	TRUE	TRUE	40.352	40.352
METALS	Potassium	MG/KG	10	0	10	100.0%	2143.350	850.245	3870.000	TRUE	TRUE	2630.544	2630.544
METALS	Selenium	MG/KG	10	0	2	20.0%	1.125	1.357	4.900	FALSE	FALSE	1.975	1.975
METALS	Silver	MG/KG	10	0	1	10.0%	0.223	0.082	0.350	TRUE	TRUE	0.269	0.269
METALS	Sodium	MG/KG	10	0	10	100.0%	253.965	215.806	782.000	FALSE	TRUE	473.179	473.179
METALS	Thallium	MG/KG	10	0	2	20.0%	0.712	0.383	1.600	TRUE	TRUE	0.931	0.931
METALS	Vanadium	MG/KG	10	0	10	100.0%	26.090	9.268	39.800	TRUE	TRUE	31.400	31.400
METALS	Zinc	MG/KG	10	0	10	100.0%	348.230	268.064	952.000	TRUE	TRUE	501.832	501.832

TABLE 6-38

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg sed/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
											Nc	Car
Volatile Organics												
2-Butanone			1.01E-02	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Acetone			2.38E-02	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Semivolatile Organics												
2,4-Dinitrotoluene			3.04E+00	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
2-Methylnaphthalene			5.50E-02	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Acenaphthene			3.20E-02	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Acenaphthylene			5.40E-02	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Anthracene			1.00E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(a)anthracene			3.39E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(a)pyrene			3.81E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(b)fluoranthene			7.43E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(g,h,i)perylene			3.37E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(k)fluoranthene			4.43E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Carbazole			1.10E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Chrysene			1.16E+00	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Di-n-butylphthalate			2.50E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Dibenz(a,h)anthracene			1.70E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Fluoranthene			1.60E+00	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene			3.23E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			3.81E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Phenanthrene			2.88E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Pyrene			6.60E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			2.30E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Pesticides												
4,4'-DDD			7.30E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
4,4'-DDE			5.70E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
4,4'-DDT			4.20E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Aroclor-1254	1.07E-07	7.64E-09	3.00E-01	1.00E-06	2,170	1.0	0.06	25	5	25	1,825	25,550
Aroclor-1260		2.04E-09	8.00E-02	1.00E-06	2,170	1.0	0.06	25	5	25	1,825	25,550
Endosulfan I			2.59E-02	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Endosulfan II			4.31E-03	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Endosulfan sulfate			7.58E-03	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Endrin aldehyde			3.20E-03	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Heptachlor epoxide			1.96E-03	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
alpha-Chlordane			8.44E-03	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
gamma-Chlordane			2.38E-03	1.00E-06	2,170	1.0		25	5	25	1,825	25,550

TABLE 6-38

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm^2/event)	Adherence Factor (mg sed/cm^2)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Metals												
Aluminum			1.69E+04	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Antimony			5.03E+01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Arsenic			7.39E+00	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Barium			2.53E+03	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Beryllium			6.95E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Cadmium	2.70E-07		4.55E+00	1.00E-06	2,170	1.0	0.01	25	5	25	1,825	25,550
Calcium			5.14E+04	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Chromium			3.39E+01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Cobalt			1.18E+01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Copper			1.40E+04	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Iron			3.38E+04	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Lead			2.22E+03	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Magnesium			1.02E+04	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Manganese			3.31E+02	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Mercury			2.50E+00	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Nickel			4.04E+01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Potassium			2.63E+03	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Selenium			1.98E+00	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Silver			2.69E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Sodium			4.73E+02	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Thallium			9.31E-01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Vanadium			3.14E+01	1.00E-06	2,170	1.0		25	5	25	1,825	25,550
Zinc			5.02E+02	1.00E-06	2,170	1.0		25	5	25	1,825	25,550

EQUATION:

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

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Sediment (mg soil/kg)	EPC - Sediment Data - CT	EF = Exposure Frequency (events/year)	25 (RME Upper Bound)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	5
SA = Surface Area Contact (cm^2)	2,170 (RME Child)	BW = Bodyweight (kg)	25 kg (child)
AF =Sediment to Skin Adherence Factor (mg/cm^2)	1.0 (RME)	AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (Car)
ABS = Absorption Factor (unitless)	Compound Specific PCBs and Cd, (EPA, 1992b) (Default Assumption 0% = 0.0)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-73

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Volatile Organics						
2-Butanone			6.00E-01	NA		
Acetone			1.00E-01	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			2.00E-03	NA		
2-Methylnaphthalene			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Fluoranthene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aroclor-1254	1.07E-07	7.64E-09	1.90E-05	2.11E+00	5.63E-03	1.61E-08
Aroclor-1260		2.04E-09	NA	8.11E+00		1.65E-08
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin aldehyde			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
gamma-Chlordane			NA	NA		

TABLE 6-73

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Metals						
Aluminum			NA	NA		
Antimony			4.00E-04	NA		
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Beryllium			5.00E-06	4.30E-03		
Cadmium	2.70E-07		3.00E-05	NA	9.02E-03	
Calcium			NA	NA		
Chromium			2.50E-04	NA		
Cobalt			NA	NA		
Copper			2.00E-02	NA		
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese			5.00E-03	NA		
Mercury			4.50E-05	NA		
Nickel			1.00E-03	NA		
Potassium			NA	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Sodium			NA	NA		
Thallium			7.00E-05	NA		
Vanadium			7.00E-03	NA		
Zinc			1.50E-01	NA		
Totals - HQ & CR					**1.46E-02**	**3.27E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-36

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Child Ingestion Rate (mg sed/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Volatile Organics											
2-Butanone	5.56E-09		1.01E-02	200	1.00E-06	1	25	5	25	1,825	25,550
Acetone	1.31E-08		2.38E-02	200	1.00E-06	1	25	5	25	1,825	25,550
Semivolatile Organics											
2,4-Dinitrotoluene	1.67E-06		3.04E+00	200	1.00E-06	1	25	5	25	1,825	25,550
2-Methylnaphthalene			5.50E-02	200	1.00E-06	1	25	5	25	1,825	25,550
Acenaphthene	1.75E-08		3.20E-02	200	1.00E-06	1	25	5	25	1,825	25,550
Acenaphthylene			5.40E-02	200	1.00E-06	1	25	5	25	1,825	25,550
Anthracene	5.48E-08		1.00E-01	200	1.00E-06	1	25	5	25	1,825	25,550
Benzo(a)anthracene		1.32E-08	3.39E-01	200	1.00E-06	1	25	5	25	1,825	25,550
Benzo(a)pyrene		1.49E-08	3.81E-01	200	1.00E-06	1	25	5	25	1,825	25,550
Benzo(b)fluoranthene		2.91E-08	7.43E-01	200	1.00E-06	1	25	5	25	1,825	25,550
Benzo(g,h,i)perylene			3.37E-01	200	1.00E-06	1	25	5	25	1,825	25,550
Benzo(k)fluoranthene		1.73E-08	4.43E-01	200	1.00E-06	1	25	5	25	1,825	25,550
Carbazole		4.31E-09	1.10E-01	200	1.00E-06	1	25	5	25	1,825	25,550
Chrysene		4.55E-08	1.16E+00	200	1.00E-06	1	25	5	25	1,825	25,550
Di-n-butylphthalate	1.37E-07		2.50E-01	200	1.00E-06	1	25	5	25	1,825	25,550
Dibenz(a,h)anthracene		6.65E-09	1.70E-01	200	1.00E-06	1	25	5	25	1,825	25,550
Fluoranthene	8.77E-07		1.60E+00	200	1.00E-06	1	25	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene		1.26E-08	3.23E-01	200	1.00E-06	1	25	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)		1.49E-08	3.81E-01	200	1.00E-06	1	25	5	25	1,825	25,550
Phenanthrene			2.88E-01	200	1.00E-06	1	25	5	25	1,825	25,550
Pyrene	3.61E-07		6.60E-01	200	1.00E-06	1	25	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate	1.26E-07	9.01E-09	2.30E-01	200	1.00E-06	1	25	5	25	1,825	25,550
Pesticides											
4,4'-DDD	4.00E-07	2.86E-08	7.30E-01	200	1.00E-06	1	25	5	25	1,825	25,550
4,4'-DDE			5.70E-01	200	1.00E-06	1	25	5	25	1,825	25,550
4,4'-DDT	2.30E-07	1.64E-08	4.20E-01	200	1.00E-06	1	25	5	25	1,825	25,550
Aroclor-1254	1.64E-07	1.17E-08	3.00E-01	200	1.00E-06	1	25	5	25	1,825	25,550
Aroclor-1260		3.13E-09	8.00E-02	200	1.00E-06	1	25	5	25	1,825	25,550
Endosulfan I	1.42E-08		2.59E-02	200	1.00E-06	1	25	5	25	1,825	25,550
Endosulfan II			4.31E-03	200	1.00E-06	1	25	5	25	1,825	25,550
Endosulfan sulfate	4.15E-09		7.58E-03	200	1.00E-06	1	25	5	25	1,825	25,550
Endrin aldehyde			3.20E-03	200	1.00E-06	1	25	5	25	1,825	25,550
Heptachlor epoxide	1.07E-09	7.65E-11	1.96E-03	200	1.00E-06	1	25	5	25	1,825	25,550
alpha-Chlordane	4.62E-09	3.30E-10	8.44E-03	200	1.00E-06	1	25	5	25	1,825	25,550
gamma-Chlordane			2.38E-03	200	1.00E-06	1	25	5	25	1,825	25,550

TABLE 6-36

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Child Ingestion Rate (mg sed/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Metals											
Aluminum			1.69E+04	200	1.00E-06	1	25	5	25	1,825	25,550
Antimony	2.76E-05		5.03E+01	200	1.00E-06	1	25	5	25	1,825	25,550
Arsenic	4.05E-06	2.89E-07	7.39E+00	200	1.00E-06	1	25	5	25	1,825	25,550
Barium	1.39E-03		2.53E+03	200	1.00E-06	1	25	5	25	1,825	25,550
Beryllium	3.81E-07	2.72E-08	6.95E-01	200	1.00E-06	1	25	5	25	1,825	25,550
Cadmium	2.49E-06		4.55E+00	200	1.00E-06	1	25	5	25	1,825	25,550
Calcium			5.14E+04	200	1.00E-06	1	25	5	25	1,825	25,550
Chromium	1.86E-05		3.39E+01	200	1.00E-06	1	25	5	25	1,825	25,550
Cobalt			1.18E+01	200	1.00E-06	1	25	5	25	1,825	25,550
Copper	7.70E-03		1.40E+04	200	1.00E-06	1	25	5	25	1,825	25,550
Iron			3.38E+04	200	1.00E-06	1	25	5	25	1,825	25,550
Lead			2.22E+03	200	1.00E-06	1	25	5	25	1,825	25,550
Magnesium			1.02E+04	200	1.00E-06	1	25	5	25	1,825	25,550
Manganese	1.81E-04		3.31E+02	200	1.00E-06	1	25	5	25	1,825	25,550
Mercury	1.37E-06		2.50E+00	200	1.00E-06	1	25	5	25	1,825	25,550
Nickel	2.21E-05		4.04E+01	200	1.00E-06	1	25	5	25	1,825	25,550
Potassium			2.63E+03	200	1.00E-06	1	25	5	25	1,825	25,550
Selenium	1.08E-06		1.98E+00	200	1.00E-06	1	25	5	25	1,825	25,550
Silver	1.48E-07		2.69E-01	200	1.00E-06	1	25	5	25	1,825	25,550
Sodium			4.73E+02	200	1.00E-06	1	25	5	25	1,825	25,550
Thallium	5.10E-07		9.31E-01	200	1.00E-06	1	25	5	25	1,825	25,550
Vanadium	1.72E-05		3.14E+01	200	1.00E-06	1	25	5	25	1,825	25,550
Zinc	2.75E-04		5.02E+02	200	1.00E-06	1	25	5	25	1,825	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Sediment (mg sediment/kg)
IR = Ingestion Rate (mg sediment/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC - Sediment Data - RME
200 (RME Child)
10-6
1
25 (RME) equals surface water exposure
5 (RME)
25 (Child)
5 x 365 (Nc), 70 x 365 (C)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-71

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS FROM THE INGESTION OF ONSITE SEDIMENT (while Wading) FUTURE TRESSPASSER (Child) REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Volatile Organics						
2-Butanone	5.56E-09		6.00E-01	NA	9.27E-09	
Acetone	1.31E-08		1.00E-01	NA	1.31E-07	
Semivolatile Organics						
2,4-Dinitrotoluene	1.67E-06		2.00E-03	NA	8.33E-04	
2-Methylnaphthalene			NA	NA		
Acenaphthene	1.75E-08		6.00E-02	NA	2.92E-07	
Acenaphthylene			NA	NA		
Anthracene	5.48E-08		3.00E-01	NA	1.83E-07	
Benzo(a)anthracene		1.32E-08	NA	7.30E-01		9.67E-09
Benzo(a)pyrene		1.49E-08	NA	7.30E+00		1.09E-07
Benzo(b)fluoranthene		2.91E-08	NA	7.30E-01		2.12E-08
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		1.73E-08	NA	7.30E-01		1.26E-08
Carbazole		4.31E-09	NA	2.00E-02		8.61E-11
Chrysene		4.55E-08	NA	7.30E-02		3.32E-09
Di-n-butylphthalate	1.37E-07		1.00E-01	NA	1.37E-06	
Dibenz(a,h)anthracene		6.65E-09	NA	7.30E+00		4.86E-08
Fluoranthene	8.77E-07		4.00E-02	NA	2.19E-05	
Indeno(1,2,3-cd)pyrene		1.26E-08	NA	7.30E-01		9.22E-09
N-Nitrosodiphenylamine (1)		1.49E-08	NA	4.90E-03		7.30E-11
Phenanthrene			NA	NA		
Pyrene	3.61E-07		3.00E-02	NA	1.20E-05	
bis(2-Ethylhexyl)phthalate	1.26E-07	9.01E-09	2.00E-02	1.40E-02	6.31E-06	1.26E-10
Pesticides						
4,4'-DDD	4.00E-07	2.86E-08	5.00E-04	2.40E-01	8.00E-04	6.86E-09
4,4'-DDE			NA	NA		
4,4'-DDT	2.30E-07	1.64E-08	5.00E-04	3.40E-01	4.60E-04	5.59E-09
Aroclor-1254	1.64E-07	1.17E-08	2.00E-05	2.00E+00	8.21E-03	2.35E-08
Aroclor-1260		3.13E-09	NA	7.70E+00		2.41E-08
Endosulfan I	1.42E-08		6.00E-03	NA	2.37E-06	
Endosulfan II			NA	NA		
Endosulfan sulfate	4.15E-09		5.00E-05	NA	8.30E-05	
Endrin aldehyde			NA	NA		
Heptachlor epoxide	1.07E-09	7.65E-11	1.30E-05	9.10E+00	8.24E-05	6.97E-10
alpha-Chlordane	4.62E-09	3.30E-10	6.00E-05	1.30E+00	7.70E-05	4.29E-10
gamma-Chlordane			NA	NA		

TABLE 6-71

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS FROM THE INGESTION OF ONSITE SEDIMENT (while Wading) FUTURE TRESSPASSER (Child) REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Metals						
Aluminum			NA	NA		
Antimony	2.76E-05		4.00E-04	NA	6.89E-02	
Arsenic	4.05E-06	2.89E-07	3.00E-04	1.75E+00	1.35E-02	5.06E-07
Barium	1.39E-03		7.00E-02	NA	1.98E-02	
Beryllium	3.81E-07	2.72E-08	5.00E-03	4.30E+00	7.62E-05	1.17E-07
Cadmium	2.49E-06		5.00E-04	NA	4.99E-03	
Calcium			NA	NA		
Chromium	1.86E-05		5.00E-03	NA	3.72E-03	
Cobalt			NA	NA		
Copper	7.70E-03		4.00E-02	NA	1.92E-01	
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese	1.81E-04		5.00E-03	NA	3.63E-02	
Mercury	1.37E-06		3.00E-04	NA	4.57E-03	
Nickel	2.21E-05		2.00E-02	NA	1.11E-03	
Potassium			NA	NA		
Selenium	1.08E-06		5.00E-03	NA	2.16E-04	
Silver	1.48E-07		5.00E-03	NA	2.95E-05	
Sodium			NA	NA		
Thallium	5.10E-07		7.00E-05	NA	7.29E-03	
Vanadium	1.72E-05		7.00E-03	NA	2.46E-03	
Zinc	2.75E-04		3.00E-01	NA	9.17E-04	
Totals - HQ & CR					**3.67E-01**	**8.98E-07**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	1,1,2,2-Tetrachloroethane	UG/KG	56	0	1	1.8%	6.049	2.917	7.750	FALSE	FALSE	6.305	6.305
VOLATILE ORGANICS	2-Butanone	UG/KG	54	2	1	1.9%	5.449	0.803	5.000	FALSE	FALSE	5.842	5.000
VOLATILE ORGANICS	Acetone	UG/KG	56	0	4	7.1%	6.915	6.289	46.000	FALSE	FALSE	7.304	7.304
VOLATILE ORGANICS	Benzene	UG/KG	54	2	7	13.0%	5.181	1.237	5.000	FALSE	FALSE	5.691	5.000
VOLATILE ORGANICS	Carbon disulfide	UG/KG	54	2	3	5.6%	5.333	1.032	2.000	FALSE	FALSE	5.834	2.000
VOLATILE ORGANICS	Chloroform	UG/KG	53	3	2	3.8%	4.127	1.451	2.000	FALSE	FALSE	4.558	2.000
VOLATILE ORGANICS	Methylene chloride	UG/KG	54	2	3	5.6%	5.384	0.845	3.000	FALSE	FALSE	5.660	3.000
VOLATILE ORGANICS	Toluene	UG/KG	56	0	23	41.1%	5.223	3.575	10.000	FALSE	FALSE	6.110	6.110
VOLATILE ORGANICS	Total Xylenes	UG/KG	54	2	1	1.9%	5.523	0.537	4.250	FALSE	FALSE	5.656	4.250
SEMIVOLATILE ORGANIC	2,4-Dinitrotoluene	UG/KG	56	0	20	35.7%	3709.179	12855.584	85000.000	FALSE	FALSE	4022.334	4022.334
SEMIVOLATILE ORGANIC	2,6-Dinitrotoluene	UG/KG	56	0	11	19.6%	1492.714	6156.951	8000.000	FALSE	FALSE	1106.520	1106.520
SEMIVOLATILE ORGANIC	2-Methylnaphthalene	UG/KG	56	0	11	19.6%	989.929	2796.613	19000.000	FALSE	FALSE	1106.051	1106.051
SEMIVOLATILE ORGANIC	3,3`-Dichlorobenzidine	UG/KG	55	1	1	1.8%	693.455	1351.647	850.000	FALSE	FALSE	744.377	744.377
SEMIVOLATILE ORGANIC	3-Nitroaniline	UG/KG	55	1	1	1.8%	1694.727	3336.224	2100.000	FALSE	FALSE	1811.851	1811.851
SEMIVOLATILE ORGANIC	Acenaphthene	UG/KG	56	0	11	19.6%	1927.107	9629.674	72000.000	FALSE	FALSE	1385.519	1385.519
SEMIVOLATILE ORGANIC	Acenaphthylene	UG/KG	44	12	10	22.7%	216.977	140.483	310.000	FALSE	FALSE	293.571	293.571
SEMIVOLATILE ORGANIC	Anthracene	UG/KG	56	0	17	30.4%	2791.964	16005.507	#########	FALSE	FALSE	1436.881	1436.881
SEMIVOLATILE ORGANIC	Benzo[a]anthracene	UG/KG	56	0	30	53.6%	4640.357	29332.373	#########	FALSE	FALSE	2571.989	2571.989
SEMIVOLATILE ORGANIC	Benzo[a]pyrene	UG/KG	56	0	33	58.9%	4368.036	26654.500	#########	FALSE	TRUE	3486.601	3486.601
SEMIVOLATILE ORGANIC	Benzo[b]fluoranthene	UG/KG	56	0	32	57.1%	4416.071	26648.605	#########	FALSE	TRUE	3556.043	3556.043
SEMIVOLATILE ORGANIC	Benzo[ghi]perylene	UG/KG	56	0	25	44.6%	2814.554	13390.161	#########	FALSE	FALSE	2818.185	2818.185
SEMIVOLATILE ORGANIC	Benzo[k]fluoranthene	UG/KG	56	0	29	51.8%	3718.339	22660.158	#########	FALSE	FALSE	2354.159	2354.159
SEMIVOLATILE ORGANIC	Bis(2-Ethylhexyl)phthalate	UG/KG	56	0	12	21.4%	1502.134	6139.030	2100.000	FALSE	FALSE	1850.607	1850.607
SEMIVOLATILE ORGANIC	Butylbenzylphthalate	UG/KG	34	22	1	2.9%	184.059	34.961	18.000	FALSE	FALSE	218.738	18.000
SEMIVOLATILE ORGANIC	Carbazole	UG/KG	56	0	14	25.0%	2225.429	11883.693	89000.000	FALSE	FALSE	1413.426	1413.426
SEMIVOLATILE ORGANIC	Chrysene	UG/KG	56	0	38	67.9%	4629.625	29335.747	#########	FALSE	TRUE	2944.084	2944.084
SEMIVOLATILE ORGANIC	Cresols (-o)	UG/KG	34	22	1	2.9%	186.029	22.353	120.000	FALSE	FALSE	192.955	120.000
SEMIVOLATILE ORGANIC	Di-n-butylphthalate	UG/KG	56	0	20	35.7%	1691.464	6393.990	16000.000	FALSE	FALSE	1566.136	1566.136
SEMIVOLATILE ORGANIC	Dibenz[a,h]anthracene	UG/KG	56	0	17	30.4%	1454.652	6557.910	49000.000	FALSE	FALSE	1522.538	1522.538
SEMIVOLATILE ORGANIC	Dibenzofuran	UG/KG	56	0	12	21.4%	1518.161	6733.791	50000.000	FALSE	FALSE	1218.485	1218.485
SEMIVOLATILE ORGANIC	Diethyl phthalate	UG/KG	34	22	2	5.9%	178.382	44.883	19.000	FALSE	FALSE	234.682	19.000
SEMIVOLATILE ORGANIC	Fluoranthene	UG/KG	56	0	39	69.6%	10372.196	70729.168	#########	FALSE	FALSE	3915.112	3915.112
SEMIVOLATILE ORGANIC	Fluorene	UG/KG	56	0	7	12.5%	2048.875	10421.132	78000.000	FALSE	FALSE	1263.767	1263.767
SEMIVOLATILE ORGANIC	Indeno[1,2,3-cd]pyrene	UG/KG	56	0	22	39.3%	2712.589	13348.287	#########	FALSE	FALSE	2748.480	2748.480
SEMIVOLATILE ORGANIC	N-Nitrosodiphenylamine	UG/KG	56	0	20	35.7%	1831.768	6857.734	25000.000	FALSE	FALSE	1654.969	1654.969
SEMIVOLATILE ORGANIC	Naphthalene	UG/KG	56	0	10	17.9%	1827.625	8834.729	66000.000	FALSE	FALSE	1400.836	1400.836
SEMIVOLATILE ORGANIC	Pentachlorophenol	UG/KG	52	4	2	3.8%	940.962	820.090	1200.000	FALSE	FALSE	1131.904	1131.904
SEMIVOLATILE ORGANIC	Phenanthrene	UG/KG	56	0	33	58.9%	9431.054	65401.770	#########	FALSE	FALSE	2860.425	2860.425

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Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
SEMIVOLATILE ORGANIC	Pyrene	UG/KG	56	0	40	71.4%	7299.857	48022.040	#########	FALSE	TRUE	3979.219	3979.219
PESTICIDES/PCB	4,4`-DDD	UG/KG	56	0	8	14.3%	4.700	5.902	23.000	FALSE	FALSE	5.352	5.352
PESTICIDES/PCB	4,4`-DDE	UG/KG	56	0	37	66.1%	57.245	191.515	1400.000	FALSE	TRUE	89.001	89.001
PESTICIDES/PCB	4,4`-DDT	UG/KG	56	0	37	66.1%	32.082	77.568	340.000	FALSE	FALSE	42.950	42.950
PESTICIDES/PCB	Aldrin	UG/KG	56	0	2	3.6%	2.075	2.661	5.000	FALSE	FALSE	2.261	2.261
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	56	0	14	25.0%	6.242	22.625	170.000	FALSE	FALSE	5.717	5.717
PESTICIDES/PCB	Aroclor-1254	UG/KG	56	0	2	3.6%	63.116	153.358	1100.000	FALSE	FALSE	61.211	61.211
PESTICIDES/PCB	Aroclor-1260	UG/KG	56	0	9	16.1%	56.330	74.975	340.000	FALSE	FALSE	66.397	66.397
PESTICIDES/PCB	Beta-BHC	UG/KG	56	0	3	5.4%	2.261	3.456	20.000	FALSE	FALSE	2.390	2.390
PESTICIDES/PCB	Delta-BHC	UG/KG	55	1	1	1.8%	1.903	2.446	2.200	FALSE	FALSE	2.059	2.059
PESTICIDES/PCB	Dieldrin	UG/KG	56	0	4	7.1%	4.239	5.464	26.000	FALSE	FALSE	4.724	4.724
PESTICIDES/PCB	Endosulfan I	UG/KG	56	0	22	39.3%	12.057	57.230	430.000	FALSE	FALSE	8.939	8.939
PESTICIDES/PCB	Endosulfan II	UG/KG	56	0	5	8.9%	4.023	5.027	5.000	FALSE	FALSE	4.401	4.401
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	56	0	2	3.6%	3.971	5.230	20.000	FALSE	FALSE	4.285	4.285
PESTICIDES/PCB	Endrin	UG/KG	56	0	7	12.5%	4.797	7.110	43.000	FALSE	FALSE	5.316	5.316
PESTICIDES/PCB	Endrin aldehyde	UG/KG	56	0	6	10.7%	4.311	5.220	14.000	FALSE	FALSE	4.861	4.861
PESTICIDES/PCB	Endrin ketone	UG/KG	56	0	6	10.7%	5.020	10.146	71.000	FALSE	FALSE	5.036	5.036
PESTICIDES/PCB	Gamma-BHC/Lindane	UG/KG	56	0	1	1.8%	2.059	2.649	2.300	FALSE	FALSE	2.236	2.236
PESTICIDES/PCB	Gamma-Chlordane	UG/KG	56	0	13	23.2%	6.744	26.588	200.000	FALSE	FALSE	5.730	5.730
PESTICIDES/PCB	Heptachlor	UG/KG	50	6	1	2.0%	1.167	0.761	1.350	FALSE	FALSE	1.242	1.242
PESTICIDES/PCB	Heptachlorepoxide	UG/KG	56	0	6	10.7%	2.185	2.708	6.700	FALSE	FALSE	2.432	2.432
PESTICIDES/PCB	Toxaphene	UG/KG	50	6	1	2.0%	116.700	76.108	135.000	FALSE	FALSE	124.152	124.152
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	56	0	55	98.2%	0.363	0.712	4.800	FALSE	TRUE	0.593	0.593
OTHER ANALYSES	Total Organic Carbon	MG/KG	5	0	5	100.0%	15265.600	23371.008	56400.000	FALSE	TRUE	62102742.802	56400.000
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	56	0	28	50.0%	2018.839	9919.629	74000.000	FALSE	FALSE	1568.636	1568.636
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	56	0	4	7.1%	106.384	194.609	900.000	FALSE	FALSE	101.711	101.711
NITROAROMATICS	2-amino-4,6-Dinitrotoluene	UG/KG	56	0	1	1.8%	92.098	165.430	430.000	FALSE	FALSE	88.551	88.551
NITROAROMATICS	Tetryl	UG/KG	56	0	1	1.8%	88.348	159.919	220.000	FALSE	FALSE	84.963	84.963
METALS	Aluminum	MG/KG	56	0	48	85.7%	9896.071	3319.115	17200.000	TRUE	TRUE	10638.372	10638.372
METALS	Antimony	MG/KG	56	0	36	64.3%	45.899	257.641	1930.000	FALSE	TRUE	51.811	51.811
METALS	Arsenic	MG/KG	56	0	56	100.0%	6.885	5.303	32.200	FALSE	FALSE	7.512	7.512
METALS	Barium	MG/KG	56	0	55	98.2%	435.921	1405.293	9340.000	FALSE	FALSE	378.785	378.785
METALS	Beryllium	MG/KG	56	0	55	98.2%	0.409	0.160	0.910	TRUE	FALSE	0.445	0.445
METALS	Cadmium	MG/KG	56	0	38	67.9%	0.915	2.454	16.600	FALSE	FALSE	1.097	1.097
METALS	Calcium	MG/KG	56	0	56	100.0%	52970.714	54382.684	#########	FALSE	TRUE	76967.114	76967.114
METALS	Chromium	MG/KG	56	0	55	98.2%	21.024	8.666	47.500	FALSE	TRUE	23.248	23.248
METALS	Cobalt	MG/KG	56	0	56	100.0%	10.227	2.959	17.800	TRUE	TRUE	10.889	10.889
METALS	Copper	MG/KG	56	0	56	100.0%	904.905	5058.042	37900.000	FALSE	FALSE	546.768	546.768

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
METALS	Cyanide	MG/KG	56	0	2	3.6%	0.303	0.169	1.500	FALSE	FALSE	0.316	0.316
METALS	Iron	MG/KG	56	0	56	100.0%	22653.214	5683.665	36500.000	TRUE	FALSE	23924.333	23924.333
METALS	Lead	MG/KG	56	0	56	100.0%	4105.800	19172.840	#########	FALSE	TRUE	7449.772	7449.772
METALS	Magnesium	MG/KG	56	0	56	100.0%	9757.411	8642.033	56000.000	FALSE	FALSE	10856.316	10856.316
METALS	Manganese	MG/KG	56	0	56	100.0%	505.625	521.145	4140.000	FALSE	FALSE	537.853	537.853
METALS	Mercury	MG/KG	56	0	44	78.6%	0.654	1.653	11.400	FALSE	TRUE	1.341	1.341
METALS	Nickel	MG/KG	56	0	56	100.0%	33.113	18.455	148.000	FALSE	FALSE	35.864	35.864
METALS	Potassium	MG/KG	56	0	56	100.0%	1326.804	400.972	2300.000	TRUE	TRUE	1416.479	1416.479
METALS	Selenium	MG/KG	56	0	30	53.6%	0.540	0.439	1.600	TRUE	TRUE	0.638	0.638
METALS	Silver	MG/KG	56	0	19	33.9%	0.547	1.467	11.100	FALSE	FALSE	0.538	0.538
METALS	Sodium	MG/KG	56	0	43	76.8%	129.401	242.135	1830.000	FALSE	FALSE	145.172	145.172
METALS	Thallium	MG/KG	56	0	17	30.4%	1.594	6.182	16.600	FALSE	FALSE	1.361	1.361
METALS	Vanadium	MG/KG	56	0	56	100.0%	22.121	8.388	61.900	FALSE	FALSE	23.919	23.919
METALS	Zinc	MG/KG	56	0	56	100.0%	483.144	1950.545	14600.000	FALSE	FALSE	361.371	361.371
HERBICIDES	2,4,5-T	UG/KG	16	0	2	12.5%	3.425	1.711	8.300	FALSE	FALSE	4.033	4.033
HERBICIDES	MCPP	UG/KG	16	0	1	6.3%	3640.625	3301.576	16000.000	FALSE	FALSE	4329.209	4329.209

TABLE 6-18

CALCULATION OF INTAKE FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Volatile Organics											
1,1,2,2-Tetrachloroethane		4.23E-10	6.31E-03	480	1.00E-06	1	250	1	70	365	25,550
2-Butanone	2.35E-08		5.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Acetone	3.43E-08		7.30E-03	480	1.00E-06	1	250	1	70	365	25,550
Benzene		3.35E-10	5.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Carbon Disulfide	9.39E-09		2.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Chloroform	9.39E-09	1.34E-10	2.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Methylene Chloride	1.41E-08	2.01E-10	3.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Toluene	2.87E-08		6.11E-03	480	1.00E-06	1	250	1	70	365	25,550
Xylene (total)	2.00E-08		4.25E-03	480	1.00E-06	1	250	1	70	365	25,550
Semivolatile Organics											
2,4-Dinitrotoluene	1.89E-05		4.02E+00	480	1.00E-06	1	250	1	70	365	25,550
2,6-Dinitrotoluene	5.20E-06		1.11E+00	480	1.00E-06	1	250	1	70	365	25,550
2-methylnaphthalene			1.11E+00	480	1.00E-06	1	250	1	70	365	25,550
3,3'-Dichlorobenzidine		4.99E-08	7.44E-01	480	1.00E-06	1	250	1	70	365	25,550
3-nitroaniline			1.81E+00	480	1.00E-06	1	250	1	70	365	25,550
Acenaphthene	6.51E-06		1.39E+00	480	1.00E-06	1	250	1	70	365	25,550
Acenaphthylene			2.94E-01	480	1.00E-06	1	250	1	70	365	25,550
Anthracene	6.75E-06		1.44E+00	480	1.00E-06	1	250	1	70	365	25,550
Benzo(a)anthracene		1.73E-07	2.57E+00	480	1.00E-06	1	250	1	70	365	25,550
Benzo(a)pyrene		2.34E-07	3.49E+00	480	1.00E-06	1	250	1	70	365	25,550
Benzo(b)fluoranthene		2.39E-07	3.56E+00	480	1.00E-06	1	250	1	70	365	25,550
Benzo(g,h,i)perylene			2.82E+00	480	1.00E-06	1	250	1	70	365	25,550
Benzo(k)fluoranthene		1.58E-07	2.35E+00	480	1.00E-06	1	250	1	70	365	25,550
Butylbenzylphthalate	8.45E-08		1.80E-02	480	1.00E-06	1	250	1	70	365	25,550
Carbazole		9.48E-08	1.41E+00	480	1.00E-06	1	250	1	70	365	25,550
Chrysene		1.98E-07	2.94E+00	480	1.00E-06	1	250	1	70	365	25,550
Di-n-butylphthalate	7.36E-06		1.57E+00	480	1.00E-06	1	250	1	70	365	25,550
Dibenz(a,h)anthracene		1.02E-07	1.52E+00	480	1.00E-06	1	250	1	70	365	25,550
Dibenzofuran			1.22E+00	480	1.00E-06	1	250	1	70	365	25,550
Diethylphthalate	8.92E-08		1.90E-02	480	1.00E-06	1	250	1	70	365	25,550
Fluoranthene	1.84E-05		3.92E+00	480	1.00E-06	1	250	1	70	365	25,550
Fluorene	5.94E-06		1.26E+00	480	1.00E-06	1	250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene		1.84E-07	2.75E+00	480	1.00E-06	1	250	1	70	365	25,550
N-Nitrosodiphenylamine (1)		1.11E-07	1.65E+00	480	1.00E-06	1	250	1	70	365	25,550
Naphthalene			1.40E+00	480	1.00E-06	1	250	1	70	365	25,550
Pentachlorophenol	5.32E-06	7.59E-08	1.13E+00	480	1.00E-06	1	250	1	70	365	25,550
Phenanthrene			2.86E+00	480	1.00E-06	1	250	1	70	365	25,550
Pyrene	1.87E-05		3.98E+00	480	1.00E-06	1	250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate	8.69E-06	1.24E-07	1.85E+00	480	1.00E-06	1	250	1	70	365	25,550
Pesticides											
4,4'-DDD	2.51E-08	3.59E-10	5.35E-03	480	1.00E-06	1	250	1	70	365	25,550
4,4'-DDE			8.90E-02	480	1.00E-06	1	250	1	70	365	25,550
4,4'-DDT	2.02E-07	2.88E-09	4.30E-02	480	1.00E-06	1	250	1	70	365	25,550
Aldrin	1.06E-08	1.52E-10	2.26E-03	480	1.00E-06	1	250	1	70	365	25,550
Aroclor-1254	2.87E-07	4.11E-09	6.12E-02	480	1.00E-06	1	250	1	70	365	25,550
Aroclor-1260		4.45E-09	6.64E-02	480	1.00E-06	1	250	1	70	365	25,550
Dieldrin	2.22E-08	3.17E-10	4.72E-03	480	1.00E-06	1	250	1	70	365	25,550
Endosulfan I	4.20E-08		8.94E-03	480	1.00E-06	1	250	1	70	365	25,550
Endosulfan II			4.40E-03	480	1.00E-06	1	250	1	70	365	25,550
Endosulfan sulfate	2.01E-08		4.28E-03	480	1.00E-06	1	250	1	70	365	25,550
Endrin	2.50E-08		5.32E-03	480	1.00E-06	1	250	1	70	365	25,550
Endrin aldehyde			4.86E-03	480	1.00E-06	1	250	1	70	365	25,550
Endrin ketone			5.04E-03	480	1.00E-06	1	250	1	70	365	25,550
Heptachlor	5.83E-09	8.33E-11	1.24E-03	480	1.00E-06	1	250	1	70	365	25,550
Heptachlor epoxide	1.14E-08	1.63E-10	2.43E-03	480	1.00E-06	1	250	1	70	365	25,550
Toxaphene		8.33E-09	1.24E-01	480	1.00E-06	1	250	1	70	365	25,550
alpha-Chlordane	2.69E-08	3.84E-10	5.72E-03	480	1.00E-06	1	250	1	70	365	25,550
beta-BHC		1.60E-10	2.39E-03	480	1.00E-06	1	250	1	70	365	25,550
gamma-BHC (Lindane)	1.05E-08		2.24E-03	480	1.00E-06	1	250	1	70	365	25,550
gamma-Chlordane			5.73E-03	480	1.00E-06	1	250	1	70	365	25,550
Nitroaromatics											
2-amino-4,6-Dinitrotoluene			8.86E-02	480	1.00E-06	1	250	1	70	365	25,550
Tetryl	3.99E-07		8.50E-02	480	1.00E-06	1	250	1	70	365	25,550

TABLE 6-18

CALCULATION OF INTAKE FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Metals											
Antimony	2.43E-04		5.18E+01	480	1.00E-06	1	250	1	70	365	25,550
Barium	1.78E-03		3.79E+02	480	1.00E-06	1	250	1	70	365	25,550
Copper	2.57E-03		5.47E+02	480	1.00E-06	1	250	1	70	365	25,550
Lead			7.45E+03	480	1.00E-06	1	250	1	70	365	25,550
Mercury	6.30E-06		1.34E+00	480	1.00E-06	1	250	1	70	365	25,550
Selenium	3.00E-06		6.38E-01	480	1.00E-06	1	250	1	70	365	25,550
Thallium	6.39E-06		1.36E+00	480	1.00E-06	1	250	1	70	365	25,550
Zinc	1.70E-03		3.61E+02	480	1.00E-06	1	250	1	70	365	25,550
Herbicides											
2,4,5-T	1.89E-08		4.03E-03	480	1.00E-06	1	250	1	70	365	25,550
MCPP	2.03E-05		4.33E+00	480	1.00E-06	1	250	1	70	365	25,550

EQUATION: Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC - Total Soil Data (RME)
480 (RME Construction Worker)
10-6
1 (All Receptors)
250 (RME Construction Worker)
1 (Upper bound limit for Construction Worker)
70 (Adult male)
1 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-57

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2-Tetrachloroethane		4.23E-10	NA	2.00E-01		8.46E-11
2-Butanone	2.35E-08		6.00E-01	NA	3.91E-08	
Acetone	3.43E-08		1.00E-01	NA	3.43E-07	
Benzene		3.35E-10	NA	2.90E-02		9.73E-12
Carbon Disulfide	9.39E-09		1.00E-01	NA	9.39E-08	
Chloroform	9.39E-09	1.34E-10	1.00E-02	6.10E-03	9.39E-07	8.19E-13
Methylene Chloride	1.41E-08	2.01E-10	6.00E-02	7.50E-03	2.35E-07	1.51E-12
Toluene	2.87E-08		2.00E-01	NA	1.43E-07	
Xylene (total)	2.00E-08		2.00E+00	NA	9.98E-09	
Semivolatile Organics						
2,4-Dinitrotoluene	1.89E-05		2.00E-03	NA	9.45E-03	
2,6-Dinitrotoluene	5.20E-06		1.00E-03	NA	5.20E-03	
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine		4.99E-08	NA	4.50E-01		2.25E-08
3-nitroaniline			NA	NA		
Acenaphthene	6.51E-06		6.00E-02	NA	1.08E-04	
Acenaphthylene			NA	NA		
Anthracene	6.75E-06		3.00E-01	NA	2.25E-05	
Benzo(a)anthracene		1.73E-07	NA	7.30E-01		1.26E-07
Benzo(a)pyrene		2.34E-07	NA	7.30E+00		1.71E-06
Benzo(b)fluoranthene		2.39E-07	NA	7.30E-01		1.74E-07
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		1.58E-07	NA	7.30E-01		1.15E-07
Butylbenzylphthalate	8.45E-08		2.00E+00	NA	4.23E-08	
Carbazole		9.48E-08	NA	2.00E-02		1.90E-09
Chrysene		1.98E-07	NA	7.30E-02		1.44E-08
Di-n-butylphthalate	7.36E-06		1.00E-01	NA	7.36E-05	
Dibenz(a,h)anthracene		1.02E-07	NA	7.30E+00		7.46E-07
Dibenzofuran			NA	NA		
Diethylphthalate	8.92E-08		8.00E+00	NA	1.12E-08	
Fluoranthene	1.84E-05		4.00E-02	NA	4.60E-04	
Fluorene	5.94E-06		4.00E-02	NA	1.48E-04	
Indeno(1,2,3-cd)pyrene		1.84E-07	NA	7.30E-01		1.35E-07
N-Nitrosodiphenylamine (1)		1.11E-07	NA	4.90E-03		5.44E-10
Naphthalene			NA	NA		
Pentachlorophenol	5.32E-06	7.59E-08	3.00E-02	1.20E-01	1.77E-04	9.11E-09
Phenanthrene			NA	NA		
Pyrene	1.87E-05		3.00E-02	NA	6.23E-04	
bis(2-Ethylhexyl)phthalate	8.69E-06	1.24E-07	2.00E-02	1.40E-02	4.35E-04	1.74E-09

TABLE 6-57

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD	2.51E-08	3.59E-10	5.00E-04	2.40E-01	5.03E-05	8.62E-11
4,4'-DDE			NA	NA		
4,4'-DDT	2.02E-07	2.88E-09	5.00E-04	3.40E-01	4.03E-04	9.80E-10
Aldrin	1.06E-08	1.52E-10	3.00E-05	1.70E+01	3.54E-04	2.58E-09
Aroclor-1254	2.87E-07	4.11E-09	2.00E-05	2.00E+00	1.44E-02	8.21E-09
Aroclor-1260		4.45E-09	NA	7.70E+00		3.43E-08
Dieldrin	2.22E-08	3.17E-10	5.00E-05	1.60E+01	4.44E-04	5.07E-09
Endosulfan I	4.20E-08		6.00E-03	NA	7.00E-06	
Endosulfan II			NA	NA		
Endosulfan sulfate	2.01E-08		5.00E-05	NA	4.02E-04	
Endrin	2.50E-08		3.00E-04	NA	8.32E-05	
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor	5.83E-09	8.33E-11	5.00E-04	4.50E+00	1.17E-05	3.75E-10
Heptachlor epoxide	1.14E-08	1.63E-10	1.30E-05	9.10E+00	8.79E-04	1.49E-09
Toxaphene		8.33E-09	NA	1.10E+00		9.16E-09
alpha-Chlordane	2.69E-08	3.84E-10	6.00E-05	1.30E+00	4.48E-04	4.99E-10
beta-BHC		1.60E-10	NA	1.80E+00		2.89E-10
gamma-BHC (Lindane)	1.05E-08		3.00E-04	NA	3.50E-05	
gamma-Chlordane			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl	3.99E-07		1.00E-02	NA	3.99E-05	
Metals						
Antimony	2.43E-04		4.00E-04	NA	6.08E-01	
Barium	1.78E-03		7.00E-02	NA	2.54E-02	
Copper	2.57E-03		4.00E-02	NA	6.42E-02	
Lead			NA	NA		
Mercury	6.30E-06		3.00E-04	NA	2.10E-02	
Selenium	3.00E-06		5.00E-03	NA	5.99E-04	
Thallium	6.39E-06		7.00E-05	NA	9.13E-02	
Zinc	1.70E-03		3.00E-01	NA	5.66E-03	
Herbicides						
2,4,5-T	1.89E-08		8.00E-03	NA	2.37E-06	
MCPP	2.03E-05		1.00E-03	NA	2.03E-02	
Totals - HQ & CR					**8.71E-01**	**3.12E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-24

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm^2)	Adherence Factor (mg soil/cm^2)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
Volatile Organics												
1,1,2,2-Tetrachloroethane			6.31E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
2-Butanone			5.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Acetone			7.30E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzene			5.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Carbon Disulfide			2.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Chloroform			2.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Methylene Chloride			3.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Toluene			6.11E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Xylene (total)			4.25E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Semivolatile Organics												
2,4-Dinitrotoluene			4.02E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
2,6-Dinitrotoluene			1.11E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
2-methylnaphthalene			1.11E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
3,3'-Dichlorobenzidine			7.44E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
3-nitroaniline			1.81E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Acenaphthene			1.39E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Acenaphthylene			2.94E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Anthracene			1.44E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(a)anthracene			2.57E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(a)pyrene			3.49E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(b)fluoranthene			3.56E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(g,h,i)perylene			2.82E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(k)fluoranthene			2.35E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Butylbenzylphthalate			1.80E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Carbazole			1.41E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Chrysene			2.94E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Di-n-butylphthalate			1.57E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Dibenz(a,h)anthracene			1.52E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Dibenzofuran			1.22E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Diethylphthalate			1.90E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Fluoranthene			3.92E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Fluorene			1.26E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene			2.75E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
N-Nitrosodiphenylamine (1)			1.65E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Naphthalene			1.40E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pentachlorophenol			1.13E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Phenanthrene			2.86E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pyrene			3.98E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate			1.85E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pesticides												
4,4'-DDD			5.35E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
4,4'-DDE			8.90E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
4,4'-DDT			4.30E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Aldrin			2.26E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Aroclor-1254	2.08E-07	2.98E-09	6.12E-02	1.00E-06	5,800	1.0	0.06	250	1	70	365	25,550
Aroclor-1260		3.23E-09	6.64E-02	1.00E-06	5,800	1.0	0.06	250	1	70	365	25,550
Dieldrin			4.72E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan I			8.94E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan II			4.40E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan sulfate			4.28E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin			5.32E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin aldehyde			4.86E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin ketone			5.04E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Heptachlor			1.24E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Heptachlor epoxide			2.43E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Toxaphene			1.24E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
alpha-Chlordane			5.72E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
beta-BHC			2.39E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
gamma-BHC (Lindane)			2.24E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
gamma-Chlordane			5.73E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Nitroaromatics												
2-amino-4,6-Dinitrotoluene			8.86E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Tetryl			8.50E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550

TABLE 6-24

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm^2)	Adherence Factor (mg soil/cm^2)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
Metals												
Antimony			5.18E+01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Barium			3.79E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Copper			5.47E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Lead			7.45E+03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Mercury			1.34E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Selenium			6.38E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Thallium			1.36E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Zinc			3.61E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Herbicides												
2,4,5-T			4.03E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
MCPP			4.33E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550

EQUATION:

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

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC - Total Soil Data (RME)	EF = Exposure Frequency (days/year)	250 (RME Construction Worker)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	1 (Upper bound limit for CW)
SA = Surface Area Contact (cm^2)	5,800 (RME Adult Worker)	BW = Bodyweight (kg)	70 (Adult Male)
AF =Soil to Skin Adherence Factor (mg/cm^2)	1.0 (RME - All Receptors)	AT = Averaging Time (days)	1 x 365 (Nc) 70 x 365 (Car)
ABS = Absorption Factor (unitless)	Applicable for PCBs and Cadmium (EPA, 1992b)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-59

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2-Tetrachloroethane			NA	2.00E-01		
2-Butanone			6.00E-01	NA		
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Carbon Disulfide			1.00E-01	NA		
Chloroform			1.00E-02	6.10E-03		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
Xylene (total)			2.00E+00	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Diethylphthalate			8.00E+00	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 6-59

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE) REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254	2.08E-07	2.98E-09	1.90E-05	2.11E+00	1.10E-02	6.28E-09
Aroclor-1260		3.23E-09	NA	8.11E+00		2.62E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor			5.00E-04	4.50E+00		
Heptachlor epoxide			1.30E-05	9.10E+00		
Toxaphene			NA	1.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			1.00E-02	NA		
Metals						
Antimony			4.00E-04	NA		
Barium			7.00E-03	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			1.50E-01	NA		
Herbicides						
2,4,5-T			8.00E-03	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR					**1.10E-02**	**3.25E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

 (use for all)

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	1,1,1-Trichloroethane	UG/KG	6	4	1	16.7%	5.667	0.683	7.000	FALSE	FALSE	6.267	6.267
VOLATILE ORGANICS	Methylene chloride	UG/KG	6	4	1	16.7%	5.667	0.683	7.000	FALSE	FALSE	6.267	6.267
VOLATILE ORGANICS	Toluene	UG/KG	10	0	1	10.0%	9.150	4.859	20.000	FALSE	TRUE	13.111	13.111
VOLATILE ORGANICS	Trichloroethene	UG/KG	10	0	1	10.0%	8.450	3.411	13.000	FALSE	FALSE	11.342	11.342
SEMIVOLATILE ORGANIC	2,4-Dinitrotoluene	UG/KG	7	3	3	42.9%	429107.143	1133657.572	3000000.000	FALSE	FALSE	28930130370962.200	3000000.000
SEMIVOLATILE ORGANIC	2,6-Dinitrotoluene	UG/KG	6	4	2	33.3%	12508.333	30124.685	74000.000	FALSE	FALSE	344636934.486	74000.000
SEMIVOLATILE ORGANIC	2-Methylnaphthalene	UG/KG	8	2	6	75.0%	2486.875	6673.546	19000.000	FALSE	TRUE	603223.499	19000.000
SEMIVOLATILE ORGANIC	Acenaphthene	UG/KG	7	3	3	42.9%	847.571	1619.104	4500.000	FALSE	TRUE	31812.193	4500.000
SEMIVOLATILE ORGANIC	Anthracene	UG/KG	7	3	4	57.1%	610.571	1033.416	2900.000	FALSE	TRUE	65844.194	2900.000
SEMIVOLATILE ORGANIC	Benzo[a]anthracene	UG/KG	9	1	8	88.9%	404.556	545.136	1600.000	FALSE	TRUE	3735.669	1600.000
SEMIVOLATILE ORGANIC	Benzo[a]pyrene	UG/KG	10	0	9	90.0%	25303.300	78951.783	1500.000	FALSE	FALSE	6389198.483	1500.000
SEMIVOLATILE ORGANIC	Benzo[b]fluoranthene	UG/KG	10	0	9	90.0%	25341.000	78938.631	1600.000	FALSE	FALSE	2899733.091	1600.000
SEMIVOLATILE ORGANIC	Benzo[ghi]perylene	UG/KG	8	2	5	62.5%	270.625	264.249	870.000	FALSE	TRUE	804.664	804.664
SEMIVOLATILE ORGANIC	Benzo[k]fluoranthene	UG/KG	9	1	8	88.9%	401.333	511.127	1600.000	FALSE	TRUE	2779.781	1600.000
SEMIVOLATILE ORGANIC	Bis(2-Ethylhexyl)phthalate	UG/KG	7	3	5	71.4%	1091.714	1772.697	5000.000	FALSE	TRUE	29453.521	5000.000
SEMIVOLATILE ORGANIC	Butylbenzylphthalate	UG/KG	6	4	2	33.3%	9129.167	21982.187	54000.000	FALSE	FALSE	456022564.114	54000.000
SEMIVOLATILE ORGANIC	Carbazole	UG/KG	7	3	4	57.1%	243.000	265.069	740.000	TRUE	TRUE	432.854	432.854
SEMIVOLATILE ORGANIC	Chrysene	UG/KG	10	0	9	90.0%	25464.000	78896.525	1900.000	FALSE	FALSE	2636800.154	1900.000
SEMIVOLATILE ORGANIC	Di-n-butylphthalate	UG/KG	7	3	3	42.9%	135893.571	358987.206	950000.000	FALSE	FALSE	361538723243.890	950000.000
SEMIVOLATILE ORGANIC	Dibenz[a,h]anthracene	UG/KG	7	3	2	28.6%	255.143	159.160	500.000	TRUE	TRUE	369.140	369.140
SEMIVOLATILE ORGANIC	Dibenzofuran	UG/KG	8	2	4	50.0%	378.500	475.019	1500.000	FALSE	TRUE	4200.422	1500.000
SEMIVOLATILE ORGANIC	Diethyl phthalate	UG/KG	7	3	1	14.3%	280.000	140.238	530.000	TRUE	TRUE	380.444	380.444
SEMIVOLATILE ORGANIC	Fluoranthene	UG/KG	10	0	9	90.0%	25929.000	78742.230	3900.000	FALSE	FALSE	2538067.274	3900.000
SEMIVOLATILE ORGANIC	Fluorene	UG/KG	7	3	3	42.9%	1076.429	2221.367	6100.000	FALSE	TRUE	51251.706	6100.000
SEMIVOLATILE ORGANIC	Indeno[1,2,3-cd]pyrene	UG/KG	8	2	5	62.5%	214.000	157.352	450.000	TRUE	TRUE	317.476	317.476
SEMIVOLATILE ORGANIC	N-Nitrosodiphenylamine	UG/KG	6	4	2	33.3%	33550.000	81543.585	200000.000	FALSE	FALSE	30551992748.782	200000.000
SEMIVOLATILE ORGANIC	Naphthalene	UG/KG	8	2	4	50.0%	392.750	509.508	1600.000	FALSE	TRUE	5504.032	1600.000
SEMIVOLATILE ORGANIC	Pentachlorophenol	UG/KG	5	5	1	20.0%	394.000	98.577	220.000	FALSE	FALSE	581.703	220.000
SEMIVOLATILE ORGANIC	Phenanthrene	UG/KG	10	0	9	90.0%	27753.400	78385.647	22000.000	FALSE	FALSE	28182411.043	22000.000
SEMIVOLATILE ORGANIC	Phenol	UG/KG	6	4	3	50.0%	6295.167	15042.285	37000.000	FALSE	FALSE	54039803.039	37000.000
SEMIVOLATILE ORGANIC	Pyrene	UG/KG	10	0	9	90.0%	26019.500	78716.118	5000.000	FALSE	FALSE	3301371.047	5000.000
PESTICIDES/PCB	4,4`-DDD	UG/KG	7	3	3	42.9%	8.529	11.754	35.000	FALSE	TRUE	30.144	30.144
PESTICIDES/PCB	4,4`-DDE	UG/KG	10	0	9	90.0%	165.960	254.959	750.000	FALSE	TRUE	3679.151	750.000
PESTICIDES/PCB	4,4`-DDT	UG/KG	10	0	10	100.0%	305.540	370.426	940.000	FALSE	TRUE	24851.615	940.000
PESTICIDES/PCB	Alpha-BHC	UG/KG	7	3	1	14.3%	1.993	1.153	3.700	TRUE	TRUE	2.819	2.819
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	9	1	7	77.8%	8.678	14.814	47.000	FALSE	TRUE	40.682	40.682
PESTICIDES/PCB	Aroclor-1254	UG/KG	8	2	6	75.0%	267.188	470.797	1400.000	FALSE	TRUE	3133.076	1400.000
PESTICIDES/PCB	Aroclor-1260	UG/KG	9	1	6	66.7%	135.778	192.436	630.000	FALSE	TRUE	451.408	451.408
PESTICIDES/PCB	Dieldrin	UG/KG	8	2	2	25.0%	6.756	8.700	28.000	FALSE	TRUE	18.230	18.230
PESTICIDES/PCB	Endosulfan I	UG/KG	8	2	2	25.0%	4.444	7.161	22.000	FALSE	TRUE	17.753	17.753
PESTICIDES/PCB	Endosulfan II	UG/KG	7	3	3	42.9%	3.800	1.666	5.700	TRUE	TRUE	4.993	4.993

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Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
PESTICIDES/PCB	Endrin	UG/KG	7	3	1	14.3%	4.036	2.771	9.200	TRUE	TRUE	6.020	6.020
PESTICIDES/PCB	Gamma-BHC/Lindane	UG/KG	6	4	1	16.7%	1.513	0.674	0.930	TRUE	FALSE	2.048	0.930
PESTICIDES/PCB	Gamma-Chlordane	UG/KG	9	1	6	66.7%	7.217	11.305	36.000	FALSE	TRUE	32.664	32.664
PESTICIDES/PCB	Heptachlorepoxide	UG/KG	7	3	1	14.3%	1.793	0.915	2.600	TRUE	TRUE	2.448	2.448
OTHER ANALYSES	Amosite Asbestos	%	13	0	0	0.0%	0.500	0.000	0.000	FALSE	FALSE	0.529	0.000
OTHER ANALYSES	Chrysotile Asbestos	%	15	0	4	26.7%	14.683	24.703	65.000	FALSE	FALSE	305.379	65.000
OTHER ANALYSES	Chrysotile Asbestos	%, > THAN	4	0	4	100.0%	1.000	0.000	1.000	FALSE	FALSE	1.154	1.000
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	10	0	10	100.0%	1501.112	4465.061	14200.000	FALSE	TRUE	40600409392.079	14200.000
NITROAROMATICS	2,4,6-Trinitrotoluene	UG/KG	8	3	1	12.5%	78.125	37.123	170.000	FALSE	FALSE	102.134	102.134
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	11	0	8	72.7%	2067589.727	5724221.473	19000000.000	FALSE	FALSE	262380457789547.000	19000000.000
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	8	3	0	0.0%	65.000	0.000	0.000	FALSE	FALSE	70.078	0.000
METALS	Aluminum	MG/KG	11	0	8	72.7%	7991.364	4849.347	16500.000	TRUE	TRUE	10617.355	10617.355
METALS	Antimony	MG/KG	11	0	10	90.9%	310.800	552.765	1560.000	FALSE	TRUE	12945.966	1560.000
METALS	Arsenic	MG/KG	11	0	11	100.0%	12.191	13.712	47.300	FALSE	TRUE	37.275	37.275
METALS	Barium	MG/KG	11	0	11	100.0%	6389.564	12248.253	40500.000	FALSE	TRUE	283279.067	40500.000
METALS	Beryllium	MG/KG	11	0	9	81.8%	0.315	0.307	1.100	FALSE	TRUE	1.311	1.100
METALS	Cadmium	MG/KG	8	3	7	87.5%	32.556	47.723	127.000	FALSE	TRUE	71577.202	127.000
METALS	Calcium	MG/KG	11	0	11	100.0%	48679.636	60949.084	215000.000	FALSE	TRUE	619306.683	215000.000
METALS	Chromium	MG/KG	10	1	7	70.0%	87.270	164.598	518.000	FALSE	TRUE	707.697	518.000
METALS	Cobalt	MG/KG	11	0	11	100.0%	13.345	11.690	40.600	FALSE	TRUE	28.969	28.969
METALS	Copper	MG/KG	11	0	11	100.0%	13076.100	25591.976	81400.000	FALSE	TRUE	4702309.728	81400.000
METALS	Cyanide	MG/KG	11	0	6	54.5%	4.097	7.237	24.200	FALSE	TRUE	27.487	24.200
METALS	Iron	MG/KG	11	0	11	100.0%	34646.364	23213.481	79200.000	TRUE	TRUE	47216.797	47216.797
METALS	Lead	MG/KG	11	0	11	100.0%	89540.273	195108.759	527000.000	FALSE	FALSE	80768558.546	527000.000
METALS	Magnesium	MG/KG	11	0	11	100.0%	11094.545	5999.121	19700.000	TRUE	TRUE	14343.155	14343.155
METALS	Manganese	MG/KG	11	0	11	100.0%	366.664	167.403	574.000	TRUE	FALSE	457.315	457.315
METALS	Mercury	MG/KG	11	0	9	81.8%	6.786	12.973	39.300	FALSE	TRUE	949.175	39.300
METALS	Nickel	MG/KG	11	0	11	100.0%	53.327	53.971	154.000	FALSE	TRUE	293.161	154.000
METALS	Potassium	MG/KG	11	0	11	100.0%	9675.455	23687.392	80600.000	FALSE	FALSE	35083.127	35083.127
METALS	Selenium	MG/KG	9	2	7	77.8%	1.453	1.722	5.800	FALSE	TRUE	14.521	5.800
METALS	Silver	MG/KG	8	3	4	50.0%	5.210	8.380	22.700	FALSE	TRUE	439.755	22.700
METALS	Sodium	MG/KG	11	0	11	100.0%	1295.364	1550.284	3690.000	FALSE	TRUE	13203.672	3690.000
METALS	Thallium	MG/KG	11	0	2	18.2%	0.451	0.418	1.400	FALSE	TRUE	0.897	0.897
METALS	Vanadium	MG/KG	11	0	11	100.0%	14.682	11.866	44.000	TRUE	FALSE	21.107	21.107
METALS	Zinc	MG/KG	11	0	11	100.0%	9735.273	15297.994	42600.000	FALSE	TRUE	468392.143	42600.000
HERBICIDES	2,4,5-T	UG/KG	8	0	2	25.0%	4.913	3.461	13.000	FALSE	TRUE	8.013	8.013
HERBICIDES	2,4,5-TP/Silvex	UG/KG	8	0	1	12.5%	4.538	1.943	7.900	TRUE	TRUE	5.815	5.815
HERBICIDES	2,4-D	UG/KG	8	0	1	12.5%	51.438	45.454	160.000	FALSE	FALSE	92.918	92.918
HERBICIDES	2,4-DB	UG/KG	8	0	1	12.5%	51.750	34.534	130.000	FALSE	TRUE	86.504	86.504
HERBICIDES	Dichloroprop	UG/KG	8	0	1	12.5%	43.125	15.654	61.000	TRUE	TRUE	53.419	53.419
HERBICIDES	MCPA	UG/KG	8	0	1	12.5%	4300.000	1549.424	6000.000	FALSE	TRUE	5898.323	5898.323

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
HERBICIDES	MCPP	UG/KG	8	0	1	12.5%	6300.000	6494.008	22000.000	FALSE	FALSE	12817.632	12817.632

TABLE 6-53

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO INDOOR DUST
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,1-Trichloroethane			NA	NA		
Bromomethane			1.40E-03	1.43E-03		
Chloroform			1.00E-02	6.10E-03		
Chloromethane			NA	NA		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
Trichloroethene			NA	1.10E-02		
Semivolatile Organics						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
Acenaphthene			6.00E-02	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Diethylphthalate			8.00E+00	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Phenol			6.00E-01	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
Pesticides/PCBs						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aroclor-1254	4.77E-06	1.70E-06	1.90E-05	2.11E+00	2.51E-01	3.59E-06
Aroclor-1260		5.49E-07	NA	8.11E+00		4.45E-06
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Endrin			3.00E-04	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-BHC			NA	6.30E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		

TABLE 6-53

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO INDOOR DUST
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Nitroaromatics						
1,3,5-Trinitrobenzene			5.00E-05	NA		
2,4,6-Trinitrotoluene			5.00E-04	3.00E-02		
Metals						
Antimony			4.00E-04	NA		
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Cadmium	7.21E-05		3.00E-05	NA	2.40E+00	
Copper			2.00E-02	NA		
Cyanide			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Sodium			NA	NA		
Thallium			7.00E-05	NA		
Zinc			1.50E-01	NA		
Herbicides						
2,4,5-T			1.00E-02	NA		
2,4,5-TP (Silvex)			8.00E-03	NA		
2,4-D			1.00E-02	NA		
2,4-DB			8.00E-03	NA		
Dichloroprop			NA	NA		
MCPA			5.00E-04	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR					**2.65E+00**	**8.04E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

Toxicity Values
Soil Medium
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Oral RfD mg/kg/day	Carc. Slope Oral (mg/kg-day)-1	Dermal RfD mg/kg/day	Carc. Slope Dermal (mg/kg-day)-1
Volatile Organics				
1,1,1-Trichloroethane	NA	NA	NA	NA
Bromomethane	1.40E-03	1.43E-03	1.40E-03	1.43E-03
Chloroform	1.00E-02	6.10E-03	1.00E-02	6.10E-03
Chloromethane	NA	NA	NA	NA
Methylene Chloride	6.00E-02	7.50E-03	6.00E-02	6.00E-02
Toluene	2.00E-01	NA	1.20E-01	NA
Trichloroethene	NA	1.10E-02	NA	1.10E-02
Semivolatile Organics				
2,4-Dinitrotoluene	2.00E-03	NA	2.00E-03	NA
2,6-Dinitrotoluene	1.00E-03	NA	1.00E-03	NA
2-methylnaphthalene	NA	NA	NA	NA
Acenaphthene	6.00E-02	NA	6.00E-02	NA
Anthracene	3.00E-01	NA	3.00E-01	NA
Benzo(a)anthracene	NA	7.30E-01	NA	1.46E+00
Benzo(a)pyrene	NA	7.30E+00	NA	1.46E+01
Benzo(b)fluoranthene	NA	7.30E-01	NA	1.46E+00
Benzo(g,h,i)perylene	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	7.30E-01	NA	1.46E+00
Butylbenzylphthalate	2.00E+00	NA	2.00E+00	NA
Carbazole	NA	2.00E-02	NA	2.00E-02
Chrysene	NA	7.30E-02	NA	1.46E-01
Di-n-butylphthalate	1.00E-01	NA	8.50E-02	NA
Dibenz(a,h)anthracene	NA	7.30E+00	NA	1.46E+01
Dibenzofuran	NA	NA	NA	NA
Diethylphthalate	8.00E+00	NA	8.00E+00	NA
Fluoranthene	4.00E-02	NA	4.00E-02	NA
Fluorene	4.00E-02	NA	4.00E-02	NA
Indeno(1,2,3-cd)pyrene	NA	7.30E-01	NA	1.46E+00
N-Nitrosodiphenylamine (1)	NA	4.90E-03	NA	4.90E-03
Naphthalene	NA	NA	NA	NA
Pentachlorophenol	3.00E-02	1.20E-01	3.00E-02	1.20E-01
Phenanthrene	NA	NA	NA	NA
Phenol	6.00E-01	NA	6.00E-01	NA
Pyrene	3.00E-02	NA	3.00E-02	NA
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	2.00E-02	1.40E-02
Pesticides				
4,4'-DDD	5.00E-04	2.40E-01	5.00E-04	2.40E-01
4,4'-DDE	NA	NA	NA	NA
4,4'-DDT	5.00E-04	3.40E-01	5.00E-04	3.40E-01
Aroclor-1254	2.00E-05	2.00E+00	1.90E-05	2.11E+00
Aroclor-1260	NA	7.70E+00	NA	8.11E+00
Dieldrin	5.00E-05	1.60E+01	5.00E-05	1.60E+01
Endosulfan I	6.00E-03	NA	6.00E-03	NA
Endosulfan II	NA	NA	NA	NA
Endrin	3.00E-04	NA	3.00E-04	NA
Heptachlor epoxide	1.30E-05	9.10E+00	1.30E-05	9.10E+00
alpha-BHC	NA	6.30E+00	NA	6.30E+00
alpha-Chlordane	6.00E-05	1.30E+00	6.00E-05	1.30E+00
gamma-BHC (Lindane)	3.00E-04	NA	3.00E-04	NA
gamma-Chlordane	NA	NA	NA	NA
Nitroaromatics				
1,3,5-Trinitrobenzene	5.00E-05	NA	5.00E-05	NA

Toxicity Values
Soil Medium
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Oral RfD mg/kg/day	Carc. Slope Oral (mg/kg-day)-1	Dermal RfD mg/kg/day	Carc. Slope Dermal (mg/kg-day)-1
2,4,6-Trinitrotoluene	5.00E-04	3.00E-02	5.00E-04	3.00E-02
Metals				
Antimony	4.00E-04	NA	4.00E-04	NA
Arsenic	3.00E-04	1.75E+00	2.94E-04	1.79E+00
Barium	7.00E-02	NA	7.00E-03	NA
Cadmium	5.00E-04	NA	3.00E-05	NA
Copper	4.00E-02	NA	2.00E-02	NA
Cyanide	2.00E-02	NA	2.00E-02	NA
Lead	NA	NA	NA	NA
Mercury	3.00E-04	NA	4.50E-05	NA
Selenium	5.00E-03	NA	3.00E-03	NA
Silver	5.00E-03	NA	5.00E-03	NA
Sodium	NA	NA	NA	NA
Thallium	7.00E-05	NA	7.00E-05	NA
Zinc	3.00E-01	NA	1.50E-01	NA
Herbicides				
2,4,5-T	1.00E-02	NA	1.00E-02	NA
2,4,5-TP (Silvex)	8.00E-03	NA	8.00E-03	NA
2,4-D	1.00E-02	NA	1.00E-02	NA
2,4-DB	8.00E-03	NA	8.00E-03	NA
Dichloroprop	NA	NA	NA	NA
MCPA	5.00E-04	NA	5.00E-04	NA
MCPP	1.00E-03	NA	1.00E-03	NA

TABLE 6-28

CALCULATION OF INTAKE FROM INGESTION OF INDOOR DUST
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Solids (mg/kg)	Ingestion Rate (mg solids/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Volatile Organics											
1,1,1-Trichloroethane			6.27E-03	100	1.00E-06	1	250	25	70	9,125	25,550
Bromomethane	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	250	25	70	9,125	25,550
Chloroform	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	250	25	70	9,125	25,550
Chloromethane			0.00E+00	100	1.00E-06	1	250	25	70	9,125	25,550
Methylene Chloride	6.13E-09	2.19E-09	6.27E-03	100	1.00E-06	1	250	25	70	9,125	25,550
Toluene	1.28E-08		1.31E-02	100	1.00E-06	1	250	25	70	9,125	25,550
Trichloroethene		3.96E-09	1.13E-02	100	1.00E-06	1	250	25	70	9,125	25,550
Semivolatile Organics											
2,4-Dinitrotoluene	2.94E-03		3.00E+03	100	1.00E-06	1	250	25	70	9,125	25,550
2,6-Dinitrotoluene	7.24E-05		7.40E+01	100	1.00E-06	1	250	25	70	9,125	25,550
2-Methylnaphthalene			1.90E+01	100	1.00E-06	1	250	25	70	9,125	25,550
Acenaphthene	4.40E-06		4.50E+00	100	1.00E-06	1	250	25	70	9,125	25,550
Anthracene	2.84E-06		2.90E+00	100	1.00E-06	1	250	25	70	9,125	25,550
Benzo(a)anthracene		5.59E-07	1.60E+00	100	1.00E-06	1	250	25	70	9,125	25,550
Benzo(a)pyrene		5.24E-07	1.50E+00	100	1.00E-06	1	250	25	70	9,125	25,550
Benzo(b)fluoranthene		5.59E-07	1.60E+00	100	1.00E-06	1	250	25	70	9,125	25,550
Benzo(g,h,i)perylene			8.05E-01	100	1.00E-06	1	250	25	70	9,125	25,550
Benzo(k)fluoranthene		5.59E-07	1.60E+00	100	1.00E-06	1	250	25	70	9,125	25,550
Butylbenzylphthalate	5.28E-05		5.40E+01	100	1.00E-06	1	250	25	70	9,125	25,550
Carbazole		1.51E-07	4.33E-01	100	1.00E-06	1	250	25	70	9,125	25,550
Chrysene		6.64E-07	1.90E+00	100	1.00E-06	1	250	25	70	9,125	25,550
Di-n-butylphthalate	9.30E-04		9.50E+02	100	1.00E-06	1	250	25	70	9,125	25,550
Dibenz(a,h)anthracene		1.29E-07	3.69E-01	100	1.00E-06	1	250	25	70	9,125	25,550
Dibenzofuran			1.50E+00	100	1.00E-06	1	250	25	70	9,125	25,550
Diethylphthalate	3.72E-07		3.80E-01	100	1.00E-06	1	250	25	70	9,125	25,550
Fluoranthene	3.82E-06		3.90E+00	100	1.00E-06	1	250	25	70	9,125	25,550
Fluorene	5.97E-06		6.10E+00	100	1.00E-06	1	250	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene		1.11E-07	3.17E-01	100	1.00E-06	1	250	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)		6.99E-05	2.00E+02	100	1.00E-06	1	250	25	70	9,125	25,550
Naphthalene			1.60E+00	100	1.00E-06	1	250	25	70	9,125	25,550
Pentachlorophenol	2.15E-07	7.69E-08	2.20E-01	100	1.00E-06	1	250	25	70	9,125	25,550
Phenanthrene			2.20E+01	100	1.00E-06	1	250	25	70	9,125	25,550
Phenol	3.62E-05		3.70E+01	100	1.00E-06	1	250	25	70	9,125	25,550
Pyrene	4.89E-06		5.00E+00	100	1.00E-06	1	250	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate	4.89E-06	1.75E-06	5.00E+00	100	1.00E-06	1	250	25	70	9,125	25,550

TABLE 6-28

CALCULATION OF INTAKE FROM INGESTION OF INDOOR DUST
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Solids (mg/kg)	Ingestion Rate (mg solids/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Pesticides/PCBs											
4,4'-DDD	2.95E-08	1.05E-08	3.01E-02	100	1.00E-06	1	250	25	70	9,125	25,550
4,4'-DDE			7.50E-01	100	1.00E-06	1	250	25	70	9,125	25,550
4,4'-DDT	9.20E-07	3.28E-07	9.40E-01	100	1.00E-06	1	250	25	70	9,125	25,550
Aroclor-1254	1.37E-06	4.89E-07	1.40E+00	100	1.00E-06	1	250	25	70	9,125	25,550
Aroclor-1260		1.58E-07	4.51E-01	100	1.00E-06	1	250	25	70	9,125	25,550
Dieldrin	1.78E-08	6.37E-09	1.82E-02	100	1.00E-06	1	250	25	70	9,125	25,550
Endosulfan I	1.74E-08		1.78E-02	100	1.00E-06	1	250	25	70	9,125	25,550
Endosulfan II			4.99E-03	100	1.00E-06	1	250	25	70	9,125	25,550
Endrin	5.89E-09		6.02E-03	100	1.00E-06	1	250	25	70	9,125	25,550
Heptachlor epoxide	2.40E-09	8.56E-10	2.45E-03	100	1.00E-06	1	250	25	70	9,125	25,550
alpha-BHC		9.85E-10	2.82E-03	100	1.00E-06	1	250	25	70	9,125	25,550
alpha-Chlordane	3.98E-08	1.42E-08	4.07E-02	100	1.00E-06	1	250	25	70	9,125	25,550
gamma-BHC (Lindane)	9.10E-10		9.30E-04	100	1.00E-06	1	250	25	70	9,125	25,550
gamma-Chlordane			3.27E-02	100	1.00E-06	1	250	25	70	9,125	25,550
Nitroaromatics											
1,3,5-Trinitrobenzene	0.00E+00		0.00E+00	100	1.00E-06	1	250	25	70	9,125	25,550
2,4,6-Trinitrotoluene	9.99E-08	3.57E-08	1.02E-01	100	1.00E-06	1	250	25	70	9,125	25,550
Metals											
Antimony	1.53E-03		1.56E+03	100	1.00E-06	1	250	25	70	9,125	25,550
Arsenic	3.65E-05	1.30E-05	3.73E+01	100	1.00E-06	1	250	25	70	9,125	25,550
Barium	3.96E-02		4.05E+04	100	1.00E-06	1	250	25	70	9,125	25,550
Cadmium	1.24E-04		1.27E+02	100	1.00E-06	1	250	25	70	9,125	25,550
Copper	7.96E-02		8.14E+04	100	1.00E-06	1	250	25	70	9,125	25,550
Cyanide	2.37E-05		2.42E+01	100	1.00E-06	1	250	25	70	9,125	25,550
Lead			5.27E+05	100	1.00E-06	1	250	25	70	9,125	25,550
Mercury	3.85E-05		3.93E+01	100	1.00E-06	1	250	25	70	9,125	25,550
Selenium	5.68E-06		5.80E+00	100	1.00E-06	1	250	25	70	9,125	25,550
Silver	2.22E-05		2.27E+01	100	1.00E-06	1	250	25	70	9,125	25,550
Sodium			3.69E+03	100	1.00E-06	1	250	25	70	9,125	25,550
Thallium	8.77E-07		8.97E-01	100	1.00E-06	1	250	25	70	9,125	25,550
Zinc	4.17E-02		4.26E+04	100	1.00E-06	1	250	25	70	9,125	25,550

TABLE 6-28

CALCULATION OF INTAKE FROM INGESTION OF INDOOR DUST
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Solids (mg/kg)	Ingestion Rate (mg solids/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Herbicides											
2,4,5-T	7.84E-09		8.01E-03	100	1.00E-06	1	250	25	70	9,125	25,550
2,4,5-TP (Silvex)	5.69E-09		5.82E-03	100	1.00E-06	1	250	25	70	9,125	25,550
2,4-D	9.09E-08		9.29E-02	100	1.00E-06	1	250	25	70	9,125	25,550
2,4-DB	8.46E-08		8.65E-02	100	1.00E-06	1	250	25	70	9,125	25,550
Dichloroprop			5.34E-02	100	1.00E-06	1	250	25	70	9,125	25,550
MCPA	5.77E-06		5.90E+00	100	1.00E-06	1	250	25	70	9,125	25,550
MCPP	1.25E-05		1.28E+01	100	1.00E-06	1	250	25	70	9,125	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration (mg solid/kg)
IR = Ingestion Rate (mg solid/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC Solid Data - RME
100 (RME Adult Worker)
10-6
1 (All Receptors)
250
25 (RME Adult Worker)
70 (Adult male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-51

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF INDOOR DUST
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,1-Trichloroethane			NA	NA		
Bromomethane	0.00E+00	0.00E+00	1.40E-03	1.43E-03	0.00E+00	0.00E+00
Chloroform	0.00E+00	0.00E+00	1.00E-02	6.10E-03	0.00E+00	0.00E+00
Chloromethane			NA	NA		
Methylene Chloride	6.13E-09	2.19E-09	6.00E-02	7.50E-03	1.02E-07	1.64E-11
Toluene	1.28E-08		2.00E-01	NA	6.41E-08	
Trichloroethene		3.96E-09	NA	1.10E-02		4.36E-11
Semivolatile Organics						
2,4-Dinitrotoluene	2.94E-03		2.00E-03	NA	1.47E+00	
2,6-Dinitrotoluene	7.24E-05		1.00E-03	NA	7.24E-02	
2-Methylnaphthalene			NA	NA		
Acenaphthene	4.40E-06		6.00E-02	NA	7.34E-05	
Anthracene	2.84E-06		3.00E-01	NA	9.46E-06	
Benzo(a)anthracene		5.59E-07	NA	7.30E-01		4.08E-07
Benzo(a)pyrene		5.24E-07	NA	7.30E+00		3.83E-06
Benzo(b)fluoranthene		5.59E-07	NA	7.30E-01		4.08E-07
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		5.59E-07	NA	7.30E-01		4.08E-07
Butylbenzylphthalate	5.28E-05		2.00E+00	NA	2.64E-05	
Carbazole		1.51E-07	NA	2.00E-02		3.03E-09
Chrysene		6.64E-07	NA	7.30E-02		4.85E-08
Di-n-butylphthalate	9.30E-04		1.00E-01	NA	9.30E-03	
Dibenz(a,h)anthracene		1.29E-07	NA	7.30E+00		9.42E-07
Dibenzofuran			NA	NA		
Diethylphthalate	3.72E-07		8.00E+00	NA	4.65E-08	
Fluoranthene	3.82E-06		4.00E-02	NA	9.54E-05	
Fluorene	5.97E-06		4.00E-02	NA	1.49E-04	
Indeno(1,2,3-cd)pyrene		1.11E-07	NA	7.30E-01		8.10E-08
N-Nitrosodiphenylamine (1)		6.99E-05	NA	4.90E-03		3.42E-07
Naphthalene			NA	NA		
Pentachlorophenol	2.15E-07	7.69E-08	3.00E-02	1.20E-01	7.18E-06	9.23E-09
Phenanthrene			NA	NA		
Phenol	3.62E-05		6.00E-01	NA	6.03E-05	
Pyrene	4.89E-06		3.00E-02	NA	1.63E-04	
bis(2-Ethylhexyl)phthalate	4.89E-06	1.75E-06	2.00E-02	1.40E-02	2.45E-04	2.45E-08
Pesticides/PCBs						
4,4'-DDD	2.95E-08	1.05E-08	5.00E-04	2.40E-01	5.90E-05	2.53E-09
4,4'-DDE			NA	NA		
4,4'-DDT	9.20E-07	3.28E-07	5.00E-04	3.40E-01	1.84E-03	1.12E-07
Aroclor-1254	1.37E-06	4.89E-07	2.00E-05	2.00E+00	6.85E-02	9.78E-07
Aroclor-1260		1.58E-07	NA	7.70E+00		1.21E-06
Dieldrin	1.78E-08	6.37E-09	5.00E-05	1.60E+01	3.57E-04	1.02E-07
Endosulfan I	1.74E-08		6.00E-03	NA	2.90E-06	
Endosulfan II			NA	NA		
Endrin	5.89E-09		3.00E-04	NA	1.96E-05	
Heptachlor epoxide	2.40E-09	8.56E-10	1.30E-05	9.10E+00	1.84E-04	7.79E-09
alpha-BHC		9.85E-10	NA	6.30E+00		6.21E-09
alpha-Chlordane	3.98E-08	1.42E-08	6.00E-05	1.30E+00	6.63E-04	1.85E-08
gamma-BHC (Lindane)	9.10E-10		3.00E-04	NA	3.03E-06	
gamma-Chlordane			NA	NA		

TABLE 6-51

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF INDOOR DUST
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Nitroaromatics						
1,3,5-Trinitrobenzene	0.00E+00		5.00E-05	NA	0.00E+00	
2,4,6-Trinitrotoluene	9.99E-08	3.57E-08	5.00E-04	3.00E-02	2.00E-04	1.07E-09
Metals						
Antimony	1.53E-03		4.00E-04	NA	3.82E+00	
Arsenic	3.65E-05	1.30E-05	3.00E-04	1.75E+00	1.22E-01	2.28E-05
Barium	3.96E-02		7.00E-02	NA	5.66E-01	
Cadmium	1.24E-04		5.00E-04	NA	2.49E-01	
Copper	7.96E-02		4.00E-02	NA	1.99E+00	
Cyanide	2.37E-05		2.00E-02	NA	1.18E-03	
Lead			NA	NA		
Mercury	3.85E-05		3.00E-04	NA	1.28E-01	
Selenium	5.68E-06		5.00E-03	NA	1.14E-03	
Silver	2.22E-05		5.00E-03	NA	4.44E-03	
Sodium			NA	NA		
Thallium	8.77E-07		7.00E-05	NA	1.25E-02	
Zinc	4.17E-02		3.00E-01	NA	1.39E-01	
Herbicides						
2,4,5-T	7.84E-09		1.00E-02	NA	7.84E-07	
2,4,5-TP (Silvex)	5.69E-09		8.00E-03	NA	7.11E-07	
2,4-D	9.09E-08		1.00E-02	NA	9.09E-06	
2,4-DB	8.46E-08		8.00E-03	NA	1.06E-05	
Dichloroprop			NA	NA		
MCPA	5.77E-06		5.00E-04	NA	1.15E-02	
MCPP	1.25E-05		1.00E-03	NA	1.25E-02	
Totals - HQ & CR					**8.68E+00**	**3.17E-05**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-30

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO INDOOR DUST
FUTURE WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Solids (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg solids/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Car
Volatile Organics												
1,1,1-Trichloroethane			6.27E-03	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Bromomethane				1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Chloroform				1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Chloromethane				1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Methylene Chloride			6.27E-03	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Toluene			1.31E-02	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Trichloroethene			1.13E-02	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Semivolatile Organics												
2,4-Dinitrotoluene			3.00E+03	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
2,6-Dinitrotoluene			7.40E+01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
2-Methylnaphthalene			1.90E+01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Acenaphthene			4.50E+00	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Anthracene			2.90E+00	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Benzo(a)anthracene			1.60E+00	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Benzo(a)pyrene			1.50E+00	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Benzo(b)fluoranthene			1.60E+00	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Benzo(g,h,i)perylene			8.05E-01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Benzo(k)fluoranthene			1.60E+00	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Butylbenzylphthalate			5.40E+01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Carbazole			4.33E-01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Chrysene			1.90E+00	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Di-n-butylphthalate			9.50E+02	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Dibenz(a,h)anthracene			3.69E-01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Dibenzofuran			1.50E+00	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Diethylphthalate			3.80E-01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Fluoranthene			3.90E+00	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Fluorene			6.10E+00	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			3.17E-01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			2.00E+02	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Naphthalene			1.60E+00	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Pentachlorophenol			2.20E-01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Phenanthrene			2.20E+01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Phenol			3.70E+01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Pyrene			5.00E+00	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			5.00E+00	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Pesticides/PCBs												
4,4'-DDD			3.01E-02	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
4,4'-DDE			7.50E-01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
4,4'-DDT			9.40E-01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Aroclor-1254	4.77E-06	1.70E-06	1.40E+00	1.00E-06	5,800	1.0	0.06	250	25	70	9,125	25,550
Aroclor-1260		5.49E-07	4.51E-01	1.00E-06	5,800	1.0	0.06	250	25	70	9,125	25,550
Dieldrin			1.82E-02	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Endosulfan I			1.78E-02	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Endosulfan II			4.99E-03	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Endrin			6.02E-03	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Heptachlor epoxide			2.45E-03	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
alpha-BHC			2.82E-03	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
alpha-Chlordane			4.07E-02	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
gamma-BHC (Lindane)			9.30E-04	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
gamma-Chlordane			3.27E-02	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Nitroaromatics												
1,3,5-Trinitrobenzene				1.00E-06	5,800	1.0		250	25	70	9,125	25,550
2,4,6-Trinitrotoluene			1.02E-01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Metals												
Antimony			1.56E+03	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Arsenic			3.73E+01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Barium			4.05E+04	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Cadmium	7.21E-05		1.27E+02	1.00E-06	5,800	1.0	0.01	250	25	70	9,125	25,550
Copper			8.14E+04	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Cyanide			2.42E+01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Lead			5.27E+05	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Mercury			3.93E+01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Selenium			5.80E+00	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Silver			2.27E+01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Sodium			3.69E+03	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Thallium			8.97E-01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Zinc			4.26E+04	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Herbicides												
2,4,5-T			8.01E-03	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
2,4,5-TP (Silvex)			5.82E-03	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
2,4-D			9.29E-02	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
2,4-DB			8.65E-02	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
Dichloroprop			5.34E-02	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
MCPA			5.90E+00	1.00E-06	5,800	1.0		250	25	70	9,125	25,550
MCPP			1.28E+01	1.00E-06	5,800	1.0		250	25	70	9,125	25,550

EQUATION: Absorbed dose (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables:

CS = Chemical Concentration (mg solid/kg)
CF = Conversion Factor (10-6 kg/mg)
SA = Surface Area Contact (cm²)
AF =Soil to Skin Adherence Factor (mg/cm²)
ABS = Absorption Factor (unitless)

Assumptions:

EPC Solid Data - RME
10-6
5,800 cm² (RME Adult Worker)
1.0 (RME all receptors)
Compound Specific for PCBs and Cd
EPA, 1992b (Default Assumption 0% = 0.0)

Variables:

EF = Exposure Frequency (events/year)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

250 (RME Adult Worker)
25 (RME Adult Worker)
70 (Adult Male)
25 x 365 (Nc) 70 x 365 Adult (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	1,1,2,2-Tetrachloroethane	UG/KG	34	0	1	2.9%	6.404	3.707	7.750	FALSE	FALSE	6.888	6.888
VOLATILE ORGANICS	2-Butanone	UG/KG	32	2	1	3.1%	5.414	0.993	5.000	FALSE	FALSE	6.107	5.000
VOLATILE ORGANICS	Acetone	UG/KG	34	0	1	2.9%	7.404	7.761	46.000	FALSE	FALSE	8.080	8.080
VOLATILE ORGANICS	Benzene	UG/KG	32	2	5	15.6%	5.164	1.334	5.000	FALSE	FALSE	5.889	5.000
VOLATILE ORGANICS	Carbon disulfide	UG/KG	32	2	2	6.3%	5.375	1.047	2.000	FALSE	FALSE	5.903	2.000
VOLATILE ORGANICS	Chloroform	UG/KG	32	2	2	6.3%	4.195	1.424	2.000	FALSE	FALSE	4.786	2.000
VOLATILE ORGANICS	Methylene chloride	UG/KG	32	2	1	3.1%	5.492	0.731	3.000	FALSE	FALSE	5.746	3.000
VOLATILE ORGANICS	Toluene	UG/KG	34	0	13	38.2%	5.809	4.289	10.000	FALSE	FALSE	7.016	7.016
VOLATILE ORGANICS	Total Xylenes	UG/KG	32	2	1	3.1%	5.539	0.616	4.250	FALSE	FALSE	5.718	4.250
SEMIVOLATILE ORGANIC	2,4-Dinitrotoluene	UG/KG	34	0	6	17.6%	2084.676	7769.222	2200.000	FALSE	FALSE	2144.381	2144.381
SEMIVOLATILE ORGANIC	2,6-Dinitrotoluene	UG/KG	22	12	3	13.6%	187.273	22.716	180.000	FALSE	TRUE	195.607	180.000
SEMIVOLATILE ORGANIC	2-Methylnaphthalene	UG/KG	34	0	5	14.7%	1114.471	3376.451	19000.000	FALSE	FALSE	1229.588	1229.588
SEMIVOLATILE ORGANIC	Acenaphthene	UG/KG	34	0	7	20.6%	2666.412	12309.156	72000.000	FALSE	FALSE	2155.796	2155.796
SEMIVOLATILE ORGANIC	Acenaphthylene	UG/KG	28	6	7	25.0%	231.464	175.317	310.000	FALSE	FALSE	308.340	308.340
SEMIVOLATILE ORGANIC	Anthracene	UG/KG	34	0	10	29.4%	4099.176	20514.996	120000.000	FALSE	FALSE	2011.200	2011.200
SEMIVOLATILE ORGANIC	Benzo[a]anthracene	UG/KG	34	0	19	55.9%	7282.382	37620.127	220000.000	FALSE	FALSE	7195.470	7195.470
SEMIVOLATILE ORGANIC	Benzo[a]pyrene	UG/KG	34	0	21	61.8%	6827.265	34173.558	200000.000	FALSE	TRUE	11520.198	11520.198
SEMIVOLATILE ORGANIC	Benzo[b]fluoranthene	UG/KG	34	0	19	55.9%	6885.676	34163.821	200000.000	FALSE	TRUE	9847.431	9847.431
SEMIVOLATILE ORGANIC	Benzo[ghi]perylene	UG/KG	34	0	18	52.9%	4126.353	17108.725	100000.000	FALSE	FALSE	5889.049	5889.049
SEMIVOLATILE ORGANIC	Benzo[k]fluoranthene	UG/KG	34	0	16	47.1%	5736.000	29063.409	170000.000	FALSE	FALSE	4709.947	4709.947
SEMIVOLATILE ORGANIC	Bis(2-Ethylhexyl)phthalate	UG/KG	33	1	5	15.2%	576.955	1236.111	2100.000	FALSE	FALSE	1269.840	1269.840
SEMIVOLATILE ORGANIC	Carbazole	UG/KG	34	0	7	20.6%	3162.324	15213.722	89000.000	FALSE	FALSE	1869.181	1869.181
SEMIVOLATILE ORGANIC	Chrysene	UG/KG	34	0	24	70.6%	7255.500	37627.269	220000.000	FALSE	FALSE	8640.767	8640.767
SEMIVOLATILE ORGANIC	Cresols (-o)	UG/KG	21	13	1	4.8%	185.952	25.623	120.000	FALSE	FALSE	196.598	120.000
SEMIVOLATILE ORGANIC	Di-n-butylphthalate	UG/KG	33	1	8	24.2%	554.667	1205.788	1300.000	FALSE	FALSE	714.218	714.218
SEMIVOLATILE ORGANIC	Dibenz[a,h]anthracene	UG/KG	34	0	14	41.2%	2086.559	8381.335	49000.000	FALSE	FALSE	2353.560	2353.560
SEMIVOLATILE ORGANIC	Dibenzofuran	UG/KG	34	0	5	14.7%	2013.500	8561.869	50000.000	FALSE	FALSE	1617.219	1617.219
SEMIVOLATILE ORGANIC	Diethyl phthalate	UG/KG	21	13	1	4.8%	180.905	42.370	19.000	FALSE	FALSE	241.142	19.000
SEMIVOLATILE ORGANIC	Fluoranthene	UG/KG	34	0	24	70.6%	16580.059	90752.290	530000.000	FALSE	FALSE	11261.722	11261.722
SEMIVOLATILE ORGANIC	Fluorene	UG/KG	34	0	4	11.8%	2858.412	13330.003	78000.000	FALSE	FALSE	1731.206	1731.206
SEMIVOLATILE ORGANIC	Indeno[1,2,3-cd]pyrene	UG/KG	34	0	16	47.1%	3953.059	17068.183	100000.000	FALSE	TRUE	5554.813	5554.813
SEMIVOLATILE ORGANIC	N-Nitrosodiphenylamine	UG/KG	32	2	7	21.9%	395.938	366.070	680.000	FALSE	FALSE	577.024	577.024
SEMIVOLATILE ORGANIC	Naphthalene	UG/KG	34	0	6	17.6%	2492.206	11284.525	66000.000	FALSE	FALSE	1953.704	1953.704
SEMIVOLATILE ORGANIC	Pentachlorophenol	UG/KG	31	3	2	6.5%	883.387	750.479	1200.000	FALSE	FALSE	1156.083	1156.083
SEMIVOLATILE ORGANIC	Phenanthrene	UG/KG	34	0	19	55.9%	15149.206	83921.323	490000.000	FALSE	FALSE	7327.205	7327.205
SEMIVOLATILE ORGANIC	Pyrene	UG/KG	34	0	25	73.5%	11578.412	61603.645	360000.000	FALSE	FALSE	12639.496	12639.496
PESTICIDES/PCB	4,4'-DDD	UG/KG	34	0	2	5.9%	3.835	5.331	5.000	FALSE	FALSE	4.378	4.378
PESTICIDES/PCB	4,4'-DDE	UG/KG	34	0	17	50.0%	12.143	24.343	140.000	FALSE	FALSE	18.463	18.463

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Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
PESTICIDES/PCB	4,4'-DDT	UG/KG	34	0	17	50.0%	7.022	8.625	43.000	FALSE	FALSE	9.855	9.855
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	34	0	4	11.8%	2.344	2.896	8.600	FALSE	FALSE	2.929	2.929
PESTICIDES/PCB	Aroclor-1260	UG/KG	30	4	1	3.3%	18.500	1.462	22.000	FALSE	FALSE	19.136	19.136
PESTICIDES/PCB	Beta-BHC	UG/KG	34	0	1	2.9%	2.265	3.985	20.000	FALSE	FALSE	2.453	2.453
PESTICIDES/PCB	Delta-BHC	UG/KG	33	1	1	3.0%	1.735	2.398	2.200	FALSE	FALSE	1.918	1.918
PESTICIDES/PCB	Dieldrin	UG/KG	34	0	3	8.8%	4.201	5.924	26.000	FALSE	FALSE	4.993	4.993
PESTICIDES/PCB	Endosulfan I	UG/KG	34	0	11	32.4%	16.836	73.364	430.000	FALSE	FALSE	13.778	13.778
PESTICIDES/PCB	Endosulfan II	UG/KG	34	0	3	8.8%	3.938	5.309	5.000	FALSE	FALSE	4.548	4.548
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	34	0	1	2.9%	3.825	5.542	20.000	FALSE	FALSE	4.287	4.287
PESTICIDES/PCB	Endrin	UG/KG	34	0	4	11.8%	4.876	8.310	43.000	FALSE	FALSE	5.588	5.588
PESTICIDES/PCB	Endrin aldehyde	UG/KG	31	3	1	3.2%	2.365	2.823	3.000	FALSE	FALSE	2.515	2.515
PESTICIDES/PCB	Endrin ketone	UG/KG	34	0	4	11.8%	5.460	12.512	71.000	FALSE	FALSE	5.579	5.579
PESTICIDES/PCB	Gamma-Chlordane	UG/KG	34	0	3	8.8%	2.499	3.163	9.400	FALSE	FALSE	3.171	3.171
PESTICIDES/PCB	Heptachlorepoxide	UG/KG	33	1	2	6.1%	1.738	2.399	2.100	FALSE	FALSE	1.935	1.935
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	34	0	33	97.1%	0.259	0.312	1.400	FALSE	TRUE	0.610	0.610
OTHER ANALYSES	Total Organic Carbon	MG/KG	4	0	4	100.0%	4982.000	4822.431	9850.000	TRUE	TRUE	10122.712	9850.000
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	34	0	10	29.4%	2570.882	12659.588	74000.000	FALSE	FALSE	1374.456	1374.456
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	34	0	2	5.9%	123.897	245.508	900.000	FALSE	FALSE	122.153	122.153
METALS	Aluminum	MG/KG	34	0	28	82.4%	9823.824	3548.324	14600.000	FALSE	FALSE	11574.807	11574.807
METALS	Antimony	MG/KG	34	0	20	58.8%	6.114	22.994	135.000	FALSE	FALSE	7.907	7.907
METALS	Arsenic	MG/KG	34	0	34	100.0%	4.953	1.058	6.900	TRUE	TRUE	5.260	5.260
METALS	Barium	MG/KG	34	0	34	100.0%	88.816	56.419	302.000	FALSE	TRUE	107.397	107.397
METALS	Beryllium	MG/KG	34	0	34	100.0%	0.398	0.146	0.750	TRUE	FALSE	0.441	0.441
METALS	Cadmium	MG/KG	34	0	22	64.7%	0.215	0.130	0.500	FALSE	FALSE	0.315	0.315
METALS	Calcium	MG/KG	34	0	34	100.0%	46529.706	59449.637	260000.000	FALSE	TRUE	73601.553	73601.553
METALS	Chromium	MG/KG	34	0	33	97.1%	17.456	5.265	28.400	TRUE	TRUE	18.984	18.984
METALS	Cobalt	MG/KG	34	0	34	100.0%	9.771	2.944	17.800	TRUE	TRUE	10.625	10.625
METALS	Copper	MG/KG	34	0	34	100.0%	68.197	126.023	736.000	FALSE	FALSE	76.552	76.552
METALS	Cyanide	MG/KG	34	0	1	2.9%	0.279	0.051	0.520	FALSE	FALSE	0.291	0.291
METALS	Iron	MG/KG	34	0	34	100.0%	21849.412	5203.600	30400.000	FALSE	FALSE	24139.760	24139.760
METALS	Lead	MG/KG	34	0	34	100.0%	1170.950	6050.372	35400.000	FALSE	FALSE	630.239	630.239
METALS	Magnesium	MG/KG	34	0	34	100.0%	8720.735	6274.900	34900.000	FALSE	TRUE	10222.985	10222.985
METALS	Manganese	MG/KG	34	0	34	100.0%	448.647	152.456	948.000	FALSE	TRUE	497.022	497.022
METALS	Mercury	MG/KG	34	0	24	70.6%	0.249	0.417	1.900	FALSE	FALSE	0.543	0.543
METALS	Nickel	MG/KG	34	0	34	100.0%	29.074	9.996	53.500	FALSE	TRUE	32.337	32.337
METALS	Potassium	MG/KG	34	0	34	100.0%	1261.559	355.637	2280.000	TRUE	TRUE	1364.744	1364.744
METALS	Selenium	MG/KG	34	0	19	55.9%	0.575	0.461	1.600	FALSE	TRUE	0.920	0.920
METALS	Silver	MG/KG	34	0	8	23.5%	0.275	0.216	1.200	FALSE	FALSE	0.338	0.338

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
METALS	Sodium	MG/KG	34	0	24	70.6%	82.743	68.708	383.000	FALSE	TRUE	105.433	105.433
METALS	Thallium	MG/KG	34	0	10	29.4%	1.839	7.477	1.700	FALSE	FALSE	1.629	1.629
METALS	Vanadium	MG/KG	34	0	34	100.0%	21.076	6.622	38.100	FALSE	TRUE	23.373	23.373
METALS	Zinc	MG/KG	34	0	34	100.0%	98.416	37.860	219.000	FALSE	TRUE	110.008	110.008

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	1,1,2,2-Tetrachloroethane	UG/KG	34	0	1	2.9%	6.404	3.707	7.750	FALSE	FALSE	6.888	6.888
VOLATILE ORGANICS	2-Butanone	UG/KG	32	2	1	3.1%	5.414	0.993	5.000	FALSE	FALSE	6.107	5.000
VOLATILE ORGANICS	Acetone	UG/KG	34	0	1	2.9%	7.404	7.761	46.000	FALSE	FALSE	8.080	8.080
VOLATILE ORGANICS	Benzene	UG/KG	32	2	5	15.6%	5.164	1.334	5.000	FALSE	FALSE	5.889	5.000
VOLATILE ORGANICS	Carbon disulfide	UG/KG	32	2	2	6.3%	5.375	1.047	2.000	FALSE	FALSE	5.903	2.000
VOLATILE ORGANICS	Chloroform	UG/KG	32	2	2	6.3%	4.195	1.424	2.000	FALSE	FALSE	4.786	2.000
VOLATILE ORGANICS	Methylene chloride	UG/KG	32	2	1	3.1%	5.492	0.731	3.000	FALSE	FALSE	5.746	3.000
VOLATILE ORGANICS	Toluene	UG/KG	34	0	13	38.2%	5.809	4.289	10.000	FALSE	FALSE	7.016	7.016
VOLATILE ORGANICS	Total Xylenes	UG/KG	32	2	1	3.1%	5.539	0.616	4.250	FALSE	FALSE	5.718	4.250
SEMIVOLATILE ORGANIC	2,4-Dinitrotoluene	UG/KG	34	0	6	17.6%	2084.676	7769.222	2200.000	FALSE	FALSE	2144.381	2144.381
SEMIVOLATILE ORGANIC	2,6-Dinitrotoluene	UG/KG	22	12	3	13.6%	187.273	22.716	180.000	FALSE	TRUE	195.607	180.000
SEMIVOLATILE ORGANIC	2-Methylnaphthalene	UG/KG	34	0	5	14.7%	1114.471	3376.451	19000.000	FALSE	FALSE	1229.588	1229.588
SEMIVOLATILE ORGANIC	Acenaphthene	UG/KG	34	0	7	20.6%	2666.412	12309.156	72000.000	FALSE	FALSE	2155.796	2155.796
SEMIVOLATILE ORGANIC	Acenaphthylene	UG/KG	28	6	7	25.0%	231.464	175.317	310.000	FALSE	FALSE	308.340	308.340
SEMIVOLATILE ORGANIC	Anthracene	UG/KG	34	0	10	29.4%	4099.176	20514.996	120000.000	FALSE	FALSE	2011.200	2011.200
SEMIVOLATILE ORGANIC	Benzo[a]anthracene	UG/KG	34	0	19	55.9%	7282.382	37620.127	220000.000	FALSE	FALSE	7195.470	7195.470
SEMIVOLATILE ORGANIC	Benzo[a]pyrene	UG/KG	34	0	21	61.8%	6827.265	34173.558	200000.000	FALSE	TRUE	11520.198	11520.198
SEMIVOLATILE ORGANIC	Benzo[b]fluoranthene	UG/KG	34	0	19	55.9%	6885.676	34163.821	200000.000	FALSE	TRUE	9847.431	9847.431
SEMIVOLATILE ORGANIC	Benzo[ghi]perylene	UG/KG	34	0	18	52.9%	4126.353	17108.725	100000.000	FALSE	FALSE	5889.049	5889.049
SEMIVOLATILE ORGANIC	Benzo[k]fluoranthene	UG/KG	34	0	16	47.1%	5736.000	29063.409	170000.000	FALSE	FALSE	4709.947	4709.947
SEMIVOLATILE ORGANIC	Bis(2-Ethylhexyl)phthalate	UG/KG	33	1	5	15.2%	576.955	1236.111	2100.000	FALSE	FALSE	1269.840	1269.840
SEMIVOLATILE ORGANIC	Carbazole	UG/KG	34	0	7	20.6%	3162.324	15213.722	89000.000	FALSE	FALSE	1869.181	1869.181
SEMIVOLATILE ORGANIC	Chrysene	UG/KG	34	0	24	70.6%	7255.500	37627.269	220000.000	FALSE	FALSE	8640.767	8640.767
SEMIVOLATILE ORGANIC	Cresols (-o)	UG/KG	21	13	1	4.8%	185.952	25.623	120.000	FALSE	FALSE	196.598	120.000
SEMIVOLATILE ORGANIC	Di-n-butylphthalate	UG/KG	33	1	8	24.2%	554.667	1205.788	1300.000	FALSE	FALSE	714.218	714.218
SEMIVOLATILE ORGANIC	Dibenz[a,h]anthracene	UG/KG	34	0	14	41.2%	2086.559	8381.335	49000.000	FALSE	FALSE	2353.560	2353.560
SEMIVOLATILE ORGANIC	Dibenzofuran	UG/KG	34	0	5	14.7%	2013.500	8561.869	50000.000	FALSE	FALSE	1617.219	1617.219
SEMIVOLATILE ORGANIC	Diethyl phthalate	UG/KG	21	13	1	4.8%	180.905	42.370	19.000	FALSE	FALSE	241.142	19.000
SEMIVOLATILE ORGANIC	Fluoranthene	UG/KG	34	0	24	70.6%	16580.059	90752.290	530000.000	FALSE	FALSE	11261.722	11261.722
SEMIVOLATILE ORGANIC	Fluorene	UG/KG	34	0	4	11.8%	2858.412	13330.003	78000.000	FALSE	FALSE	1731.206	1731.206
SEMIVOLATILE ORGANIC	Indeno[1,2,3-cd]pyrene	UG/KG	34	0	16	47.1%	3953.059	17068.183	100000.000	FALSE	TRUE	5554.813	5554.813
SEMIVOLATILE ORGANIC	N-Nitrosodiphenylamine	UG/KG	32	2	7	21.9%	395.938	366.070	680.000	FALSE	FALSE	577.024	577.024
SEMIVOLATILE ORGANIC	Naphthalene	UG/KG	34	0	6	17.6%	2492.206	11284.525	66000.000	FALSE	FALSE	1953.704	1953.704
SEMIVOLATILE ORGANIC	Pentachlorophenol	UG/KG	31	3	2	6.5%	883.387	750.479	1200.000	FALSE	FALSE	1156.083	1156.083
SEMIVOLATILE ORGANIC	Phenanthrene	UG/KG	34	0	19	55.9%	15149.206	83921.323	490000.000	FALSE	FALSE	7327.205	7327.205
SEMIVOLATILE ORGANIC	Pyrene	UG/KG	34	0	25	73.5%	11578.412	61603.645	360000.000	FALSE	FALSE	12639.496	12639.496
PESTICIDES/PCB	4,4'-DDD	UG/KG	34	0	2	5.9%	3.835	5.331	5.000	FALSE	FALSE	4.378	4.378
PESTICIDES/PCB	4,4'-DDE	UG/KG	34	0	17	50.0%	12.143	24.343	140.000	FALSE	FALSE	18.463	18.463

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Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
PESTICIDES/PCB	4,4`-DDT	UG/KG	34	0	17	50.0%	7.022	8.625	43.000	FALSE	FALSE	9.855	9.855
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	34	0	4	11.8%	2.344	2.896	8.600	FALSE	FALSE	2.929	2.929
PESTICIDES/PCB	Aroclor-1260	UG/KG	30	4	1	3.3%	18.500	1.462	22.000	FALSE	FALSE	19.136	19.136
PESTICIDES/PCB	Beta-BHC	UG/KG	34	0	1	2.9%	2.265	3.985	20.000	FALSE	FALSE	2.453	2.453
PESTICIDES/PCB	Delta-BHC	UG/KG	33	1	1	3.0%	1.735	2.398	2.200	FALSE	FALSE	1.918	1.918
PESTICIDES/PCB	Dieldrin	UG/KG	34	0	3	8.8%	4.201	5.924	26.000	FALSE	FALSE	4.993	4.993
PESTICIDES/PCB	Endosulfan I	UG/KG	34	0	11	32.4%	16.836	73.364	430.000	FALSE	FALSE	13.778	13.778
PESTICIDES/PCB	Endosulfan II	UG/KG	34	0	3	8.8%	3.938	5.309	5.000	FALSE	FALSE	4.548	4.548
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	34	0	1	2.9%	3.825	5.542	20.000	FALSE	FALSE	4.287	4.287
PESTICIDES/PCB	Endrin	UG/KG	34	0	4	11.8%	4.876	8.310	43.000	FALSE	FALSE	5.588	5.588
PESTICIDES/PCB	Endrin aldehyde	UG/KG	31	3	1	3.2%	2.365	2.823	3.000	FALSE	FALSE	2.515	2.515
PESTICIDES/PCB	Endrin ketone	UG/KG	34	0	4	11.8%	5.460	12.512	71.000	FALSE	FALSE	5.579	5.579
PESTICIDES/PCB	Gamma-Chlordane	UG/KG	34	0	3	8.8%	2.499	3.163	9.400	FALSE	FALSE	3.171	3.171
PESTICIDES/PCB	Heptachlorepoxide	UG/KG	33	1	2	6.1%	1.738	2.399	2.100	FALSE	FALSE	1.935	1.935
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	34	0	33	97.1%	0.259	0.312	1.400	FALSE	TRUE	0.610	0.610
OTHER ANALYSES	Total Organic Carbon	MG/KG	4	0	4	100.0%	4982.000	4822.431	9850.000	TRUE	TRUE	10122.712	9850.000
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	34	0	10	29.4%	2570.882	12659.588	74000.000	FALSE	FALSE	1374.456	1374.456
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	34	0	2	5.9%	123.897	245.508	900.000	FALSE	FALSE	122.153	122.153
METALS	Aluminum	MG/KG	34	0	28	82.4%	9823.824	3548.324	14600.000	FALSE	FALSE	11574.807	11574.807
METALS	Antimony	MG/KG	34	0	20	58.8%	6.114	22.994	135.000	FALSE	FALSE	7.907	7.907
METALS	Arsenic	MG/KG	34	0	34	100.0%	4.953	1.058	6.900	TRUE	TRUE	5.260	5.260
METALS	Barium	MG/KG	34	0	34	100.0%	88.816	56.419	302.000	FALSE	TRUE	107.397	107.397
METALS	Beryllium	MG/KG	34	0	34	100.0%	0.398	0.146	0.750	TRUE	FALSE	0.441	0.441
METALS	Cadmium	MG/KG	34	0	22	64.7%	0.215	0.130	0.500	FALSE	FALSE	0.315	0.315
METALS	Calcium	MG/KG	34	0	34	100.0%	46529.706	59449.637	260000.000	FALSE	TRUE	73601.553	73601.553
METALS	Chromium	MG/KG	34	0	33	97.1%	17.456	5.265	28.400	TRUE	TRUE	18.984	18.984
METALS	Cobalt	MG/KG	34	0	34	100.0%	9.771	2.944	17.800	TRUE	TRUE	10.625	10.625
METALS	Copper	MG/KG	34	0	34	100.0%	68.197	126.023	736.000	FALSE	FALSE	76.552	76.552
METALS	Cyanide	MG/KG	34	0	1	2.9%	0.279	0.051	0.520	FALSE	FALSE	0.291	0.291
METALS	Iron	MG/KG	34	0	34	100.0%	21849.412	5203.600	30400.000	FALSE	FALSE	24139.760	24139.760
METALS	Lead	MG/KG	34	0	34	100.0%	1170.950	6050.372	35400.000	FALSE	FALSE	630.239	630.239
METALS	Magnesium	MG/KG	34	0	34	100.0%	8720.735	6274.900	34900.000	FALSE	TRUE	10222.985	10222.985
METALS	Manganese	MG/KG	34	0	34	100.0%	448.647	152.456	948.000	FALSE	TRUE	497.022	497.022
METALS	Mercury	MG/KG	34	0	24	70.6%	0.249	0.417	1.900	FALSE	FALSE	0.543	0.543
METALS	Nickel	MG/KG	34	0	34	100.0%	29.074	9.996	53.500	FALSE	TRUE	32.337	32.337
METALS	Potassium	MG/KG	34	0	34	100.0%	1261.559	355.637	2280.000	TRUE	TRUE	1364.744	1364.744
METALS	Selenium	MG/KG	34	0	19	55.9%	0.575	0.461	1.600	FALSE	TRUE	0.920	0.920
METALS	Silver	MG/KG	34	0	8	23.5%	0.275	0.216	1.200	FALSE	FALSE	0.338	0.338

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
METALS	Sodium	MG/KG	34	0	24	70.6%	82.743	68.708	383.000	FALSE	TRUE	105.433	105.433
METALS	Thallium	MG/KG	34	0	10	29.4%	1.839	7.477	1.700	FALSE	FALSE	1.629	1.629
METALS	Vanadium	MG/KG	34	0	34	100.0%	21.076	6.622	38.100	FALSE	TRUE	23.373	23.373
METALS	Zinc	MG/KG	34	0	34	100.0%	98.416	37.860	219.000	FALSE	TRUE	110.008	110.008

TABLE 6-20

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Volatile Organics											
1,1,2,2,-Tetrachloroethane		5.39E-10	6.89E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Acetone	8.85E-09		8.08E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Benzene		3.91E-10	5.00E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Carbon Disulfide	2.19E-09		2.00E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Chloroform	2.19E-09	1.57E-10	2.00E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Methylene Chloride	3.29E-09	2.35E-10	3.00E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Toluene	7.69E-09		7.02E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Xylene (total)	4.66E-09		4.25E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Semivolatile Organics											
2,4-Dinitrotoluene	2.35E-06		2.14E+00	200	1.00E-06	1	50	5	25	1,825	25,550
2,6-Dinitrotoluene	1.97E-07		1.80E-01	200	1.00E-06	1	50	5	25	1,825	25,550
2-methylnaphthalene			1.23E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Acenaphthene			2.16E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Acenaphthylene	3.38E-07		3.08E-01	200	1.00E-06	1	50	5	25	1,825	25,550
Anthracene		1.57E-07	2.01E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(a)anthracene		5.63E-07	7.20E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(a)pyrene		9.02E-07	1.15E+01	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(b)fluoranthene			9.85E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(g,h,i)perylene		4.61E-07	5.89E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(k)fluoranthene		3.69E-07	4.71E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Carbazole		1.46E-07	1.87E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Chrysene	9.47E-06		8.64E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Di-n-butylphthalate		5.59E-08	7.14E-01	200	1.00E-06	1	50	5	25	1,825	25,550
Dibenz(a,h)anthracene			2.35E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Dibenzofuran	1.77E-06		1.62E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Diethylphthalate	2.08E-08		1.90E-02	200	1.00E-06	1	50	5	25	1,825	25,550
Fluoranthene	1.23E-05		1.13E+01	200	1.00E-06	1	50	5	25	1,825	25,550
Fluorene		1.36E-07	1.73E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene		4.35E-07	5.55E+00	200	1.00E-06	1	50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			5.77E-01	200	1.00E-06	1	50	5	25	1,825	25,550
Naphthalene	2.14E-06	1.53E-07	1.95E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Pentachlorophenol			1.16E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Phenanthrene	8.03E-06		7.33E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Pyrene	1.39E-05	9.89E-07	1.26E+01	200	1.00E-06	1	50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate	1.39E-06	9.94E-08	1.27E+00	200	1.00E-06	1	50	5	25	1,825	25,550

TABLE 6-20

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Pesticides											
4,4'-DDD			4.38E-03	200	1.00E-06	1	50	5	25	1,825	25,550
4,4'-DDE	2.02E-08	1.45E-09	1.85E-02	200	1.00E-06	1	50	5	25	1,825	25,550
4,4'-DDT	1.08E-08	7.71E-10	9.85E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Aroclor-1260	2.10E-08	1.50E-09	1.91E-02	200	1.00E-06	1	50	5	25	1,825	25,550
Dieldrin	5.47E-09		4.99E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endosulfan I			1.38E-02	200	1.00E-06	1	50	5	25	1,825	25,550
Endosulfan II	4.98E-09		4.55E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endosulfan sulfate	4.70E-09		4.29E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endrin			5.59E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endrin aldehyde			2.51E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endrin ketone	6.11E-09	4.37E-10	5.58E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Heptachlor				200	1.00E-06	1	50	5	25	1,825	25,550
Heptachlor epoxide		1.51E-10	1.94E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Toxaphene				200	1.00E-06	1	50	5	25	1,825	25,550
alpha-Chlordane		2.29E-10	2.93E-03	200	1.00E-06	1	50	5	25	1,825	25,550
beta-BHC	2.69E-09		2.45E-03	200	1.00E-06	1	50	5	25	1,825	25,550
gamma-Chlordane			3.17E-03	200	1.00E-06	1	50	5	25	1,825	25,550
delta-BHC	2.10E-09	1.50E-10	1.92E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Metals											
Antimony	8.67E-09		7.91E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Barium	1.18E-07		1.07E-01	200	1.00E-06	1	50	5	25	1,825	25,550
Lead	6.91E-07		6.30E-01	200	1.00E-06	1	50	5	25	1,825	25,550
Mercury	5.95E-10		5.43E-04	200	1.00E-06	1	50	5	25	1,825	25,550
Selenium	1.01E-09		9.20E-04	200	1.00E-06	1	50	5	25	1,825	25,550
Thallium	1.79E-09		1.63E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Zinc	1.21E-07	8.61E-09	1.10E-01	200	1.00E-06	1	50	5	25	1,825	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC Soil Data - RME
IR = Ingestion Rate (mg soil/day)	200 (RME Child)
CF = Conversion Factor (10-6 kg/mg)	10-6
FI = Fraction Ingested (unitless)	1
EF = Exposure Frequency (days/years)	50 (RME)
ED = Exposure Duration (years)	5 (RME)
BW = Bodyweight (kg)	25 (Child)
AT = Averaging Time (days)	5 x 365 (NC), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-63

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane		5.39E-10	NA	2.00E-01		1.08E-10
Acetone	8.85E-09		1.00E-01	NA	8.85E-08	
Benzene		3.91E-10	NA	2.90E-02		1.14E-11
Carbon Disulfide	2.19E-09		1.00E-01	NA	2.19E-08	
Chloroform	2.19E-09	1.57E-10	1.00E-02	6.10E-03	2.19E-07	9.55E-13
Methylene Chloride	3.29E-09	2.35E-10	6.00E-02	7.50E-03	5.48E-08	1.76E-12
Toluene	7.69E-09		2.00E-01	NA	3.84E-08	
Xylene (total)	4.66E-09		2.00E+00	NA	2.33E-09	
Semivolatile Organics						
2,4-Dinitrotoluene	2.35E-06		2.00E-03	NA	1.18E-03	
2,6-Dinitrotoluene	1.97E-07		1.00E-03	NA	1.97E-04	
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene	3.38E-07		NA	NA		
Anthracene		1.57E-07	3.00E-01	NA		
Benzo(a)anthracene		5.63E-07	NA	7.30E-01		4.11E-07
Benzo(a)pyrene		9.02E-07	NA	7.30E+00		6.58E-06
Benzo(b)fluoranthene			NA	7.30E-01		
Benzo(g,h,i)perylene		4.61E-07	NA	NA		
Benzo(k)fluoranthene		3.69E-07	NA	7.30E-01		2.69E-07
Carbazole		1.46E-07	NA	2.00E-02		2.93E-09
Chrysene	9.47E-06		NA	7.30E-02		
Di-n-butylphthalate		5.59E-08	1.00E-01	NA		
Dibenz(a,h)anthracene			NA	7.30E+00		
Dibenzofuran	1.77E-06		NA	NA		
Diethylphthalate	2.08E-08		8.00E+00	NA	2.60E-09	
Fluoranthene	1.23E-05		4.00E-02	NA	3.09E-04	
Fluorene		1.36E-07	4.00E-02	NA		
Indeno(1,2,3-cd)pyrene		4.35E-07	NA	7.30E-01		3.17E-07
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene	2.14E-06	1.53E-07	NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene	8.03E-06		NA	NA		
Pyrene	1.39E-05	9.89E-07	3.00E-02	NA	4.62E-04	
bis(2-Ethylhexyl)phthalate	1.39E-06	9.94E-08	2.00E-02	1.40E-02	6.96E-05	1.39E-09

TABLE 6-63

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE	2.02E-08	1.45E-09	NA	NA		
4,4'-DDT	1.08E-08	7.71E-10	5.00E-04	3.40E-01	2.16E-05	2.62E-10
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254			2.00E-05	2.00E+00		
Aroclor-1260	2.10E-08	1.50E-09	NA	7.70E+00		1.15E-08
Dieldrin	5.47E-09		5.00E-05	1.60E+01	1.09E-04	
Endosulfan I			6.00E-03	NA		
Endosulfan II	4.98E-09		NA	NA		
Endosulfan sulfate	4.70E-09		5.00E-05	NA	9.40E-05	
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone	6.11E-09	4.37E-10	NA	NA		
Heptachlor			5.00E-04	4.50E+00		
Heptachlor epoxide		1.51E-10	1.30E-05	9.10E+00		1.38E-09
Toxaphene			NA	1.10E+00		
alpha-Chlordane		2.29E-10	6.00E-05	1.30E+00		2.98E-10
beta-BHC	2.69E-09		NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
delta-BHC	2.10E-09	1.50E-10	NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			1.00E-02	NA		
Metals						
Antimony	8.67E-09		4.00E-04	NA	2.17E-05	
Barium	1.18E-07		7.00E-02	NA	1.68E-06	
Copper			4.00E-02	NA		
Lead	6.91E-07		NA	NA		
Mercury	5.95E-10		3.00E-04	NA	1.98E-06	
Selenium	1.01E-09		5.00E-03	NA	2.02E-07	
Thallium	1.79E-09		7.00E-05	NA	2.55E-05	
Zinc	1.21E-07	8.61E-09	3.00E-01	NA	4.02E-07	
Herbicides						
2,4,5-T			1.00E-02	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR					**2.49E-03**	**7.60E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE I
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Volatile Organics												
1,1,2,2,-Tetrachloroethane			6.89E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acetone			8.08E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzene			5.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Carbon Disulfide			2.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Chloroform			2.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Methylene Chloride			3.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Toluene			7.02E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Xylene (total)			4.25E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Semivolatile Organics												
2,4-Dinitrotoluene			2.14E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2,6-Dinitrotoluene			1.80E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2-methylnaphthalene			1.23E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
3,3'-Dichlorobenzidine				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
3-nitroaniline				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acenaphthene			2.16E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acenaphthylene			3.08E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Anthracene			2.01E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(a)anthracene			7.20E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(a)pyrene			1.15E+01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(b)fluoranthene			9.85E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(g,h,i)perylene			5.89E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(k)fluoranthene			4.71E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Carbazole			1.87E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Chrysene			8.64E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Di-n-butylphthalate			7.14E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Dibenz(a,h)anthracene			2.35E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Dibenzofuran			1.62E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Diethylphthalate			1.90E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Fluoranthene			1.13E+01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Fluorene			1.73E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene			5.55E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			5.77E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Naphthalene			1.95E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pentachlorophenol			1.16E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Phenanthrene			7.33E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pyrene			1.26E+01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			1.27E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pesticides												
4,4'-DDD			4.38E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4,4'-DDE			1.85E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4,4'-DDT			9.85E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Aldrin				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Aroclor-1254				1.00E-06	2,300	1.0	0.06	50	5	25	1,825	25,550
Aroclor-1260		1.03E-09	1.91E-02	1.00E-06	2,300	1.0	0.06	50	5	25	1,825	25,550
Dieldrin			4.99E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan I			1.38E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan II			4.55E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan sulfate			4.29E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin			5.59E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin aldehyde			2.51E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin ketone			5.58E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Heptachlor				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Heptachlor epoxide			1.94E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Toxaphene				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
alpha-Chlordane			2.93E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
beta-BHC			2.45E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
gamma-BHC (Lindane)				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
gamma-Chlordane			3.17E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
delta-BHC			1.92E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Nitroaromatics												
2-amino-4,6-Dinitrotoluene				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Tetryl				1.00E-06	2,300	1.0		50	5	25	1,825	25,550

TABLE 6-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Metals												
Antimony			7.91E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Barium			1.07E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Copper			7.66E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Lead			6.30E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Mercury			5.43E-04	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Selenium			9.20E-04	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Thallium			1.63E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Zinc			1.10E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Herbicides												
2,4,5-T				1.00E-06	2,300	1.0		250	5	25	1,825	25,550
MCPP				1.00E-06	2,300	1.0		250	5	25	1,825	25,550

EQUATION:

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

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
CF = Conversion Factor (10-6 kg/mg)
SA = Surface Area Contact (cm²)
AF =Soil to Skin Adherence Factor (mg/cm²)
ABS = Absorption Factor (unitless)

Assumptions:

EPC Soil Data - RME
10-6
2,300 (RME Child)
1.0 (RME all receptors)
Compound Specific PCBs and Cd (EPA, 1992b)
(Default Assumption 0% = 0.0)

Variables:

EF = Exposure Frequency (events/year)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

50 (RME)
5 (RME)
25 kg (child)
5 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-65

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane			NA	2.00E-01		
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Carbon Disulfide			1.00E-01	NA		
Chloroform			1.00E-02	6.10E-03		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
Xylene (total)			2.00E+00	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Diethylphthalate			8.00E+00	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 6-65

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254			1.90E-05	2.11E+00		
Aroclor-1260		1.03E-09	NA	8.11E+00		8.38E-09
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor			5.00E-04	4.50E+00		
Heptachlor epoxide			1.30E-05	9.10E+00		
Toxaphene			NA	1.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			1.00E-02	NA		
Metals						
Antimony			4.00E-04	NA		
Barium			7.00E-03	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			1.50E-01	NA		
Herbicides						
2,4,5-T			1.00E-02	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR						**8.38E-09**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Volatile Organics											
1,1,2,2,-Tetrachloroethane		1.93E-10	6.89E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Acetone	6.32E-10		8.08E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Benzene		1.40E-10	5.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Carbon Disulfide	1.57E-10		2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Chloroform	1.57E-10	5.59E-11	2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Methylene Chloride	2.35E-10	8.39E-11	3.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Toluene	5.49E-10		7.02E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Xylene (total)	3.33E-10		4.25E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Semivolatile Organics											
2,4-Dinitrotoluene	1.68E-07		2.14E+00	100	1.00E-06	1	20	25	70	9,125	25,550
2,6-Dinitrotoluene	1.41E-08		1.80E-01	100	1.00E-06	1	20	25	70	9,125	25,550
2-methylnaphthalene			1.23E+00	100	1.00E-06	1	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine		0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
3-nitroaniline			0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthene	1.69E-07		2.16E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthylene			3.08E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Anthracene	1.57E-07		2.01E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)anthracene		2.01E-07	7.20E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)pyrene		3.22E-07	1.15E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(b)fluoranthene		2.75E-07	9.85E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			5.89E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(k)fluoranthene		1.32E-07	4.71E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Carbazole		5.23E-08	1.87E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Chrysene		2.42E-07	8.64E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Di-n-butylphthalate	5.59E-08		7.14E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenz(a,h)anthracene		6.58E-08	2.35E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenzofuran			1.62E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Diethylphthalate	1.49E-09		1.90E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Fluoranthene	8.82E-07		1.13E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Fluorene	1.36E-07		1.73E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene		1.55E-07	5.55E+00	100	1.00E-06	1	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)		1.61E-08	5.77E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Naphthalene			1.95E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pentachlorophenol	9.05E-08	3.23E-08	1.16E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Phenanthrene			7.33E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pyrene	9.89E-07		1.26E+01	100	1.00E-06	1	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate	9.94E-08	3.55E-08	1.27E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pesticides											
4,4'-DDD	3.43E-10	1.22E-10	4.38E-03	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDE			1.85E-02	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDT	7.71E-10	2.75E-10	9.85E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Aldrin	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1254	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1260		5.35E-10	1.91E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Dieldrin	3.91E-10	1.40E-10	4.99E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan I	1.08E-09		1.38E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan II			4.55E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan sulfate	3.36E-10		4.29E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin	4.37E-10		5.59E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin aldehyde			2.51E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin ketone			5.58E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor epoxide	1.51E-10	5.41E-11	1.94E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Toxaphene		0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
alpha-Chlordane	2.29E-10	8.19E-11	2.93E-03	100	1.00E-06	1	20	25	70	9,125	25,550
beta-BHC		6.86E-11	2.45E-03	100	1.00E-06	1	20	25	70	9,125	25,550
gamma-BHC (Lindane)	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
gamma-Chlordane			3.17E-03	100	1.00E-06	1	20	25	70	9,125	25,550
delta-BHC			1.92E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Nitroaromatics											
2-amino-4,6-Dinitrotoluene			0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Tetryl	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550

TABLE 6-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Metals											
Antimony	6.19E-10		7.91E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Barium	8.41E-09		1.07E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Copper	5.99E-09		7.66E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Lead			6.30E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Mercury	4.25E-11		5.43E-04	100	1.00E-06	1	20	25	70	9,125	25,550
Selenium	7.20E-11		9.20E-04	100	1.00E-06	1	20	25	70	9,125	25,550
Thallium	1.28E-10		1.63E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Zinc	8.61E-09		1.10E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Herbicides											
2,4,5-T	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
MCPP	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550

EQUATION: Intake (mg/kg-day) =

$$\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC Soil Data - RME
100 (RME Site Worker)
10-6
1 (All Receptors)
20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-45

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS (DAILY)
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane		1.93E-10	NA	2.00E-01		3.85E-11
Acetone	6.32E-10		1.00E-01	NA	6.32E-09	
Benzene		1.40E-10	NA	2.90E-02		4.05E-12
Carbon Disulfide	1.57E-10		1.00E-01	NA	1.57E-09	
Chloroform	1.57E-10	5.59E-11	1.00E-02	6.10E-03	1.57E-08	3.41E-13
Methylene Chloride	2.35E-10	8.39E-11	6.00E-02	7.50E-03	3.91E-09	6.29E-13
Toluene	5.49E-10		2.00E-01	NA	2.75E-09	
Xylene (total)	3.33E-10		2.00E+00	NA	1.66E-10	
Semivolatile Organics						
2,4-Dinitrotoluene	1.68E-07		2.00E-03	NA	8.39E-05	
2,6-Dinitrotoluene	1.41E-08		1.00E-03	NA	1.41E-05	
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine		0.00E+00	NA	4.50E-01		0.00E+00
3-nitroaniline			NA	NA		
Acenaphthene	1.69E-07		6.00E-02	NA	2.81E-06	
Acenaphthylene			NA	NA		
Anthracene	1.57E-07		3.00E-01	NA	5.25E-07	
Benzo(a)anthracene		2.01E-07	NA	7.30E-01		1.47E-07
Benzo(a)pyrene		3.22E-07	NA	7.30E+00		2.35E-06
Benzo(b)fluoranthene		2.75E-07	NA	7.30E-01		2.01E-07
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		1.32E-07	NA	7.30E-01		9.61E-08
Carbazole		5.23E-08	NA	2.00E-02		1.05E-09
Chrysene		2.42E-07	NA	7.30E-02		1.76E-08
Di-n-butylphthalate	5.59E-08		1.00E-01	NA	5.59E-07	
Dibenz(a,h)anthracene		6.58E-08	NA	7.30E+00		4.80E-07
Dibenzofuran			NA	NA		
Diethylphthalate	1.49E-09		8.00E+00	NA	1.86E-10	
Fluoranthene	8.82E-07		4.00E-02	NA	2.20E-05	
Fluorene	1.36E-07		4.00E-02	NA	3.39E-06	
Indeno(1,2,3-cd)pyrene		1.55E-07	NA	7.30E-01		1.13E-07
N-Nitrosodiphenylamine (1)		1.61E-08	NA	4.90E-03		7.90E-11
Naphthalene			NA	NA		
Pentachlorophenol	9.05E-08	3.23E-08	3.00E-02	1.20E-01	3.02E-06	3.88E-09
Phenanthrene			NA	NA		
Pyrene	9.89E-07		3.00E-02	NA	3.30E-05	
bis(2-Ethylhexyl)phthalate	9.94E-08	3.55E-08	2.00E-02	1.40E-02	4.97E-06	4.97E-10

TABLE 6-45

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS (DAILY)
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD	3.43E-10	1.22E-10	5.00E-04	2.40E-01	6.85E-07	2.94E-11
4,4'-DDE			NA	NA		
4,4'-DDT	7.71E-10	2.75E-10	5.00E-04	3.40E-01	1.54E-06	9.37E-11
Aldrin	0.00E+00	0.00E+00	3.00E-05	1.70E+01	0.00E+00	0.00E+00
Aroclor-1254	0.00E+00	0.00E+00	2.00E-05	2.00E+00	0.00E+00	0.00E+00
Aroclor-1260		5.35E-10	NA	7.70E+00		4.12E-09
Dieldrin	3.91E-10	1.40E-10	5.00E-05	1.60E+01	7.82E-06	2.23E-09
Endosulfan I	1.08E-09		6.00E-03	NA	1.80E-07	
Endosulfan II			NA	NA		
Endosulfan sulfate	3.36E-10		5.00E-05	NA	6.71E-06	
Endrin	4.37E-10		3.00E-04	NA	1.46E-06	
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor	0.00E+00	0.00E+00	5.00E-04	4.50E+00	0.00E+00	0.00E+00
Heptachlor epoxide	1.51E-10	5.41E-11	1.30E-05	9.10E+00	1.17E-05	4.92E-10
Toxaphene		0.00E+00	NA	1.10E+00		0.00E+00
alpha-Chlordane	2.29E-10	8.19E-11	6.00E-05	1.30E+00	3.82E-06	1.06E-10
beta-BHC		6.86E-11	NA	1.80E+00		1.23E-10
gamma-BHC (Lindane)	0.00E+00		3.00E-04	NA	0.00E+00	
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl	0.00E+00		1.00E-02	NA	0.00E+00	
Metals						
Antimony	6.19E-10		4.00E-04	NA	1.55E-06	
Barium	8.41E-09		7.00E-02	NA	1.20E-07	
Copper	5.99E-09		4.00E-02	NA	1.50E-07	
Lead			NA	NA		
Mercury	4.25E-11		3.00E-04	NA	1.42E-07	
Selenium	7.20E-11		5.00E-03	NA	1.44E-08	
Thallium	1.28E-10		7.00E-05	NA	1.82E-06	
Zinc	8.61E-09		3.00E-01	NA	2.87E-08	
Herbicides						
2,4,5-T	0.00E+00		1.00E-02	NA	0.00E+00	
MCPP	0.00E+00		1.00E-03	NA	0.00E+00	
Totals - HQ & CR					**2.06E-04**	**3.42E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-22

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
Volatile Organics												
1,1,2,2,-Tetrachloroethane			6.89E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acetone			8.08E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzene			5.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbon Disulfide			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chloroform			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Methylene Chloride			3.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toluene			7.02E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Xylene (total)			4.25E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Semivolatile Organics												
2,4-Dinitrotoluene			2.14E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2,6-Dinitrotoluene			1.80E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2-methylnaphthalene			1.23E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3,3'-Dichlorobenzidine				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3-nitroaniline				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthene			2.16E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthylene			3.08E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Anthracene			2.01E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)anthracene			7.20E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)pyrene			1.15E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(b)fluoranthene			9.85E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(g,h,i)perylene			5.89E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(k)fluoranthene			4.71E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbazole			1.87E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chrysene			8.64E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Di-n-butylphthalate			7.14E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenz(a,h)anthracene			2.35E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenzofuran			1.62E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Diethylphthalate			1.90E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluoranthene			1.13E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluorene			1.73E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			5.55E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			5.77E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Naphthalene			1.95E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pentachlorophenol			1.16E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Phenanthrene			7.33E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pyrene			1.26E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			1.27E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pesticides												
4,4'-DDD			4.38E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDE			1.85E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDT			9.85E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aldrin				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aroclor-1254				1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Aroclor-1260		1.86E-09	1.91E-02	1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Dieldrin			4.99E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan I			1.38E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan II			4.55E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan sulfate			4.29E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin			5.59E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin aldehyde			2.51E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin ketone			5.58E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor epoxide			1.94E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toxaphene				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
alpha-Chlordane			2.93E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
beta-BHC			2.45E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
gamma-BHC (Lindane)				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
gamma-Chlordane			3.17E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
delta-BHC			1.92E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Nitroaromatics												
2-amino-4,6-Dinitrotoluene				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Tetryl				1.00E-06	5,800	1.0		20	25	70	9,125	25,550

TABLE 6-22

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm^2/event)	Adherence Factor (mg soil/cm^2)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Metals												
Antimony			7.91E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Barium			1.07E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Copper			7.66E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Lead			6.30E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Mercury			5.43E-04	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Selenium			9.20E-04	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Thallium			1.63E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Zinc			1.10E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Herbicides												
2,4,5-T				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
MCPP				1.00E-06	5,800	1.0		20	25	70	9,125	25,550

EQUATION:

Absorbed dose (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
CF = Conversion Factor (10-6 kg/mg)
SA = Surface Area Contact (cm^2)
AF =Soil to Skin Adherence Factor (mg/cm^2)
ABS = Absorption Factor (unitless)

Assumptions:

EPC Soil Data - RME
10-6
5,800 cm^2 (RME Site Worker)
1.0 (RME all receptors)
Compound Specific for PCBs and Cd
EPA, 1992b (Default Assumption 0% = 0.0)

Variables:

EF = Exposure Frequency (events/year)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult Male)
25 x 365 (Nc) 70 x 365 Adult (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-47

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL (DAILY)
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane			NA	2.00E-01		
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Carbon Disulfide			1.00E-01	NA		
Chloroform			1.00E-02	6.10E-03		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
Xylene (total)			2.00E+00	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Diethylphthalate			8.00E+00	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 6-47

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL (DAILY)
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254			1.90E-05	2.11E+00		
Aroclor-1260		1.86E-09	NA	8.11E+00		1.51E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor			5.00E-04	4.50E+00		
Heptachlor epoxide			1.30E-05	9.10E+00		
Toxaphene			NA	1.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			1.00E-02	NA		
Metals						
Antimony			4.00E-04	NA		
Barium			7.00E-03	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			1.50E-01	NA		
Herbicides						
2,4,5-T			1.00E-02	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR						**1.51E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-13
CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 1

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Volatile Organics											
1,1,2,2,-Tetrachloroethane		1.93E-10	6.89E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Acetone	6.32E-10		8.08E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Benzene		1.40E-10	5.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Carbon Disulfide	1.57E-10		2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Chloroform	1.57E-10	5.59E-11	2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Methylene Chloride	2.35E-10	8.39E-11	3.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Toluene	5.49E-10		7.02E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Xylene (total)	3.33E-10		4.25E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Semivolatile Organics											
2,4-Dinitrotoluene	1.68E-07		2.14E+00	100	1.00E-06	1	20	25	70	9,125	25,550
2,6-Dinitrotoluene	1.41E-08		1.80E-01	100	1.00E-06	1	20	25	70	9,125	25,550
2-methylnaphthalene			1.23E+00	100	1.00E-06	1	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine		0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
3-nitroaniline			0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthene	1.69E-07		2.16E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthylene			3.08E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Anthracene	1.57E-07		2.01E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)anthracene		2.01E-07	7.20E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)pyrene		3.22E-07	1.15E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(b)fluoranthene		2.75E-07	9.85E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			5.89E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(k)fluoranthene		1.32E-07	4.71E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Carbazole		5.23E-08	1.87E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Chrysene		2.42E-07	8.64E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Di-n-butylphthalate	5.59E-08		7.14E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenz(a,h)anthracene		6.58E-08	2.35E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenzofuran			1.62E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Diethylphthalate	1.49E-09		1.90E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Fluoranthene	8.82E-07		1.13E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Fluorene	1.36E-07		1.73E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene		1.55E-07	5.55E+00	100	1.00E-06	1	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)		1.61E-08	5.77E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Naphthalene			1.95E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pentachlorophenol	9.05E-08	3.23E-08	1.16E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Phenanthrene			7.33E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pyrene	9.89E-07		1.26E+01	100	1.00E-06	1	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate	9.94E-08	3.55E-08	1.27E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pesticides											
4,4'-DDD	3.43E-10	1.22E-10	4.38E-03	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDE			1.85E-02	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDT	7.71E-10	2.75E-10	9.85E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Aldrin	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1254	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1260		5.35E-10	1.91E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Dieldrin	3.91E-10	1.40E-10	4.99E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan I	1.08E-09		1.38E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan II			4.55E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan sulfate	3.36E-10		4.29E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin	4.37E-10		5.59E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin aldehyde			2.51E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin ketone			5.58E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor epoxide	1.51E-10	5.41E-11	1.94E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Toxaphene		0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
alpha-Chlordane	2.29E-10	8.19E-11	2.93E-03	100	1.00E-06	1	20	25	70	9,125	25,550
beta-BHC		6.86E-11	2.45E-03	100	1.00E-06	1	20	25	70	9,125	25,550
gamma-BHC (Lindane)	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
gamma-Chlordane			3.17E-03	100	1.00E-06	1	20	25	70	9,125	25,550
delta-BHC			1.92E-03	100	1.00E-06	1	20	25	70	9,125	25,550

TABLE 6-13
CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 1

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Nitroaromatics											
2-amino-4,6-Dinitrotoluene			0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Tetryl	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Metals											
Antimony	6.19E-10		7.91E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Barium	8.41E-09		1.07E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Copper	5.99E-09		7.66E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Lead			6.30E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Mercury	4.25E-11		5.43E-04	100	1.00E-06	1	20	25	70	9,125	25,550
Selenium	7.20E-11		9.20E-04	100	1.00E-06	1	20	25	70	9,125	25,550
Thallium	1.28E-10		1.63E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Zinc	8.61E-09		1.10E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Herbicides											
2,4,5-T	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
MCPP	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC Soil Data - RME
100 (RME Site Worker)
10-6
1 (All Receptors)
20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-44
CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 1

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane		1.93E-10	NA	2.00E-01		3.85E-11
Acetone	6.32E-10		1.00E-01	NA	6.32E-09	
Benzene		1.40E-10	NA	2.90E-02		4.05E-12
Carbon Disulfide	1.57E-10		1.00E-01	NA	1.57E-09	
Chloroform	1.57E-10	5.59E-11	1.00E-02	6.10E-03	1.57E-08	3.41E-13
Methylene Chloride	2.35E-10	8.39E-11	6.00E-02	7.50E-03	3.91E-09	6.29E-13
Toluene	5.49E-10		2.00E-01	NA	2.75E-09	
Xylene (total)	3.33E-10		2.00E+00	NA	1.66E-10	
Semivolatile Organics						
2,4-Dinitrotoluene	1.68E-07		2.00E-03	NA	8.39E-05	
2,6-Dinitrotoluene	1.41E-08		1.00E-03	NA	1.41E-05	
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine		0.00E+00	NA	4.50E-01		0.00E+00
3-nitroaniline			NA	NA		
Acenaphthene	1.69E-07		6.00E-02	NA	2.81E-06	
Acenaphthylene			NA	NA		
Anthracene	1.57E-07		3.00E-01	NA	5.25E-07	
Benzo(a)anthracene		2.01E-07	NA	7.30E-01		1.47E-07
Benzo(a)pyrene		3.22E-07	NA	7.30E+00		2.35E-06
Benzo(b)fluoranthene		2.75E-07	NA	7.30E-01		2.01E-07
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		1.32E-07	NA	7.30E-01		9.61E-08
Carbazole		5.23E-08	NA	2.00E-02		1.05E-09
Chrysene		2.42E-07	NA	7.30E-02		1.76E-08
Di-n-butylphthalate	5.59E-08		1.00E-01	NA	5.59E-07	
Dibenz(a,h)anthracene		6.58E-08	NA	7.30E+00		4.80E-07
Dibenzofuran			NA	NA		
Diethylphthalate	1.49E-09		8.00E+00	NA	1.86E-10	
Fluoranthene	8.82E-07		4.00E-02	NA	2.20E-05	
Fluorene	1.36E-07		4.00E-02	NA	3.39E-06	
Indeno(1,2,3-cd)pyrene		1.55E-07	NA	7.30E-01		1.13E-07
N-Nitrosodiphenylamine (1)		1.61E-08	NA	4.90E-03		7.90E-11
Naphthalene			NA	NA		
Pentachlorophenol	9.05E-08	3.23E-08	3.00E-02	1.20E-01	3.02E-06	3.88E-09
Phenanthrene			NA	NA		
Pyrene	9.89E-07		3.00E-02	NA	3.30E-05	
bis(2-Ethylhexyl)phthalate	9.94E-08	3.55E-08	2.00E-02	1.40E-02	4.97E-06	4.97E-10
Pesticides						
4,4'-DDD	3.43E-10	1.22E-10	5.00E-04	2.40E-01	6.85E-07	2.94E-11
4,4'-DDE			NA	NA		
4,4'-DDT	7.71E-10	2.75E-10	5.00E-04	3.40E-01	1.54E-06	9.37E-11
Aldrin	0.00E+00	0.00E+00	3.00E-05	1.70E+01	0.00E+00	0.00E+00
Aroclor-1254	0.00E+00	0.00E+00	2.00E-05	2.00E+00	0.00E+00	0.00E+00
Aroclor-1260		5.35E-10	NA	7.70E+00		4.12E-09
Dieldrin	3.91E-10	1.40E-10	5.00E-05	1.60E+01	7.82E-06	2.23E-09
Endosulfan I	1.08E-09		6.00E-03	NA	1.80E-07	
Endosulfan II			NA	NA		
Endosulfan sulfate	3.36E-10		5.00E-05	NA	6.71E-06	
Endrin	4.37E-10		3.00E-04	NA	1.46E-06	
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor	0.00E+00	0.00E+00	5.00E-04	4.50E+00	0.00E+00	0.00E+00
Heptachlor epoxide	1.51E-10	5.41E-11	1.30E-05	9.10E+00	1.17E-05	4.92E-10
Toxaphene		0.00E+00	NA	1.10E+00		0.00E+00
alpha-Chlordane	2.29E-10	8.19E-11	6.00E-05	1.30E+00	3.82E-06	1.06E-10
beta-BHC		6.86E-11	NA	1.80E+00		1.23E-10
gamma-BHC (Lindane)	0.00E+00		3.00E-04	NA	0.00E+00	
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		

TABLE 6-44
CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 1

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl	0.00E+00		1.00E-02	NA	0.00E+00	
Metals						
Antimony	6.19E-10		4.00E-04	NA	1.55E-06	
Barium	8.41E-09		7.00E-02	NA	1.20E-07	
Copper	5.99E-09		4.00E-02	NA	1.50E-07	
Lead			NA	NA		
Mercury	4.25E-11		3.00E-04	NA	1.42E-07	
Selenium	7.20E-11		5.00E-03	NA	1.44E-08	
Thallium	1.28E-10		7.00E-05	NA	1.82E-06	
Zinc	8.61E-09		3.00E-01	NA	2.87E-08	
Herbicides						
2,4,5-T	0.00E+00		1.00E-02	NA	0.00E+00	
MCPP	0.00E+00		1.00E-03	NA	0.00E+00	
Totals - HQ & CR					**2.06E-04**	**3.42E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose (Oral)
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor (Oral)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-19
CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 1

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Volatile Organics												
1,1,2,2,-Tetrachloroethane			6.89E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acetone			8.08E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzene			5.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbon Disulfide			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chloroform			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Methylene Chloride			3.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toluene			7.02E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Xylene (total)			4.25E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Semivolatile Organics												
2,4-Dinitrotoluene			2.14E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2,6-Dinitrotoluene			1.80E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2-methylnaphthalene			1.23E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3,3'-Dichlorobenzidine				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3-nitroaniline				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthene			2.16E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthylene			3.08E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Anthracene			2.01E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)anthracene			7.20E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)pyrene			1.15E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(b)fluoranthene			9.85E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(g,h,i)perylene			5.89E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(k)fluoranthene			4.71E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbazole			1.87E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chrysene			8.64E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Di-n-butylphthalate			7.14E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenz(a,h)anthracene			2.35E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenzofuran			1.62E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Diethylphthalate			1.90E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluoranthene			1.13E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluorene			1.73E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			5.55E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			5.77E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Naphthalene			1.95E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pentachlorophenol			1.16E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Phenanthrene			7.33E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pyrene			1.26E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			1.27E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pesticides												
4,4'-DDD			4.38E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDE			1.85E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDT			9.85E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aldrin				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aroclor-1254				1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Aroclor-1260		1.86E-09	1.91E-02	1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Dieldrin			4.99E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan I			1.38E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan II			4.55E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan sulfate			4.29E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin			5.59E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin aldehyde			2.51E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin ketone			5.58E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor epoxide			1.94E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toxaphene				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
alpha-Chlordane			2.93E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
beta-BHC			2.45E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
gamma-BHC (Lindane)				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
gamma-Chlordane			3.17E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
delta-BHC			1.92E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550

TABLE 6-19
CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 1

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Nitroaromatics												
2-amino-4,6-Dinitrotoluene				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Tetryl				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Metals												
Antimony			7.91E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Barium			1.07E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Copper			7.66E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Lead			6.30E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Mercury			5.43E-04	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Selenium			9.20E-04	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Thallium			1.63E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Zinc			1.10E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Herbicides												
2,4,5-T				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
MCPP				1.00E-06	5,800	1.0		20	25	70	9,125	25,550

EQUATION: **Absorbed dose (mg/kg-day) =** $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
CF = Conversion Factor (10-6 kg/mg)
SA = Surface Area Contact (cm²)
AF =Soil to Skin Adherence Factor (mg/cm²)
ABS = Absorption Factor (unitless)

Assumptions:

EPC Soil Data - RME
10-6
5,800 cm² (RME Site Worker)
1.0 (RME all receptors)
Compound Specific for PCBs and Cd
EPA, 1992b (Default Assumption 0% = 0.0)

Variables:

EF = Exposure Frequency (events/year)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult Male)
25 x 365 (Nc) 70 x 365 Adult (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-46
CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL (DAILY)
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 1

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane			NA	2.00E-01		
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Carbon Disulfide			1.00E-01	NA		
Chloroform			1.00E-02	6.10E-03		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
Xylene (total)			2.00E+00	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Diethylphthalate			8.00E+00	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 6-46
CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL (DAILY)
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 1

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254			1.90E-05	2.11E+00		
Aroclor-1260		1.86E-09	NA	8.11E+00		1.51E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor			5.00E-04	4.50E+00		
Heptachlor epoxide			1.30E-05	9.10E+00		
Toxaphene			NA	1.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			1.00E-02	NA		
Metals						
Antimony			4.00E-04	NA		
Barium			7.00E-03	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			1.50E-01	NA		
Herbicides						
2,4,5-T			1.00E-02	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR						**1.51E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose (Oral)
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor (Oral)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-12

CALCULATION OF INTAKE (ONSITE)
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Volatile Organics									
1,1,2,2-Tetrachloroethane		2.05E-13	2.62E-10	2	50	5	25	1,825	25,550
Acetone			3.07E-10	2	50	5	25	1,825	25,550
Benzene		2.40E-13	3.07E-10	2	50	5	25	1,825	25,550
Carbon Disulfide	2.08E-12		1.90E-10	2	50	5	25	1,825	25,550
Chloroform		5.95E-14	7.60E-11	2	50	5	25	1,825	25,550
Methylene Chloride	8.33E-13	5.95E-14	7.60E-11	2	50	5	25	1,825	25,550
Toluene	1.25E-12		1.14E-10	2	50	5	25	1,825	25,550
Xylene (total)			2.67E-10	2	50	5	25	1,825	25,550
Semivolatile Organics									
2,4-Dinitrotoluene			8.15E-08	2	50	5	25	1,825	25,550
2,6-Dinitrotoluene			6.84E-09	2	50	5	25	1,825	25,550
2-Methylnaphthalene			4.67E-08	2	50	5	25	1,825	25,550
3,3'-Dichlorobenzidine			0.00E+00	2	50	5	25	1,825	25,550
3-nitroaniline			0.00E+00	2	50	5	25	1,825	25,550
Acenaphthene			ERR	2	50	5	25	1,825	25,550
Acenaphthylene			8.19E-08	2	50	5	25	1,825	25,550
Anthracene			1.17E-08	2	50	5	25	1,825	25,550
Benzo(a)anthracene			7.64E-08	2	50	5	25	1,825	25,550
Benzo(a)pyrene			2.73E-07	2	50	5	25	1,825	25,550
Benzo(b)fluoranthene			4.38E-07	2	50	5	25	1,825	25,550
Benzo(g,h,i)perylene			3.74E-07	2	50	5	25	1,825	25,550
Benzo(k)fluoranthene			2.24E-07	2	50	5	25	1,825	25,550
Carbazole			7.10E-08	2	50	5	25	1,825	25,550
Chrysene			3.28E-07	2	50	5	25	1,825	25,550
Di-n-butylphthalate			2.71E-08	2	50	5	25	1,825	25,550
Dibenz(a,h)anthracene			8.94E-08	2	50	5	25	1,825	25,550
Dibenzofuran			ERR	2	50	5	25	1,825	25,550
Diethylphthalate			6.15E-08	2	50	5	25	1,825	25,550
Fluoranthene			7.22E-10	2	50	5	25	1,825	25,550
Fluorene			4.28E-07	2	50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene			6.58E-08	2	50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			2.11E-07	2	50	5	25	1,825	25,550
Naphthalene			2.19E-08	2	50	5	25	1,825	25,550
Pentachlorophenol			7.42E-08	2	50	5	25	1,825	25,550
Phenanthrene			4.39E-08	2	50	5	25	1,825	25,550
Pyrene			2.78E-07	2	50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			4.80E-07	2	50	5	25	1,825	25,550

TABLE 6-12

CALCULATION OF INTAKE (ONSITE)
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Pesticides									
4,4'-DDD			1.66E-10	2	50	5	25	1,825	25,550
4,4'-DDE			7.02E-10	2	50	5	25	1,825	25,550
4,4'-DDT		2.93E-13	3.74E-10	2	50	5	25	1,825	25,550
Aldrin	0.00E+00	0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
Aroclor-1254		0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
Aroclor-1260			7.27E-10	2	50	5	25	1,825	25,550
Dieldrin		1.49E-13	1.90E-10	2	50	5	25	1,825	25,550
Endosulfan I			5.24E-10	2	50	5	25	1,825	25,550
Endosulfan II			1.73E-10	2	50	5	25	1,825	25,550
Endosulfan sulfate			1.63E-10	2	50	5	25	1,825	25,550
Endrin			2.12E-10	2	50	5	25	1,825	25,550
Endrin aldehyde			9.56E-11	2	50	5	25	1,825	25,550
Endrin ketone			2.12E-10	2	50	5	25	1,825	25,550
Heptachlor		0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
Heptachlor epoxide		5.76E-14	7.35E-11	2	50	5	25	1,825	25,550
Toxaphene		0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
alpha-Chlordane			1.11E-10	2	50	5	25	1,825	25,550
beta-BHC		7.30E-14	9.32E-11	2	50	5	25	1,825	25,550
gamma-BHC (Lindane)			0.00E+00	2	50	5	25	1,825	25,550
gamma-Chlordane			1.21E-10	2	50	5	25	1,825	25,550
Nitroaromatics									
2-amino-4,6-Dinitrotoluene			0.00E+00	2	50	5	25	1,825	25,550
Tetryl			0.00E+00	2	50	5	25	1,825	25,550
Metals									
Antimony			3.00E-10	2	50	5	25	1,825	25,550
Barium	1.58E-07		1.44E-05	2	50	5	25	1,825	25,550
Copper			3.42E-04	2	50	5	25	1,825	25,550
Lead			1.31E-05	2	50	5	25	1,825	25,550
Mercury	4.04E-06		3.69E-04	2	50	5	25	1,825	25,550
Selenium			4.62E-06	2	50	5	25	1,825	25,550
Thallium			6.19E-11	2	50	5	25	1,825	25,550
Zinc			4.18E-09	2	50	5	25	1,825	25,550
Herbicides									
2,4,5-T			0.00E+00	2	50	5	25	1,825	25,550
MCPP			0.00E+00	2	50	5	25	1,825	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:	Assumptions:
CA = Chemical Concentration in Air (mg/m³)	Calculated Air EPC Data - RME
IR = Inhalation Rate (m³/day)	2 (RME Child)
EF = Exposure Frequency (days/yr)	50
ED = Exposure Duration (years)	5 (RME)
BW = Bodyweight (kg)	25 (Child)
AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-61

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2-Tetrachloroethane		2.05E-13	NA	2.03E-01		4.16E-14
Acetone			NA	NA		
Benzene		2.40E-13	NA	2.91E-02		6.98E-15
Carbon Disulfide	2.08E-12		2.86E-03	NA	7.29E-10	
Chloroform		5.95E-14	NA	8.05E-02		4.79E-15
Methylene Chloride	8.33E-13	5.95E-14	8.57E-01	1.65E-03	9.72E-13	9.82E-17
Toluene	1.25E-12		1.14E-01	NA	1.09E-11	
Xylene (total)			NA	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Diethylphthalate			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Ethylhexyl)phthalate			NA	NA		

TABLE 6-61

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		2.93E-13	NA	3.40E-01		9.95E-14
Aldrin	0.00E+00	0.00E+00	1.70E+01	1.72E+01	0.00E+00	0.00E+00
Aroclor-1254		0.00E+00	NA	4.00E-01		0.00E+00
Aroclor-1260			NA	NA		
Dieldrin		1.49E-13	NA	1.61E+01		2.39E-12
Endosulfan I			NA	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor		0.00E+00	NA	4.55E+00		0.00E+00
Heptachlor epoxide		5.76E-14	NA	9.10E+00		5.24E-13
Toxaphene		0.00E+00	NA	1.12E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		7.30E-14	NA	1.86E+00		1.35E-13
gamma-BHC (Lindane)			NA	NA		
gamma-Chlordane			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			NA	NA		
Metals						
Antimony			NA	NA		
Barium	1.58E-07		1.43E-04	NA	1.10E-03	
Copper			NA	NA		
Lead			NA	NA		
Mercury	4.04E-06		8.57E-05	NA	4.72E-02	
Selenium			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
Herbicides						
2,4,5-T			NA	NA		
MCPP			NA	NA		
Total HQ & CR					**4.83E-02**	**3.20E-12**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-7A

AMBIENT AIR EXPOSURE POINT CONCENTRATIONS
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

COMPOUND	SURFACE SOIL EPC Data mg/kg	AVERAGE TSP (ug/m³)	CONVERSION FACTOR (kg/ug)	AMBIENT AIR CALCULATED EPC (mg/m³)	MEASURED AIR SAMPLES (mg/m³)	AMBIENT AIR EPC (mg/m³)
Volatile Organics						
1,1,2,2-Tetrachloroethane	6.89E-03	3.80E+01	1.00E-09	2.62E-10		2.62E-10
Acetone	8.08E-03	3.80E+01	1.00E-09	3.07E-10		3.07E-10
Benzene	5.00E-03	3.80E+01	1.00E-09	3.07E-10		3.07E-10
Carbon Disulfide	2.00E-03	3.80E+01	1.00E-09	1.90E-10		1.90E-10
Chloroform	2.00E-03	3.80E+01	1.00E-09	7.60E-11		7.60E-11
Methylene Chloride	3.00E-03	3.80E+01	1.00E-09	7.60E-11		7.60E-11
Toluene	7.02E-03	3.80E+01	1.00E-09	1.14E-10		1.14E-10
Xylene (total)	4.25E-03	3.80E+01	1.00E-09	2.67E-10		2.67E-10
Semivolatile Organics						
2,4-Dinitrotoluene	2.14E+00	3.80E+01	1.00E-09	8.15E-08		8.15E-08
2,6-Dinitrotoluene	1.80E-01	3.80E+01	1.00E-09	6.84E-09		6.84E-09
2-Methylnaphthalene	1.23E+00	3.80E+01	1.00E-09	4.67E-08	7.84E-05 U	4.67E-08
3,3'-Dichlorobenzidine		3.80E+01	1.00E-09	0.00E+00		0.00E+00
3-nitroaniline		3.80E+01	1.00E-09	0.00E+00		0.00E+00
Acenaphthene	2.16E+00	3.80E+01	1.00E-09	ERR	7.84E-05 U	ERR
Acenaphthylene	3.08E-01	3.80E+01	1.00E-09	8.19E-08		8.19E-08
Anthracene	2.01E+00	3.80E+01	1.00E-09	1.17E-08	7.84E-05 U	1.17E-08
Benzo(a)anthracene	7.20E+00	3.80E+01	1.00E-09	7.64E-08		7.64E-08
Benzo(a)pyrene	1.15E+01	3.80E+01	1.00E-09	2.73E-07		2.73E-07
Benzo(b)fluoranthene	9.85E+00	3.80E+01	1.00E-09	4.38E-07		4.38E-07
Benzo(g,h,i)perylene	5.89E+00	3.80E+01	1.00E-09	3.74E-07		3.74E-07
Benzo(k)fluoranthene	4.71E+00	3.80E+01	1.00E-09	2.24E-07		2.24E-07
Carbazole	1.87E+00	3.80E+01	1.00E-09	7.10E-08		7.10E-08
Chrysene	8.64E+00	3.80E+01	1.00E-09	3.28E-07		3.28E-07
Di-n-butylphthalate	7.14E-01	3.80E+01	1.00E-09	2.71E-08	7.84E-05 U	2.71E-08
Dibenz(a,h)anthracene	2.35E+00	3.80E+01	1.00E-09	8.94E-08		8.94E-08
Dibenzofuran	1.62E+00	3.80E+01	1.00E-09	ERR	7.84E-05 U	ERR
Diethylphthalate	1.90E-02	3.80E+01	1.00E-09	6.15E-08	7.84E-05 U	6.15E-08
Fluoranthene	1.13E+01	3.80E+01	1.00E-09	7.22E-10		7.22E-10
Fluorene	1.73E+00	3.80E+01	1.00E-09	4.28E-07	7.84E-05 U	4.28E-07
Indeno(1,2,3-cd)pyrene	5.55E+00	3.80E+01	1.00E-09	6.58E-08		6.58E-08
N-Nitrosodiphenylamine (1)	5.77E-01	3.80E+01	1.00E-09	2.11E-07		2.11E-07
Naphthalene	1.95E+00	3.80E+01	1.00E-09	2.19E-08		2.19E-08
Pentachlorophenol	1.16E+00	3.80E+01	1.00E-09	7.42E-08		7.42E-08
Phenanthrene	7.33E+00	3.80E+01	1.00E-09	4.39E-08	7.84E-05 U	4.39E-08
Pyrene	1.26E+01	3.80E+01	1.00E-09	2.78E-07		2.78E-07
bis(2-Ethylhexyl)phthalate	1.27E+00	3.80E+01	1.00E-09	4.80E-07	7.84E-05 U	4.80E-07

TABLE 6-7A

AMBIENT AIR EXPOSURE POINT CONCENTRATIONS
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

COMPOUND	SURFACE SOIL EPC Data mg/kg	AVERAGE TSP (ug/m³)	CONVERSION FACTOR (kg/ug)	AMBIENT AIR CALCULATED EPC (mg/m³)	MEASURED AIR SAMPLES (mg/m³)	AMBIENT AIR EPC (mg/m³)
Pesticides						
4,4'-DDD	4.38E-03	3.80E+01	1.00E-09	1.66E-10		1.66E-10
4,4'-DDE	1.85E-02	3.80E+01	1.00E-09	7.02E-10		7.02E-10
4,4'-DDT	9.85E-03	3.80E+01	1.00E-09	3.74E-10		3.74E-10
Aldrin		3.80E+01	1.00E-09	0.00E+00		0.00E+00
Aroclor-1254		3.80E+01	1.00E-09	0.00E+00		0.00E+00
Aroclor-1260	1.91E-02	3.80E+01	1.00E-09	7.27E-10		7.27E-10
Dieldrin	4.99E-03	3.80E+01	1.00E-09	1.90E-10		1.90E-10
Endosulfan I	1.38E-02	3.80E+01	1.00E-09	5.24E-10		5.24E-10
Endosulfan II	4.55E-03	3.80E+01	1.00E-09	1.73E-10		1.73E-10
Endosulfan sulfate	4.29E-03	3.80E+01	1.00E-09	1.63E-10		1.63E-10
Endrin	5.59E-03	3.80E+01	1.00E-09	2.12E-10		2.12E-10
Endrin aldehyde	2.51E-03	3.80E+01	1.00E-09	9.56E-11		9.56E-11
Endrin ketone	5.58E-03	3.80E+01	1.00E-09	2.12E-10		2.12E-10
Heptachlor		3.80E+01	1.00E-09	0.00E+00		0.00E+00
Heptachlor epoxide	1.94E-03	3.80E+01	1.00E-09	7.35E-11		7.35E-11
Toxaphene		3.80E+01	1.00E-09	0.00E+00		0.00E+00
alpha-Chlordane	2.93E-03	3.80E+01	1.00E-09	1.11E-10		1.11E-10
beta-BHC	2.45E-03	3.80E+01	1.00E-09	9.32E-11		9.32E-11
gamma-BHC (Lindane)		3.80E+01	1.00E-09	0.00E+00		0.00E+00
gamma-Chlordane	3.17E-03	3.80E+01	1.00E-09	1.21E-10		1.21E-10
Nitroaromatics						
2-amino-4,6-Dinitrotoluene		3.80E+01	1.00E-09	0.00E+00		0.00E+00
Tetryl		3.80E+01	1.00E-09	0.00E+00		0.00E+00
Metals						
Antimony	7.91E-03	3.80E+01	1.00E-09	3.00E-10	9.80E-06 U	3.00E-10
Barium	1.07E-01	3.80E+01	1.00E-09	4.08E-09	1.44E-05	1.44E-05
Copper	7.66E-02	3.80E+01	1.00E-09	2.91E-09	3.42E-04	3.42E-04
Lead	6.30E-01	3.80E+01	1.00E-09	2.39E-08	1.31E-05	1.31E-05
Mercury	5.43E-04	3.80E+01	1.00E-09	2.06E-11	3.69E-04	3.69E-04
Selenium	9.20E-04	3.80E+01	1.00E-09	3.50E-11	4.62E-06	4.62E-06
Thallium	1.63E-03	3.80E+01	1.00E-09	6.19E-11	6.50E-06 U	6.19E-11
Zinc	1.10E-01	3.80E+01	1.00E-09	4.18E-09	6.52E-05 U	4.18E-09
Herbicides						
2,4,5-T		3.80E+01	1.00E-09	0.00E+00		0.00E+00
MCPP		3.80E+01	1.00E-09	0.00E+00		0.00E+00

EQUATION: **Calculated Air EPC (mg/m3) = Soil EPC x TSP x CF**

Variables:	**Assumptions:**
TSP = Total Suspended Particulates	**Average value - 38 ug/m3**
CF = Conversion Factor	**10-9 kg/ug**

U = Compound was not detected above the detection limit shown

TABLE 6-8

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Volatile Organics									
1,1,2,2-Tetrachloroethane		1.46E-12	2.62E-10	20	20	25	70	9,125	25,550
Acetone			3.07E-10	20	20	25	70	9,125	25,550
Benzene		1.72E-12	3.07E-10	20	20	25	70	9,125	25,550
Carbon Disulfide	2.97E-12		1.90E-10	20	20	25	70	9,125	25,550
Chloroform		4.25E-13	7.60E-11	20	20	25	70	9,125	25,550
Methylene Chloride	1.19E-12	4.25E-13	7.60E-11	20	20	25	70	9,125	25,550
Toluene	1.78E-12		1.14E-10	20	20	25	70	9,125	25,550
Xylene (total)			2.67E-10	20	20	25	70	9,125	25,550
Semivolatile Organics									
2,4-Dinitrotoluene			8.15E-08	20	20	25	70	9,125	25,550
2,6-Dinitrotoluene			6.84E-09	20	20	25	70	9,125	25,550
2-Methylnaphthalene			4.67E-08	20	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine			0.00E+00	20	20	25	70	9,125	25,550
3-nitroaniline			0.00E+00	20	20	25	70	9,125	25,550
Acenaphthene			ERR	20	20	25	70	9,125	25,550
Acenaphthylene			8.19E-08	20	20	25	70	9,125	25,550
Anthracene			1.17E-08	20	20	25	70	9,125	25,550
Benzo(a)anthracene			7.64E-08	20	20	25	70	9,125	25,550
Benzo(a)pyrene			2.73E-07	20	20	25	70	9,125	25,550
Benzo(b)fluoranthene			4.38E-07	20	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			3.74E-07	20	20	25	70	9,125	25,550
Benzo(k)fluoranthene			2.24E-07	20	20	25	70	9,125	25,550
Carbazole			7.10E-08	20	20	25	70	9,125	25,550
Chrysene			3.28E-07	20	20	25	70	9,125	25,550
Di-n-butylphthalate			2.71E-08	20	20	25	70	9,125	25,550
Dibenz(a,h)anthracene			8.94E-08	20	20	25	70	9,125	25,550
Dibenzofuran			ERR	20	20	25	70	9,125	25,550
Diethylphthalate			6.15E-08	20	20	25	70	9,125	25,550
Fluoranthene			7.22E-10	20	20	25	70	9,125	25,550
Fluorene			4.28E-07	20	20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			6.58E-08	20	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			2.11E-07	20	20	25	70	9,125	25,550
Naphthalene			2.19E-08	20	20	25	70	9,125	25,550
Pentachlorophenol			7.42E-08	20	20	25	70	9,125	25,550
Phenanthrene			4.39E-08	20	20	25	70	9,125	25,550
Pyrene			2.78E-07	20	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			4.80E-07	20	20	25	70	9,125	25,550

TABLE 6-8

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Pesticides									
4,4'-DDD			1.66E-10	20	20	25	70	9,125	25,550
4,4'-DDE			7.02E-10	20	20	25	70	9,125	25,550
4,4'-DDT		2.09E-12	3.74E-10	20	20	25	70	9,125	25,550
Aldrin	0.00E+00	0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
Aroclor-1254		0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
Aroclor-1260			7.27E-10	20	20	25	70	9,125	25,550
Dieldrin		1.06E-12	1.90E-10	20	20	25	70	9,125	25,550
Endosulfan I			5.24E-10	20	20	25	70	9,125	25,550
Endosulfan II			1.73E-10	20	20	25	70	9,125	25,550
Endosulfan sulfate			1.63E-10	20	20	25	70	9,125	25,550
Endrin			2.12E-10	20	20	25	70	9,125	25,550
Endrin aldehyde			9.56E-11	20	20	25	70	9,125	25,550
Endrin ketone			2.12E-10	20	20	25	70	9,125	25,550
Heptachlor		0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
Heptachlor epoxide		4.11E-13	7.35E-11	20	20	25	70	9,125	25,550
Toxaphene		0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
alpha-Chlordane			1.11E-10	20	20	25	70	9,125	25,550
beta-BHC		5.21E-13	9.32E-11	20	20	25	70	9,125	25,550
gamma-BHC (Lindane)			0.00E+00	20	20	25	70	9,125	25,550
gamma-Chlordane			1.21E-10	20	20	25	70	9,125	25,550
Nitroaromatics									
2-amino-4,6-Dinitrotoluene			0.00E+00	20	20	25	70	9,125	25,550
Tetryl			0.00E+00	20	20	25	70	9,125	25,550
Metals									
Antimony			3.00E-10	20	20	25	70	9,125	25,550
Barium	2.25E-07		1.44E-05	20	20	25	70	9,125	25,550
Copper			3.42E-04	20	20	25	70	9,125	25,550
Lead			1.31E-05	20	20	25	70	9,125	25,550
Mercury	5.78E-06		3.69E-04	20	20	25	70	9,125	25,550
Selenium			4.62E-06	20	20	25	70	9,125	25,550
Thallium			6.19E-11	20	20	25	70	9,125	25,550
Zinc			4.18E-09	20	20	25	70	9,125	25,550
Herbicides									
2,4,5-T			0.00E+00	20	20	25	70	9,125	25,550
MCPP			0.00E+00	20	20	25	70	9,125	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:

CA = Chemical Concentration in Air (mg/m³)
IR = Inhalation Rate (m³/day)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

Calculated Air EPC Data - RME
20 (RME All Receptors)
20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult Male)
25 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-43

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2-Tetrachloroethane		1.46E-12	NA	2.03E-01		2.97E-13
Acetone			NA	NA		
Benzene		1.72E-12	NA	2.91E-02		4.99E-14
Carbon Disulfide	2.97E-12		2.86E-03	NA	1.04E-09	
Chloroform		4.25E-13	NA	8.05E-02		3.42E-14
Methylene Chloride	1.19E-12	4.25E-13	8.57E-01	1.65E-03	1.39E-12	7.01E-16
Toluene	1.78E-12		1.14E-01	NA	1.56E-11	
Xylene (total)			NA	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Diethylphthalate			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Ethylhexyl)phthalate			NA	NA		

TABLE 6-43

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		2.09E-12	NA	3.40E-01		7.11E-13
Aldrin	0.00E+00	0.00E+00	1.70E+01	1.72E+01	0.00E+00	0.00E+00
Aroclor-1254		0.00E+00	NA	4.00E-01		0.00E+00
Aroclor-1260			NA	NA		
Dieldrin		1.06E-12	NA	1.61E+01		1.71E-11
Endosulfan I			NA	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor		0.00E+00	NA	4.55E+00		0.00E+00
Heptachlor epoxide		4.11E-13	NA	9.10E+00		3.74E-12
Toxaphene		0.00E+00	NA	1.12E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		5.21E-13	NA	1.86E+00		9.67E-13
gamma-BHC (Lindane)			NA	NA		
gamma-Chlordane			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			NA	NA		
Metals						
Antimony			NA	NA		
Barium	2.25E-07		1.43E-04	NA	1.58E-03	
Copper			NA	NA		
Lead			NA	NA		
Mercury	5.78E-06		8.57E-05	NA	6.74E-02	
Selenium			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
Herbicides						
2,4,5-T			NA	NA		
MCPP			NA	NA		
Total HQ & CR					**6.90E-02**	**2.29E-11**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-10

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Volatile Organics									
1,1,2,2-Tetrachloroethane		7.32E-13	2.62E-10	20	250	1	70	365	25,550
Acetone			3.07E-10	20	250	1	70	365	25,550
Benzene		8.58E-13	3.07E-10	20	250	1	70	365	25,550
Carbon Disulfide	3.72E-11		1.90E-10	20	250	1	70	365	25,550
Chloroform		2.12E-13	7.60E-11	20	250	1	70	365	25,550
Methylene Chloride	1.49E-11	2.12E-13	7.60E-11	20	250	1	70	365	25,550
Toluene	2.23E-11		1.14E-10	20	250	1	70	365	25,550
Xylene (total)			2.67E-10	20	250	1	70	365	25,550
Semivolatile Organics									
2,4-Dinitrotoluene			8.15E-08	20	250	1	70	365	25,550
2,6-Dinitrotoluene			6.84E-09	20	250	1	70	365	25,550
2-Methylnaphthalene			4.67E-08	20	250	1	70	365	25,550
3,3'-Dichlorobenzidine			0.00E+00	20	250	1	70	365	25,550
3-nitroaniline			0.00E+00	20	250	1	70	365	25,550
Acenaphthene			ERR	20	250	1	70	365	25,550
Acenaphthylene			8.19E-08	20	250	1	70	365	25,550
Anthracene			1.17E-08	20	250	1	70	365	25,550
Benzo(a)anthracene			7.64E-08	20	250	1	70	365	25,550
Benzo(a)pyrene			2.73E-07	20	250	1	70	365	25,550
Benzo(b)fluoranthene			4.38E-07	20	250	1	70	365	25,550
Benzo(g,h,i)perylene			3.74E-07	20	250	1	70	365	25,550
Benzo(k)fluoranthene			2.24E-07	20	250	1	70	365	25,550
Carbazole			7.10E-08	20	250	1	70	365	25,550
Chrysene			3.28E-07	20	250	1	70	365	25,550
Di-n-butylphthalate			2.71E-08	20	250	1	70	365	25,550
Dibenz(a,h)anthracene			8.94E-08	20	250	1	70	365	25,550
Dibenzofuran			ERR	20	250	1	70	365	25,550
Diethylphthalate			6.15E-08	20	250	1	70	365	25,550
Fluoranthene			7.22E-10	20	250	1	70	365	25,550
Fluorene			4.28E-07	20	250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene			6.58E-08	20	250	1	70	365	25,550
N-Nitrosodiphenylamine (1)			2.11E-07	20	250	1	70	365	25,550
Naphthalene			2.19E-08	20	250	1	70	365	25,550
Pentachlorophenol			7.42E-08	20	250	1	70	365	25,550
Phenanthrene			4.39E-08	20	250	1	70	365	25,550
Pyrene			2.78E-07	20	250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate			4.80E-07	20	250	1	70	365	25,550

TABLE 6-10

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m^3)	Inhalation Rate (m^3/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Pesticides									
4,4'-DDD			1.66E-10	20	250	1	70	365	25,550
4,4'-DDE			7.02E-10	20	250	1	70	365	25,550
4,4'-DDT		1.05E-12	3.74E-10	20	250	1	70	365	25,550
Aldrin	0.00E+00	0.00E+00	0.00E+00	20	250	1	70	365	25,550
Aroclor-1254		0.00E+00	0.00E+00	20	250	1	70	365	25,550
Aroclor-1260			7.27E-10	20	250	1	70	365	25,550
Dieldrin		5.30E-13	1.90E-10	20	250	1	70	365	25,550
Endosulfan I			5.24E-10	20	250	1	70	365	25,550
Endosulfan II			1.73E-10	20	250	1	70	365	25,550
Endosulfan sulfate			1.63E-10	20	250	1	70	365	25,550
Endrin			2.12E-10	20	250	1	70	365	25,550
Endrin aldehyde			9.56E-11	20	250	1	70	365	25,550
Endrin ketone			2.12E-10	20	250	1	70	365	25,550
Heptachlor		0.00E+00	0.00E+00	20	250	1	70	365	25,550
Heptachlor epoxide		2.06E-13	7.35E-11	20	250	1	70	365	25,550
Toxaphene		0.00E+00	0.00E+00	20	250	1	70	365	25,550
alpha-Chlordane			1.11E-10	20	250	1	70	365	25,550
beta-BHC		2.61E-13	9.32E-11	20	250	1	70	365	25,550
gamma-BHC (Lindane)			0.00E+00	20	250	1	70	365	25,550
gamma-Chlordane			1.21E-10	20	250	1	70	365	25,550
Nitroaromatics									
2-amino-4,6-Dinitrotoluene			0.00E+00	20	250	1	70	365	25,550
Tetryl			0.00E+00	20	250	1	70	365	25,550
Metals									
Antimony			3.00E-10	20	250	1	70	365	25,550
Barium	2.82E-06		1.44E-05	20	250	1	70	365	25,550
Copper			3.42E-04	20	250	1	70	365	25,550
Lead			1.31E-05	20	250	1	70	365	25,550
Mercury	7.22E-05		3.69E-04	20	250	1	70	365	25,550
Selenium			4.62E-06	20	250	1	70	365	25,550
Thallium			6.19E-11	20	250	1	70	365	25,550
Zinc			4.18E-09	20	250	1	70	365	25,550
Herbicides									
2,4,5-T			0.00E+00	20	250	1	70	365	25,550
MCPP			0.00E+00	20	250	1	70	365	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:

CA = Chemical Concentration in Air (mg/m^3)
IR = Inhalation Rate (m^3/day)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

Calculated Air EPC Data - RME
20 (all receptors)
250 (RME Construction Workers)
1 (Upper bound period of Construction Worker)
70 (Adult Male)
1 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-55

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2-Tetrachloroethane		7.32E-13	NA	2.03E-01		1.49E-13
Acetone			NA	NA		
Benzene		8.58E-13	NA	2.91E-02		2.49E-14
Carbon Disulfide	3.72E-11		2.86E-03	NA	1.30E-08	
Chloroform		2.12E-13	NA	8.05E-02		1.71E-14
Methylene Chloride	1.49E-11	2.12E-13	8.57E-01	1.65E-03	1.74E-11	3.51E-16
Toluene	2.23E-11		1.14E-01	NA	1.95E-10	
Xylene (total)			NA	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Diethylphthalate			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Ethylhexyl)phthalate			NA	NA		

TABLE 6-55

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		1.05E-12	NA	3.40E-01		3.55E-13
Aldrin	0.00E+00	0.00E+00	1.70E+01	1.72E+01	0.00E+00	0.00E+00
Aroclor-1254		0.00E+00	NA	4.00E-01		0.00E+00
Aroclor-1260			NA	NA		
Dieldrin		5.30E-13	NA	1.61E+01		8.54E-12
Endosulfan I			NA	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor		0.00E+00	NA	4.55E+00		0.00E+00
Heptachlor epoxide		2.06E-13	NA	9.10E+00		1.87E-12
Toxaphene		0.00E+00	NA	1.12E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		2.61E-13	NA	1.86E+00		4.83E-13
gamma-BHC (Lindane)			NA	NA		
gamma-Chlordane			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			NA	NA		
Metals						
Antimony			NA	NA		
Barium	2.82E-06		1.43E-04	NA	1.97E-02	
Copper			NA	NA		
Lead			NA	NA		
Mercury	7.22E-05		8.57E-05	NA	8.42E-01	
Selenium			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
Herbicides						
2,4,5-T			NA	NA		
MCPP			NA	NA		
Total HQ & CR					**8.62E-01**	**1.14E-11**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-18

CALCULATION OF INTAKE FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Volatile Organics											
1,1,2,2-Tetrachloroethane		4.62E-10	6.89E-03	480	1.00E-06	1	250	1	70	365	25,550
2-Butanone	2.35E-08		5.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Acetone	3.79E-08		8.08E-03	480	1.00E-06	1	250	1	70	365	25,550
Benzene		3.35E-10	5.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Carbon Disulfide	9.39E-09		2.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Chloroform	9.39E-09	1.34E-10	2.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Methylene Chloride	1.41E-08	2.01E-10	3.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Toluene	3.30E-08		7.02E-03	480	1.00E-06	1	250	1	70	365	25,550
Xylene (total)	2.00E-08		4.25E-03	480	1.00E-06	1	250	1	70	365	25,550
Semivolatile Organics											
2,4-Dinitrotoluene	1.01E-05		2.14E+00	480	1.00E-06	1	250	1	70	365	25,550
2,6-Dinitrotoluene	8.45E-07		1.80E-01	480	1.00E-06	1	250	1	70	365	25,550
2-methylnaphthalene			1.23E+00	480	1.00E-06	1	250	1	70	365	25,550
3,3'-Dichlorobenzidine		0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
3-nitroaniline			0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
Acenaphthene	1.01E-05		2.16E+00	480	1.00E-06	1	250	1	70	365	25,550
Acenaphthylene			3.08E-01	480	1.00E-06	1	250	1	70	365	25,550
Anthracene	9.45E-06		2.01E+00	480	1.00E-06	1	250	1	70	365	25,550
Benzo(a)anthracene		4.83E-07	7.20E+00	480	1.00E-06	1	250	1	70	365	25,550
Benzo(a)pyrene		7.73E-07	1.15E+01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(b)fluoranthene		6.61E-07	9.85E+00	480	1.00E-06	1	250	1	70	365	25,550
Benzo(g,h,i)perylene			5.89E+00	480	1.00E-06	1	250	1	70	365	25,550
Benzo(k)fluoranthene		3.16E-07	4.71E+00	480	1.00E-06	1	250	1	70	365	25,550
Butylbenzylphthalate	0.00E+00		0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
Carbazole		1.25E-07	1.87E+00	480	1.00E-06	1	250	1	70	365	25,550
Chrysene		5.80E-07	8.64E+00	480	1.00E-06	1	250	1	70	365	25,550
Di-n-butylphthalate	3.35E-06		7.14E-01	480	1.00E-06	1	250	1	70	365	25,550
Dibenz(a,h)anthracene		1.58E-07	2.35E+00	480	1.00E-06	1	250	1	70	365	25,550
Dibenzofuran			1.62E+00	480	1.00E-06	1	250	1	70	365	25,550
Diethylphthalate	8.92E-08		1.90E-02	480	1.00E-06	1	250	1	70	365	25,550
Fluoranthene	5.29E-05		1.13E+01	480	1.00E-06	1	250	1	70	365	25,550
Fluorene	8.13E-06		1.73E+00	480	1.00E-06	1	250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene		3.73E-07	5.55E+00	480	1.00E-06	1	250	1	70	365	25,550
N-Nitrosodiphenylamine (1)		3.87E-08	5.77E-01	480	1.00E-06	1	250	1	70	365	25,550
Naphthalene			1.95E+00	480	1.00E-06	1	250	1	70	365	25,550
Pentachlorophenol	5.43E-06	7.76E-08	1.16E+00	480	1.00E-06	1	250	1	70	365	25,550
Phenanthrene			7.33E+00	480	1.00E-06	1	250	1	70	365	25,550
Pyrene	5.94E-05		1.26E+01	480	1.00E-06	1	250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate	5.96E-06	8.52E-08	1.27E+00	480	1.00E-06	1	250	1	70	365	25,550
Pesticides											
4,4'-DDD	2.06E-08	2.94E-10	4.38E-03	480	1.00E-06	1	250	1	70	365	25,550
4,4'-DDE			1.85E-02	480	1.00E-06	1	250	1	70	365	25,550
4,4'-DDT	4.63E-08	6.61E-10	9.85E-03	480	1.00E-06	1	250	1	70	365	25,550
Aldrin	0.00E+00	0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
Aroclor-1254	0.00E+00	0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
Aroclor-1260		1.28E-09	1.91E-02	480	1.00E-06	1	250	1	70	365	25,550
Dieldrin	2.34E-08	3.35E-10	4.99E-03	480	1.00E-06	1	250	1	70	365	25,550
Endosulfan I	6.47E-08		1.38E-02	480	1.00E-06	1	250	1	70	365	25,550
Endosulfan II			4.55E-03	480	1.00E-06	1	250	1	70	365	25,550
Endosulfan sulfate	2.01E-08		4.29E-03	480	1.00E-06	1	250	1	70	365	25,550
Endrin	2.62E-08		5.59E-03	480	1.00E-06	1	250	1	70	365	25,550
Endrin aldehyde			2.51E-03	480	1.00E-06	1	250	1	70	365	25,550
Endrin ketone			5.58E-03	480	1.00E-06	1	250	1	70	365	25,550
Heptachlor	0.00E+00	0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
Heptachlor epoxide	9.09E-09	1.30E-10	1.94E-03	480	1.00E-06	1	250	1	70	365	25,550
Toxaphene		0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
alpha-Chlordane	1.38E-08	1.97E-10	2.93E-03	480	1.00E-06	1	250	1	70	365	25,550
beta-BHC		1.65E-10	2.45E-03	480	1.00E-06	1	250	1	70	365	25,550
gamma-BHC (Lindane)	0.00E+00		0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
gamma-Chlordane			3.17E-03	480	1.00E-06	1	250	1	70	365	25,550
Nitroaromatics											
2-amino-4,6-Dinitrotoluene			0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
Tetryl	0.00E+00		0.00E+00	480	1.00E-06	1	250	1	70	365	25,550

TABLE 6-18

CALCULATION OF INTAKE FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Metals											
Antimony	3.71E-05		7.91E+00	480	1.00E-06	1	250	1	70	365	25,550
Barium	5.04E-04		1.07E+02	480	1.00E-06	1	250	1	70	365	25,550
Copper	3.60E-04		7.66E+01	480	1.00E-06	1	250	1	70	365	25,550
Lead			6.30E+02	480	1.00E-06	1	250	1	70	365	25,550
Mercury	2.55E-06		5.43E-01	480	1.00E-06	1	250	1	70	365	25,550
Selenium	4.32E-06		9.20E-01	480	1.00E-06	1	250	1	70	365	25,550
Thallium	7.65E-06		1.63E+00	480	1.00E-06	1	250	1	70	365	25,550
Zinc	5.17E-04		1.10E+02	480	1.00E-06	1	250	1	70	365	25,550
Herbicides											
2,4,5-T	0.00E+00		0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
MCPP	0.00E+00		0.00E+00	480	1.00E-06	1	250	1	70	365	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC - Total Soil Data (RME)
480 (RME Construction Worker)
10-6
1 (All Receptors)
250 (RME Construction Worker)
1 (Upper bound limit for Construction Worker)
70 (Adult male)
1 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-57

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2-Tetrachloroethane		4.62E-10	NA	2.00E-01		9.24E-11
2-Butanone	2.35E-08		6.00E-01	NA	3.91E-08	
Acetone	3.79E-08		1.00E-01	NA	3.79E-07	
Benzene		3.35E-10	NA	2.90E-02		9.73E-12
Carbon Disulfide	9.39E-09		1.00E-01	NA	9.39E-08	
Chloroform	9.39E-09	1.34E-10	1.00E-02	6.10E-03	9.39E-07	8.19E-13
Methylene Chloride	1.41E-08	2.01E-10	6.00E-02	7.50E-03	2.35E-07	1.51E-12
Toluene	3.30E-08		2.00E-01	NA	1.65E-07	
Xylene (total)	2.00E-08		2.00E+00	NA	9.98E-09	
Semivolatile Organics						
2,4-Dinitrotoluene	1.01E-05		2.00E-03	NA	5.04E-03	
2,6-Dinitrotoluene	8.45E-07		1.00E-03	NA	8.45E-04	
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine		0.00E+00	NA	4.50E-01		0.00E+00
3-nitroaniline			NA	NA		
Acenaphthene	1.01E-05		6.00E-02	NA	1.69E-04	
Acenaphthylene			NA	NA		
Anthracene	9.45E-06		3.00E-01	NA	3.15E-05	
Benzo(a)anthracene		4.83E-07	NA	7.30E-01		3.52E-07
Benzo(a)pyrene		7.73E-07	NA	7.30E+00		5.64E-06
Benzo(b)fluoranthene		6.61E-07	NA	7.30E-01		4.82E-07
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		3.16E-07	NA	7.30E-01		2.31E-07
Butylbenzylphthalate	0.00E+00		2.00E+00	NA	0.00E+00	
Carbazole		1.25E-07	NA	2.00E-02		2.51E-09
Chrysene		5.80E-07	NA	7.30E-02		4.23E-08
Di-n-butylphthalate	3.35E-06		1.00E-01	NA	3.35E-05	
Dibenz(a,h)anthracene		1.58E-07	NA	7.30E+00		1.15E-06
Dibenzofuran			NA	NA		
Diethylphthalate	8.92E-08		8.00E+00	NA	1.12E-08	
Fluoranthene	5.29E-05		4.00E-02	NA	1.32E-03	
Fluorene	8.13E-06		4.00E-02	NA	2.03E-04	
Indeno(1,2,3-cd)pyrene		3.73E-07	NA	7.30E-01		2.72E-07
N-Nitrosodiphenylamine (1)		3.87E-08	NA	4.90E-03		1.90E-10
Naphthalene			NA	NA		
Pentachlorophenol	5.43E-06	7.76E-08	3.00E-02	1.20E-01	1.81E-04	9.31E-09
Phenanthrene			NA	NA		
Pyrene	5.94E-05		3.00E-02	NA	1.98E-03	
bis(2-Ethylhexyl)phthalate	5.96E-06	8.52E-08	2.00E-02	1.40E-02	2.98E-04	1.19E-09

TABLE 6-57

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD	2.06E-08	2.94E-10	5.00E-04	2.40E-01	4.11E-05	7.05E-11
4,4'-DDE			NA	NA		
4,4'-DDT	4.63E-08	6.61E-10	5.00E-04	3.40E-01	9.26E-05	2.25E-10
Aldrin	0.00E+00	0.00E+00	3.00E-05	1.70E+01	0.00E+00	0.00E+00
Aroclor-1254	0.00E+00	0.00E+00	2.00E-05	2.00E+00	0.00E+00	0.00E+00
Aroclor-1260		1.28E-09	NA	7.70E+00		9.89E-09
Dieldrin	2.34E-08	3.35E-10	5.00E-05	1.60E+01	4.69E-04	5.36E-09
Endosulfan I	6.47E-08		6.00E-03	NA	1.08E-05	
Endosulfan II			NA	NA		
Endosulfan sulfate	2.01E-08		5.00E-05	NA	4.03E-04	
Endrin	2.62E-08		3.00E-04	NA	8.75E-05	
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor	0.00E+00	0.00E+00	5.00E-04	4.50E+00	0.00E+00	0.00E+00
Heptachlor epoxide	9.09E-09	1.30E-10	1.30E-05	9.10E+00	6.99E-04	1.18E-09
Toxaphene		0.00E+00	NA	1.10E+00		0.00E+00
alpha-Chlordane	1.38E-08	1.97E-10	6.00E-05	1.30E+00	2.29E-04	2.56E-10
beta-BHC		1.65E-10	NA	1.80E+00		2.96E-10
gamma-BHC (Lindane)	0.00E+00		3.00E-04	NA	0.00E+00	
gamma-Chlordane			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl	0.00E+00		1.00E-02	NA	0.00E+00	
Metals						
Antimony	3.71E-05		4.00E-04	NA	9.28E-02	
Barium	5.04E-04		7.00E-02	NA	7.21E-03	
Copper	3.60E-04		4.00E-02	NA	8.99E-03	
Lead			NA	NA		
Mercury	2.55E-06		3.00E-04	NA	8.50E-03	
Selenium	4.32E-06		5.00E-03	NA	8.64E-04	
Thallium	7.65E-06		7.00E-05	NA	1.09E-01	
Zinc	5.17E-04		3.00E-01	NA	1.72E-03	
Herbicides						
2,4,5-T	0.00E+00		8.00E-03	NA	0.00E+00	
MCPP	0.00E+00		1.00E-03	NA	0.00E+00	
Totals - HQ & CR					**2.42E-01**	**8.21E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-24

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
Volatile Organics												
1,1,2,2-Tetrachloroethane			6.89E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
2-Butanone			5.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Acetone			8.08E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzene			5.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Carbon Disulfide			2.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Chloroform			2.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Methylene Chloride			3.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Toluene			7.02E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Xylene (total)			4.25E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Semivolatile Organics												
2,4-Dinitrotoluene			2.14E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
2,6-Dinitrotoluene			1.80E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
2-methylnaphthalene			1.23E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
3,3'-Dichlorobenzidine				1.00E-06	5,800	1.0		250	1	70	365	25,550
3-nitroaniline				1.00E-06	5,800	1.0		250	1	70	365	25,550
Acenaphthene			2.16E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Acenaphthylene			3.08E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Anthracene			2.01E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(a)anthracene			7.20E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(a)pyrene			1.15E+01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(b)fluoranthene			9.85E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(g,h,i)perylene			5.89E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(k)fluoranthene			4.71E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Butylbenzylphthalate				1.00E-06	5,800	1.0		250	1	70	365	25,550
Carbazole			1.87E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Chrysene			8.64E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Di-n-butylphthalate			7.14E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Dibenz(a,h)anthracene			2.35E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Dibenzofuran			1.62E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Diethylphthalate			1.90E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Fluoranthene			1.13E+01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Fluorene			1.73E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene			5.55E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
N-Nitrosodiphenylamine (1)			5.77E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Naphthalene			1.95E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pentachlorophenol			1.16E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Phenanthrene			7.33E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pyrene			1.26E+01	1.00E-06	5,800	1.0		250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate			1.27E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pesticides												
4,4'-DDD			4.38E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
4,4'-DDE			1.85E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
4,4'-DDT			9.85E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Aldrin				1.00E-06	5,800	1.0		250	1	70	365	25,550
Aroclor-1254				1.00E-06	5,800	1.0	0.06	250	1	70	365	25,550
Aroclor-1260		9.31E-10	1.91E-02	1.00E-06	5,800	1.0	0.06	250	1	70	365	25,550
Dieldrin			4.99E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan I			1.38E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan II			4.55E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan sulfate			4.29E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin			5.59E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin aldehyde			2.51E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin ketone			5.58E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Heptachlor				1.00E-06	5,800	1.0		250	1	70	365	25,550
Heptachlor epoxide			1.94E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Toxaphene				1.00E-06	5,800	1.0		250	1	70	365	25,550
alpha-Chlordane			2.93E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
beta-BHC			2.45E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
gamma-BHC (Lindane)				1.00E-06	5,800	1.0		250	1	70	365	25,550
gamma-Chlordane			3.17E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Nitroaromatics												
2-amino-4,6-Dinitrotoluene				1.00E-06	5,800	1.0		250	1	70	365	25,550
Tetryl				1.00E-06	5,800	1.0		250	1	70	365	25,550

TABLE 6-24

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm^2)	Adherence Factor (mg soil/cm^2)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Metals												
Antimony			7.91E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Barium			1.07E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Copper			7.66E+01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Lead			6.30E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Mercury			5.43E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Selenium			9.20E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Thallium			1.63E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Zinc			1.10E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Herbicides												
2,4,5-T				1.00E-06	5,800	1.0		250	1	70	365	25,550
MCPP				1.00E-06	5,800	1.0		250	1	70	365	25,550

EQUATION:

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

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC - Total Soil Data (RME)	EF = Exposure Frequency (days/year)	250 (RME Construction Worker)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	1 (Upper bound limit for CW)
SA = Surface Area Contact (cm^2)	5,800 (RME Adult Worker)	BW = Bodyweight (kg)	70 (Adult Male)
AF = Soil to Skin Adherence Factor (mg/cm^2)	1.0 (RME - All Receptors)	AT = Averaging Time (days)	1 x 365 (Nc) 70 x 365 (Car)
ABS = Absorption Factor (unitless)	Applicable for PCBs and Cadmium (EPA, 1992b)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-59

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE) REASONABLE MAXIMUM EXPOSURE (RME) CASE 1 SEAD-16 Remedial Investigation Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2-Tetrachloroethane			NA	2.00E-01		
2-Butanone			6.00E-01	NA		
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Carbon Disulfide			1.00E-01	NA		
Chloroform			1.00E-02	6.10E-03		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
Xylene (total)			2.00E+00	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Diethylphthalate			8.00E+00	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 6-59

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254			1.90E-05	2.11E+00		
Aroclor-1260		9.31E-10	NA	8.11E+00		7.55E-09
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor			5.00E-04	4.50E+00		
Heptachlor epoxide			1.30E-05	9.10E+00		
Toxaphene			NA	1.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			1.00E-02	NA		
Metals						
Antimony			4.00E-04	NA		
Barium			7.00E-03	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			1.50E-01	NA		
Herbicides						
2,4,5-T			8.00E-03	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR						**7.55E-09**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-45

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS (DAILY)
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD	3.43E-10	1.22E-10	5.00E-04	2.40E-01	6.85E-07	2.94E-11
4,4'-DDE			NA	NA		
4,4'-DDT	7.71E-10	2.75E-10	5.00E-04	3.40E-01	1.54E-06	9.37E-11
Aldrin	0.00E+00	0.00E+00	3.00E-05	1.70E+01	0.00E+00	0.00E+00
Aroclor-1254	0.00E+00	0.00E+00	2.00E-05	2.00E+00	0.00E+00	0.00E+00
Aroclor-1260		5.35E-10	NA	7.70E+00		4.12E-09
Dieldrin	3.91E-10	1.40E-10	5.00E-05	1.60E+01	7.82E-06	2.23E-09
Endosulfan I	1.08E-09		6.00E-03	NA	1.80E-07	
Endosulfan II			NA	NA		
Endosulfan sulfate	3.36E-10		5.00E-05	NA	6.71E-06	
Endrin	4.37E-10		3.00E-04	NA	1.46E-06	
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor	0.00E+00	0.00E+00	5.00E-04	4.50E+00	0.00E+00	0.00E+00
Heptachlor epoxide	1.51E-10	5.41E-11	1.30E-05	9.10E+00	1.17E-05	4.92E-10
Toxaphene		0.00E+00	NA	1.10E+00		0.00E+00
alpha-Chlordane	2.29E-10	8.19E-11	6.00E-05	1.30E+00	3.82E-06	1.06E-10
beta-BHC		6.86E-11	NA	1.80E+00		1.23E-10
gamma-BHC (Lindane)	0.00E+00		3.00E-04	NA	0.00E+00	
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl	0.00E+00		1.00E-02	NA	0.00E+00	
Metals						
Antimony	6.19E-10		4.00E-04	NA	1.55E-06	
Barium	8.41E-09		7.00E-02	NA	1.20E-07	
Copper	5.99E-09		4.00E-02	NA	1.50E-07	
Lead			NA	NA		
Mercury	4.25E-11		3.00E-04	NA	1.42E-07	
Selenium	7.20E-11		5.00E-03	NA	1.44E-08	
Thallium	1.28E-10		7.00E-05	NA	1.82E-06	
Zinc	8.61E-09		3.00E-01	NA	2.87E-08	
Herbicides						
2,4,5-T	0.00E+00		1.00E-02	NA	0.00E+00	
MCPP	0.00E+00		1.00E-03	NA	0.00E+00	
Totals - HQ & CR					**2.06E-04**	**3.42E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-22

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Volatile Organics												
1,1,2,2,-Tetrachloroethane			6.89E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acetone			8.08E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzene			5.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbon Disulfide			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chloroform			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Methylene Chloride			3.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toluene			7.02E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Xylene (total)			4.25E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Semivolatile Organics												
2,4-Dinitrotoluene			2.14E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2,6-Dinitrotoluene			1.80E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2-methylnaphthalene			1.23E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3,3'-Dichlorobenzidine				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3-nitroaniline				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthene			2.16E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthylene			3.08E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Anthracene			2.01E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)anthracene			7.20E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)pyrene			1.15E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(b)fluoranthene			9.85E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(g,h,i)perylene			5.89E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(k)fluoranthene			4.71E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbazole			1.87E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chrysene			8.64E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Di-n-butylphthalate			7.14E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenz(a,h)anthracene			2.35E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenzofuran			1.62E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Diethylphthalate			1.90E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluoranthene			1.13E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluorene			1.73E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			5.55E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			5.77E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Naphthalene			1.95E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pentachlorophenol			1.16E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Phenanthrene			7.33E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pyrene			1.26E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			1.27E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pesticides												
4,4'-DDD			4.38E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDE			1.85E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDT			9.85E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aldrin				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aroclor-1254				1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Aroclor-1260		1.86E-09	1.91E-02	1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Dieldrin			4.99E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan I			1.38E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan II			4.55E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan sulfate			4.29E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin			5.59E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin aldehyde			2.51E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin ketone			5.58E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor epoxide			1.94E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toxaphene				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
alpha-Chlordane			2.93E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
beta-BHC			2.45E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
gamma-BHC (Lindane)				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
gamma-Chlordane			3.17E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
delta-BHC			1.92E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Nitroaromatics												
2-amino-4,6-Dinitrotoluene				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Tetryl				1.00E-06	5,800	1.0		20	25	70	9,125	25,550

TABLE 6-22

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Metals												
Antimony			7.91E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Barium			1.07E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Copper			7.66E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Lead			6.30E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Mercury			5.43E-04	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Selenium			9.20E-04	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Thallium			1.63E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Zinc			1.10E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Herbicides												
2,4,5-T				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
MCPP				1.00E-06	5,800	1.0		20	25	70	9,125	25,550

EQUATION:

Absorbed dose (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
CF = Conversion Factor (10-6 kg/mg)
SA = Surface Area Contact (cm²)
AF =Soil to Skin Adherence Factor (mg/cm²)
ABS = Absorption Factor (unitless)

Assumptions:

EPC Soil Data - RME
10-6
5,800 cm² (RME Site Worker)
1.0 (RME all receptors)
Compound Specific for PCBs and Cd
EPA, 1992b (Default Assumption 0% = 0.0)

Variables:

EF = Exposure Frequency (events/year)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult Male)
25 x 365 (Nc) 70 x 365 Adult (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-47

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL (DAILY)
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane			NA	2.00E-01		
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Carbon Disulfide			1.00E-01	NA		
Chloroform			1.00E-02	6.10E-03		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
Xylene (total)			2.00E+00	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Diethylphthalate			8.00E+00	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 6-47

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL (DAILY)
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254			1.90E-05	2.11E+00		
Aroclor-1260		1.86E-09	NA	8.11E+00		1.51E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor			5.00E-04	4.50E+00		
Heptachlor epoxide			1.30E-05	9.10E+00		
Toxaphene			NA	1.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			1.00E-02	NA		
Metals						
Antimony			4.00E-04	NA		
Barium			7.00E-03	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			1.50E-01	NA		
Herbicides						
2,4,5-T			1.00E-02	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR						**1.51E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-13
CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 2

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Volatile Organics											
1,1,2,2,-Tetrachloroethane		1.93E-10	6.89E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Acetone	6.32E-10		8.08E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Benzene		1.40E-10	5.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Carbon Disulfide	1.57E-10		2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Chloroform	1.57E-10	5.59E-11	2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Methylene Chloride	2.35E-10	8.39E-11	3.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Toluene	5.49E-10		7.02E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Xylene (total)	3.33E-10		4.25E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Semivolatile Organics											
2,4-Dinitrotoluene	1.68E-07		2.14E+00	100	1.00E-06	1	20	25	70	9,125	25,550
2,6-Dinitrotoluene	1.41E-08		1.80E-01	100	1.00E-06	1	20	25	70	9,125	25,550
2-methylnaphthalene			1.23E+00	100	1.00E-06	1	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine		0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
3-nitroaniline			0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthene	1.69E-07		2.16E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthylene			3.08E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Anthracene	1.57E-07		2.01E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)anthracene		2.01E-07	7.20E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)pyrene		3.22E-07	1.15E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(b)fluoranthene		2.75E-07	9.85E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			5.89E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(k)fluoranthene		1.32E-07	4.71E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Carbazole		5.23E-08	1.87E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Chrysene		2.42E-07	8.64E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Di-n-butylphthalate	5.59E-08		7.14E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenz(a,h)anthracene		6.58E-08	2.35E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenzofuran			1.62E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Diethylphthalate	1.49E-09		1.90E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Fluoranthene	8.82E-07		1.13E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Fluorene	1.36E-07		1.73E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene		1.55E-07	5.55E+00	100	1.00E-06	1	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)		1.61E-08	5.77E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Naphthalene			1.95E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pentachlorophenol	9.05E-08	3.23E-08	1.16E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Phenanthrene			7.33E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pyrene	9.89E-07		1.26E+01	100	1.00E-06	1	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate	9.94E-08	3.55E-08	1.27E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pesticides											
4,4'-DDD	3.43E-10	1.22E-10	4.38E-03	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDE			1.85E-02	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDT	7.71E-10	2.75E-10	9.85E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Aldrin	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1254	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1260		5.35E-10	1.91E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Dieldrin	3.91E-10	1.40E-10	4.99E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan I	1.08E-09		1.38E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan II			4.55E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan sulfate	3.36E-10		4.29E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin	4.37E-10		5.59E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin aldehyde			2.51E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin ketone			5.58E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor epoxide	1.51E-10	5.41E-11	1.94E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Toxaphene		0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
alpha-Chlordane	2.29E-10	8.19E-11	2.93E-03	100	1.00E-06	1	20	25	70	9,125	25,550
beta-BHC		6.86E-11	2.45E-03	100	1.00E-06	1	20	25	70	9,125	25,550
gamma-BHC (Lindane)	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
gamma-Chlordane			3.17E-03	100	1.00E-06	1	20	25	70	9,125	25,550
delta-BHC			1.92E-03	100	1.00E-06	1	20	25	70	9,125	25,550

TABLE 6-13
CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 2

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Nitroaromatics											
2-amino-4,6-Dinitrotoluene			0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Tetryl	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Metals											
Antimony	6.19E-10		7.91E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Barium	8.41E-09		1.07E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Copper	5.99E-09		7.66E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Lead			6.30E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Mercury	4.25E-11		5.43E-04	100	1.00E-06	1	20	25	70	9,125	25,550
Selenium	7.20E-11		9.20E-04	100	1.00E-06	1	20	25	70	9,125	25,550
Thallium	1.28E-10		1.63E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Zinc	8.61E-09		1.10E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Herbicides											
2,4,5-T	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
MCPP	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC Soil Data - RME
100 (RME Site Worker)
10-6
1 (All Receptors)
20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-44
CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 2

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane		1.93E-10	NA	2.00E-01		3.85E-11
Acetone	6.32E-10		1.00E-01	NA	6.32E-09	
Benzene		1.40E-10	NA	2.90E-02		4.05E-12
Carbon Disulfide	1.57E-10		1.00E-01	NA	1.57E-09	
Chloroform	1.57E-10	5.59E-11	1.00E-02	6.10E-03	1.57E-08	3.41E-13
Methylene Chloride	2.35E-10	8.39E-11	6.00E-02	7.50E-03	3.91E-09	6.29E-13
Toluene	5.49E-10		2.00E-01	NA	2.75E-09	
Xylene (total)	3.33E-10		2.00E+00	NA	1.66E-10	
Semivolatile Organics						
2,4-Dinitrotoluene	1.68E-07		2.00E-03	NA	8.39E-05	
2,6-Dinitrotoluene	1.41E-08		1.00E-03	NA	1.41E-05	
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine		0.00E+00	NA	4.50E-01		0.00E+00
3-nitroaniline			NA	NA		
Acenaphthene	1.69E-07		6.00E-02	NA	2.81E-06	
Acenaphthylene			NA	NA		
Anthracene	1.57E-07		3.00E-01	NA	5.25E-07	
Benzo(a)anthracene		2.01E-07	NA	7.30E-01		1.47E-07
Benzo(a)pyrene		3.22E-07	NA	7.30E+00		2.35E-06
Benzo(b)fluoranthene		2.75E-07	NA	7.30E-01		2.01E-07
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		1.32E-07	NA	7.30E-01		9.61E-08
Carbazole		5.23E-08	NA	2.00E-02		1.05E-09
Chrysene		2.42E-07	NA	7.30E-02		1.76E-08
Di-n-butylphthalate	5.59E-08		1.00E-01	NA	5.59E-07	
Dibenz(a,h)anthracene		6.58E-08	NA	7.30E+00		4.80E-07
Dibenzofuran			NA	NA		
Diethylphthalate	1.49E-09		8.00E+00	NA	1.86E-10	
Fluoranthene	8.82E-07		4.00E-02	NA	2.20E-05	
Fluorene	1.36E-07		4.00E-02	NA	3.39E-06	
Indeno(1,2,3-cd)pyrene		1.55E-07	NA	7.30E-01		1.13E-07
N-Nitrosodiphenylamine (1)		1.61E-08	NA	4.90E-03		7.90E-11
Naphthalene			NA	NA		
Pentachlorophenol	9.05E-08	3.23E-08	3.00E-02	1.20E-01	3.02E-06	3.88E-09
Phenanthrene			NA	NA		
Pyrene	9.89E-07		3.00E-02	NA	3.30E-05	
bis(2-Ethylhexyl)phthalate	9.94E-08	3.55E-08	2.00E-02	1.40E-02	4.97E-06	4.97E-10
Pesticides						
4,4'-DDD	3.43E-10	1.22E-10	5.00E-04	2.40E-01	6.85E-07	2.94E-11
4,4'-DDE			NA	NA		
4,4'-DDT	7.71E-10	2.75E-10	5.00E-04	3.40E-01	1.54E-06	9.37E-11
Aldrin	0.00E+00	0.00E+00	3.00E-05	1.70E+01	0.00E+00	0.00E+00
Aroclor-1254	0.00E+00	0.00E+00	2.00E-05	2.00E+00	0.00E+00	0.00E+00
Aroclor-1260		5.35E-10	NA	7.70E+00		4.12E-09
Dieldrin	3.91E-10	1.40E-10	5.00E-05	1.60E+01	7.82E-06	2.23E-09
Endosulfan I	1.08E-09		6.00E-03	NA	1.80E-07	
Endosulfan II			NA	NA		
Endosulfan sulfate	3.36E-10		5.00E-05	NA	6.71E-06	
Endrin	4.37E-10		3.00E-04	NA	1.46E-06	
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor	0.00E+00	0.00E+00	5.00E-04	4.50E+00	0.00E+00	0.00E+00
Heptachlor epoxide	1.51E-10	5.41E-11	1.30E-05	9.10E+00	1.17E-05	4.92E-10
Toxaphene		0.00E+00	NA	1.10E+00		0.00E+00
alpha-Chlordane	2.29E-10	8.19E-11	6.00E-05	1.30E+00	3.82E-06	1.06E-10
beta-BHC		6.86E-11	NA	1.80E+00		1.23E-10
gamma-BHC (Lindane)	0.00E+00		3.00E-04	NA	0.00E+00	
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		

TABLE 6-44
CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 2

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl	0.00E+00		1.00E-02	NA	0.00E+00	
Metals						
Antimony	6.19E-10		4.00E-04	NA	1.55E-06	
Barium	8.41E-09		7.00E-02	NA	1.20E-07	
Copper	5.99E-09		4.00E-02	NA	1.50E-07	
Lead			NA	NA		
Mercury	4.25E-11		3.00E-04	NA	1.42E-07	
Selenium	7.20E-11		5.00E-03	NA	1.44E-08	
Thallium	1.28E-10		7.00E-05	NA	1.82E-06	
Zinc	8.61E-09		3.00E-01	NA	2.87E-08	
Herbicides						
2,4,5-T	0.00E+00		1.00E-02	NA	0.00E+00	
MCPP	0.00E+00		1.00E-03	NA	0.00E+00	
Totals - HQ & CR					**2.06E-04**	**3.42E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose (Oral)
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor (Oral)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-19
CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 2

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
Volatile Organics												
1,1,2,2,-Tetrachloroethane			6.89E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acetone			8.08E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzene			5.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbon Disulfide			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chloroform			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Methylene Chloride			3.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toluene			7.02E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Xylene (total)			4.25E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Semivolatile Organics												
2,4-Dinitrotoluene			2.14E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2,6-Dinitrotoluene			1.80E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2-methylnaphthalene			1.23E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3,3'-Dichlorobenzidine				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3-nitroaniline				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthene			2.16E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthylene			3.08E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Anthracene			2.01E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)anthracene			7.20E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)pyrene			1.15E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(b)fluoranthene			9.85E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(g,h,i)perylene			5.89E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(k)fluoranthene			4.71E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbazole			1.87E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chrysene			8.64E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Di-n-butylphthalate			7.14E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenz(a,h)anthracene			2.35E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenzofuran			1.62E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Diethylphthalate			1.90E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluoranthene			1.13E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluorene			1.73E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			5.55E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			5.77E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Naphthalene			1.95E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pentachlorophenol			1.16E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Phenanthrene			7.33E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pyrene			1.26E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			1.27E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pesticides												
4,4'-DDD			4.38E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDE			1.85E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDT			9.85E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aldrin				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aroclor-1254				1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Aroclor-1260		1.86E-09	1.91E-02	1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Dieldrin			4.99E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan I			1.38E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan II			4.55E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan sulfate			4.29E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin			5.59E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin aldehyde			2.51E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin ketone			5.58E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor epoxide			1.94E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toxaphene				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
alpha-Chlordane			2.93E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
beta-BHC			2.45E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
gamma-BHC (Lindane)				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
gamma-Chlordane			3.17E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
delta-BHC			1.92E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550

TABLE 6-19
CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 2

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Nitroaromatics												
2-amino-4,6-Dinitrotoluene				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Tetryl				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Metals												
Antimony			7.91E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Barium			1.07E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Copper			7.66E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Lead			6.30E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Mercury			5.43E-04	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Selenium			9.20E-04	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Thallium			1.63E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Zinc			1.10E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Herbicides												
2,4,5-T				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
MCPP				1.00E-06	5,800	1.0		20	25	70	9,125	25,550

EQUATION: **Absorbed dose (mg/kg-day) =** $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
CF = Conversion Factor (10-6 kg/mg)
SA = Surface Area Contact (cm²)
AF =Soil to Skin Adherence Factor (mg/cm²)
ABS = Absorption Factor (unitless)

Assumptions:

EPC Soil Data - RME
10-6
5,800 cm² (RME Site Worker)
1.0 (RME all receptors)
Compound Specific for PCBs and Cd
EPA, 1992b (Default Assumption 0% = 0.0)

Variables:

EF = Exposure Frequency (events/year)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult Male)
25 x 365 (Nc) 70 x 365 Adult (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-46
CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL (DAILY)
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 2

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane			NA	2.00E-01		
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Carbon Disulfide			1.00E-01	NA		
Chloroform			1.00E-02	6.10E-03		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
Xylene (total)			2.00E+00	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Diethylphthalate			8.00E+00	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 6-46
CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL (DAILY)
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 2

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254			1.90E-05	2.11E+00		
Aroclor-1260		1.86E-09	NA	8.11E+00		1.51E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor			5.00E-04	4.50E+00		
Heptachlor epoxide			1.30E-05	9.10E+00		
Toxaphene			NA	1.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			1.00E-02	NA		
Metals						
Antimony			4.00E-04	NA		
Barium			7.00E-03	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			1.50E-01	NA		
Herbicides						
2,4,5-T			1.00E-02	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR						**1.51E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose (Oral)
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor (Oral)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-20

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Volatile Organics											
1,1,2,2,-Tetrachloroethane		5.39E-10	6.89E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Acetone	8.85E-09		8.08E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Benzene		3.91E-10	5.00E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Carbon Disulfide	2.19E-09		2.00E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Chloroform	2.19E-09	1.57E-10	2.00E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Methylene Chloride	3.29E-09	2.35E-10	3.00E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Toluene	7.69E-09		7.02E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Xylene (total)	4.66E-09		4.25E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Semivolatile Organics											
2,4-Dinitrotoluene	2.35E-06		2.14E+00	200	1.00E-06	1	50	5	25	1,825	25,550
2,6-Dinitrotoluene	1.97E-07		1.80E-01	200	1.00E-06	1	50	5	25	1,825	25,550
2-methylnaphthalene			1.23E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Acenaphthene			2.16E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Acenaphthylene	3.38E-07		3.08E-01	200	1.00E-06	1	50	5	25	1,825	25,550
Anthracene		1.57E-07	2.01E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(a)anthracene		5.63E-07	7.20E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(a)pyrene		9.02E-07	1.15E+01	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(b)fluoranthene			9.85E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(g,h,i)perylene		4.61E-07	5.89E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(k)fluoranthene		3.69E-07	4.71E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Carbazole		1.46E-07	1.87E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Chrysene	9.47E-06		8.64E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Di-n-butylphthalate		5.59E-08	7.14E-01	200	1.00E-06	1	50	5	25	1,825	25,550
Dibenz(a,h)anthracene			2.35E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Dibenzofuran	1.77E-06		1.62E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Diethylphthalate	2.08E-08		1.90E-02	200	1.00E-06	1	50	5	25	1,825	25,550
Fluoranthene	1.23E-05		1.13E+01	200	1.00E-06	1	50	5	25	1,825	25,550
Fluorene		1.36E-07	1.73E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene		4.35E-07	5.55E+00	200	1.00E-06	1	50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			5.77E-01	200	1.00E-06	1	50	5	25	1,825	25,550
Naphthalene	2.14E-06	1.53E-07	1.95E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Pentachlorophenol			1.16E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Phenanthrene	8.03E-06		7.33E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Pyrene	1.39E-05	9.89E-07	1.26E+01	200	1.00E-06	1	50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate	1.39E-06	9.94E-08	1.27E+00	200	1.00E-06	1	50	5	25	1,825	25,550

TABLE 6-20

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Pesticides											
4,4'-DDD			4.38E-03	200	1.00E-06	1	50	5	25	1,825	25,550
4,4'-DDE	2.02E-08	1.45E-09	1.85E-02	200	1.00E-06	1	50	5	25	1,825	25,550
4,4'-DDT	1.08E-08	7.71E-10	9.85E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Aroclor-1260	2.10E-08	1.50E-09	1.91E-02	200	1.00E-06	1	50	5	25	1,825	25,550
Dieldrin	5.47E-09		4.99E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endosulfan I			1.38E-02	200	1.00E-06	1	50	5	25	1,825	25,550
Endosulfan II	4.98E-09		4.55E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endosulfan sulfate	4.70E-09		4.29E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endrin			5.59E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endrin aldehyde			2.51E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endrin ketone	6.11E-09	4.37E-10	5.58E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Heptachlor				200	1.00E-06	1	50	5	25	1,825	25,550
Heptachlor epoxide		1.51E-10	1.94E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Toxaphene				200	1.00E-06	1	50	5	25	1,825	25,550
alpha-Chlordane		2.29E-10	2.93E-03	200	1.00E-06	1	50	5	25	1,825	25,550
beta-BHC	2.69E-09		2.45E-03	200	1.00E-06	1	50	5	25	1,825	25,550
gamma-Chlordane			3.17E-03	200	1.00E-06	1	50	5	25	1,825	25,550
delta-BHC	2.10E-09	1.50E-10	1.92E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Metals											
Antimony	8.67E-09		7.91E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Barium	1.18E-07		1.07E-01	200	1.00E-06	1	50	5	25	1,825	25,550
Lead	6.91E-07		6.30E-01	200	1.00E-06	1	50	5	25	1,825	25,550
Mercury	5.95E-10		5.43E-04	200	1.00E-06	1	50	5	25	1,825	25,550
Selenium	1.01E-09		9.20E-04	200	1.00E-06	1	50	5	25	1,825	25,550
Thallium	1.79E-09		1.63E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Zinc	1.21E-07	8.61E-09	1.10E-01	200	1.00E-06	1	50	5	25	1,825	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC Soil Data - RME
IR = Ingestion Rate (mg soil/day)	200 (RME Child)
CF = Conversion Factor (10-6 kg/mg)	10-6
FI = Fraction Ingested (unitless)	1
EF = Exposure Frequency (days/years)	50 (RME)
ED = Exposure Duration (years)	5 (RME)
BW = Bodyweight (kg)	25 (Child)
AT = Averaging Time (days)	5 x 365 (NC), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-63

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane		5.39E-10	NA	2.00E-01		1.08E-10
Acetone	8.85E-09		1.00E-01	NA	8.85E-08	
Benzene		3.91E-10	NA	2.90E-02		1.14E-11
Carbon Disulfide	2.19E-09		1.00E-01	NA	2.19E-08	
Chloroform	2.19E-09	1.57E-10	1.00E-02	6.10E-03	2.19E-07	9.55E-13
Methylene Chloride	3.29E-09	2.35E-10	6.00E-02	7.50E-03	5.48E-08	1.76E-12
Toluene	7.69E-09		2.00E-01	NA	3.84E-08	
Xylene (total)	4.66E-09		2.00E+00	NA	2.33E-09	
Semivolatile Organics						
2,4-Dinitrotoluene	2.35E-06		2.00E-03	NA	1.18E-03	
2,6-Dinitrotoluene	1.97E-07		1.00E-03	NA	1.97E-04	
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene	3.38E-07		NA	NA		
Anthracene		1.57E-07	3.00E-01	NA		
Benzo(a)anthracene		5.63E-07	NA	7.30E-01		4.11E-07
Benzo(a)pyrene		9.02E-07	NA	7.30E+00		6.58E-06
Benzo(b)fluoranthene			NA	7.30E-01		
Benzo(g,h,i)perylene		4.61E-07	NA	NA		
Benzo(k)fluoranthene		3.69E-07	NA	7.30E-01		2.69E-07
Carbazole		1.46E-07	NA	2.00E-02		2.93E-09
Chrysene	9.47E-06		NA	7.30E-02		
Di-n-butylphthalate		5.59E-08	1.00E-01	NA		
Dibenz(a,h)anthracene			NA	7.30E+00		
Dibenzofuran	1.77E-06		NA	NA		
Diethylphthalate	2.08E-08		8.00E+00	NA	2.60E-09	
Fluoranthene	1.23E-05		4.00E-02	NA	3.09E-04	
Fluorene		1.36E-07	4.00E-02	NA		
Indeno(1,2,3-cd)pyrene		4.35E-07	NA	7.30E-01		3.17E-07
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene	2.14E-06	1.53E-07	NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene	8.03E-06		NA	NA		
Pyrene	1.39E-05	9.89E-07	3.00E-02	NA	4.62E-04	
bis(2-Ethylhexyl)phthalate	1.39E-06	9.94E-08	2.00E-02	1.40E-02	6.96E-05	1.39E-09

TABLE 6-63

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE	2.02E-08	1.45E-09	NA	NA		
4,4'-DDT	1.08E-08	7.71E-10	5.00E-04	3.40E-01	2.16E-05	2.62E-10
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254			2.00E-05	2.00E+00		
Aroclor-1260	2.10E-08	1.50E-09	NA	7.70E+00		1.15E-08
Dieldrin	5.47E-09		5.00E-05	1.60E+01	1.09E-04	
Endosulfan I			6.00E-03	NA		
Endosulfan II	4.98E-09		NA	NA		
Endosulfan sulfate	4.70E-09		5.00E-05	NA	9.40E-05	
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone	6.11E-09	4.37E-10	NA	NA		
Heptachlor			5.00E-04	4.50E+00		
Heptachlor epoxide		1.51E-10	1.30E-05	9.10E+00		1.38E-09
Toxaphene			NA	1.10E+00		
alpha-Chlordane		2.29E-10	6.00E-05	1.30E+00		2.98E-10
beta-BHC	2.69E-09		NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
delta-BHC	2.10E-09	1.50E-10	NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			1.00E-02	NA		
Metals						
Antimony	8.67E-09		4.00E-04	NA	2.17E-05	
Barium	1.18E-07		7.00E-02	NA	1.68E-06	
Copper			4.00E-02	NA		
Lead	6.91E-07		NA	NA		
Mercury	5.95E-10		3.00E-04	NA	1.98E-06	
Selenium	1.01E-09		5.00E-03	NA	2.02E-07	
Thallium	1.79E-09		7.00E-05	NA	2.55E-05	
Zinc	1.21E-07	8.61E-09	3.00E-01	NA	4.02E-07	
Herbicides						
2,4,5-T			1.00E-02	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR					**2.49E-03**	**7.60E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
											Nc	Car
Volatile Organics												
1,1,2,2,-Tetrachloroethane			6.89E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acetone			8.08E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzene			5.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Carbon Disulfide			2.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Chloroform			2.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Methylene Chloride			3.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Toluene			7.02E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Xylene (total)			4.25E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Semivolatile Organics												
2,4-Dinitrotoluene			2.14E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2,6-Dinitrotoluene			1.80E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2-methylnaphthalene			1.23E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
3,3'-Dichlorobenzidine				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
3-nitroaniline				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acenaphthene			2.16E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acenaphthylene			3.08E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Anthracene			2.01E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(a)anthracene			7.20E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(a)pyrene			1.15E+01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(b)fluoranthene			9.85E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(g,h,i)perylene			5.89E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(k)fluoranthene			4.71E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Carbazole			1.87E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Chrysene			8.64E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Di-n-butylphthalate			7.14E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Dibenz(a,h)anthracene			2.35E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Dibenzofuran			1.62E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Diethylphthalate			1.90E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Fluoranthene			1.13E+01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Fluorene			1.73E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene			5.55E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			5.77E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Naphthalene			1.95E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pentachlorophenol			1.16E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Phenanthrene			7.33E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pyrene			1.26E+01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			1.27E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pesticides												
4,4'-DDD			4.38E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4,4'-DDE			1.85E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4,4'-DDT			9.85E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Aldrin				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Aroclor-1254				1.00E-06	2,300	1.0	0.06	50	5	25	1,825	25,550
Aroclor-1260		1.03E-09	1.91E-02	1.00E-06	2,300	1.0	0.06	50	5	25	1,825	25,550
Dieldrin			4.99E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan I			1.38E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan II			4.55E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan sulfate			4.29E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin			5.59E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin aldehyde			2.51E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin ketone			5.58E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Heptachlor				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Heptachlor epoxide			1.94E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Toxaphene				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
alpha-Chlordane			2.93E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
beta-BHC			2.45E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
gamma-BHC (Lindane)				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
gamma-Chlordane			3.17E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
delta-BHC			1.92E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Nitroaromatics												
2-amino-4,6-Dinitrotoluene				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Tetryl				1.00E-06	2,300	1.0		50	5	25	1,825	25,550

TABLE 6-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Metals												
Antimony			7.91E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Barium			1.07E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Copper			7.66E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Lead			6.30E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Mercury			5.43E-04	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Selenium			9.20E-04	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Thallium			1.63E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Zinc			1.10E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Herbicides												
2,4,5-T				1.00E-06	2,300	1.0		250	5	25	1,825	25,550
MCPP				1.00E-06	2,300	1.0		250	5	25	1,825	25,550

EQUATION:

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

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC Soil Data - RME	EF = Exposure Frequency (events/year)	50 (RME)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	5 (RME)
SA = Surface Area Contact (cm²)	2,300 (RME Child)	BW = Bodyweight (kg)	25 kg (child)
AF =Soil to Skin Adherence Factor (mg/cm²)	1.0 (RME all receptors)	AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (Car)
ABS = Absorption Factor (unitless)	Compound Specific PCBs and Cd (EPA, 1992b) (Default Assumption 0% = 0.0)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-65

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane			NA	2.00E-01		
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Carbon Disulfide			1.00E-01	NA		
Chloroform			1.00E-02	6.10E-03		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
Xylene (total)			2.00E+00	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Diethylphthalate			8.00E+00	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 6-65

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254			1.90E-05	2.11E+00		
Aroclor-1260		1.03E-09	NA	8.11E+00		8.38E-09
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor			5.00E-04	4.50E+00		
Heptachlor epoxide			1.30E-05	9.10E+00		
Toxaphene			NA	1.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			1.00E-02	NA		
Metals						
Antimony			4.00E-04	NA		
Barium			7.00E-03	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			1.50E-01	NA		
Herbicides						
2,4,5-T			1.00E-02	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR						**8.38E-09**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Volatile Organics											
1,1,2,2,-Tetrachloroethane		1.93E-10	6.89E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Acetone	6.32E-10		8.08E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Benzene		1.40E-10	5.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Carbon Disulfide	1.57E-10		2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Chloroform	1.57E-10	5.59E-11	2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Methylene Chloride	2.35E-10	8.39E-11	3.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Toluene	5.49E-10		7.02E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Xylene (total)	3.33E-10		4.25E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Semivolatile Organics											
2,4-Dinitrotoluene	1.68E-07		2.14E+00	100	1.00E-06	1	20	25	70	9,125	25,550
2,6-Dinitrotoluene	1.41E-08		1.80E-01	100	1.00E-06	1	20	25	70	9,125	25,550
2-methylnaphthalene			1.23E+00	100	1.00E-06	1	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine		0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
3-nitroaniline			0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthene	1.69E-07		2.16E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthylene			3.08E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Anthracene	1.57E-07		2.01E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)anthracene		2.01E-07	7.20E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)pyrene		3.22E-07	1.15E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(b)fluoranthene		2.75E-07	9.85E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			5.89E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(k)fluoranthene		1.32E-07	4.71E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Carbazole		5.23E-08	1.87E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Chrysene		2.42E-07	8.64E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Di-n-butylphthalate	5.59E-08		7.14E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenz(a,h)anthracene		6.58E-08	2.35E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenzofuran			1.62E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Diethylphthalate	1.49E-09		1.90E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Fluoranthene	8.82E-07		1.13E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Fluorene	1.36E-07		1.73E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene		1.55E-07	5.55E+00	100	1.00E-06	1	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)		1.61E-08	5.77E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Naphthalene			1.95E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pentachlorophenol	9.05E-08	3.23E-08	1.16E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Phenanthrene			7.33E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pyrene	9.89E-07		1.26E+01	100	1.00E-06	1	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate	9.94E-08	3.55E-08	1.27E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pesticides											
4,4'-DDD	3.43E-10	1.22E-10	4.38E-03	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDE			1.85E-02	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDT	7.71E-10	2.75E-10	9.85E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Aldrin	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1254	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1260		5.35E-10	1.91E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Dieldrin	3.91E-10	1.40E-10	4.99E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan I	1.08E-09		1.38E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan II			4.55E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan sulfate	3.36E-10		4.29E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin	4.37E-10		5.59E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin aldehyde			2.51E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin ketone			5.58E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor epoxide	1.51E-10	5.41E-11	1.94E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Toxaphene		0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
alpha-Chlordane	2.29E-10	8.19E-11	2.93E-03	100	1.00E-06	1	20	25	70	9,125	25,550
beta-BHC		6.86E-11	2.45E-03	100	1.00E-06	1	20	25	70	9,125	25,550
gamma-BHC (Lindane)	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
gamma-Chlordane			3.17E-03	100	1.00E-06	1	20	25	70	9,125	25,550
delta-BHC			1.92E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Nitroaromatics											
2-amino-4,6-Dinitrotoluene			0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Tetryl	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550

TABLE 6-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Metals											
Antimony	6.19E-10		7.91E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Barium	8.41E-09		1.07E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Copper	5.99E-09		7.66E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Lead			6.30E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Mercury	4.25E-11		5.43E-04	100	1.00E-06	1	20	25	70	9,125	25,550
Selenium	7.20E-11		9.20E-04	100	1.00E-06	1	20	25	70	9,125	25,550
Thallium	1.28E-10		1.63E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Zinc	8.61E-09		1.10E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Herbicides											
2,4,5-T	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
MCPP	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550

EQUATION: **Intake (mg/kg-day) =** $\dfrac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC Soil Data - RME
100 (RME Site Worker)
10-6
1 (All Receptors)
20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-45

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS (DAILY)
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane		1.93E-10	NA	2.00E-01		3.85E-11
Acetone	6.32E-10		1.00E-01	NA	6.32E-09	
Benzene		1.40E-10	NA	2.90E-02		4.05E-12
Carbon Disulfide	1.57E-10		1.00E-01	NA	1.57E-09	
Chloroform	1.57E-10	5.59E-11	1.00E-02	6.10E-03	1.57E-08	3.41E-13
Methylene Chloride	2.35E-10	8.39E-11	6.00E-02	7.50E-03	3.91E-09	6.29E-13
Toluene	5.49E-10		2.00E-01	NA	2.75E-09	
Xylene (total)	3.33E-10		2.00E+00	NA	1.66E-10	
Semivolatile Organics						
2,4-Dinitrotoluene	1.68E-07		2.00E-03	NA	8.39E-05	
2,6-Dinitrotoluene	1.41E-08		1.00E-03	NA	1.41E-05	
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine		0.00E+00	NA	4.50E-01		0.00E+00
3-nitroaniline			NA	NA		
Acenaphthene	1.69E-07		6.00E-02	NA	2.81E-06	
Acenaphthylene			NA	NA		
Anthracene	1.57E-07		3.00E-01	NA	5.25E-07	
Benzo(a)anthracene		2.01E-07	NA	7.30E-01		1.47E-07
Benzo(a)pyrene		3.22E-07	NA	7.30E+00		2.35E-06
Benzo(b)fluoranthene		2.75E-07	NA	7.30E-01		2.01E-07
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		1.32E-07	NA	7.30E-01		9.61E-08
Carbazole		5.23E-08	NA	2.00E-02		1.05E-09
Chrysene		2.42E-07	NA	7.30E-02		1.76E-08
Di-n-butylphthalate	5.59E-08		1.00E-01	NA	5.59E-07	
Dibenz(a,h)anthracene		6.58E-08	NA	7.30E+00		4.80E-07
Dibenzofuran			NA	NA		
Diethylphthalate	1.49E-09		8.00E+00	NA	1.86E-10	
Fluoranthene	8.82E-07		4.00E-02	NA	2.20E-05	
Fluorene	1.36E-07		4.00E-02	NA	3.39E-06	
Indeno(1,2,3-cd)pyrene		1.55E-07	NA	7.30E-01		1.13E-07
N-Nitrosodiphenylamine (1)		1.61E-08	NA	4.90E-03		7.90E-11
Naphthalene			NA	NA		
Pentachlorophenol	9.05E-08	3.23E-08	3.00E-02	1.20E-01	3.02E-06	3.88E-09
Phenanthrene			NA	NA		
Pyrene	9.89E-07		3.00E-02	NA	3.30E-05	
bis(2-Ethylhexyl)phthalate	9.94E-08	3.55E-08	2.00E-02	1.40E-02	4.97E-06	4.97E-10

TABLE 6-12

CALCULATION OF INTAKE (ONSITE)
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Volatile Organics									
1,1,2,2-Tetrachloroethane		2.05E-13	2.62E-10	2	50	5	25	1,825	25,550
Acetone			3.07E-10	2	50	5	25	1,825	25,550
Benzene		2.40E-13	3.07E-10	2	50	5	25	1,825	25,550
Carbon Disulfide	2.08E-12		1.90E-10	2	50	5	25	1,825	25,550
Chloroform		5.95E-14	7.60E-11	2	50	5	25	1,825	25,550
Methylene Chloride	8.33E-13	5.95E-14	7.60E-11	2	50	5	25	1,825	25,550
Toluene	1.25E-12		1.14E-10	2	50	5	25	1,825	25,550
Xylene (total)			2.67E-10	2	50	5	25	1,825	25,550
Semivolatile Organics									
2,4-Dinitrotoluene			8.15E-08	2	50	5	25	1,825	25,550
2,6-Dinitrotoluene			6.84E-09	2	50	5	25	1,825	25,550
2-Methylnaphthalene			4.67E-08	2	50	5	25	1,825	25,550
3,3'-Dichlorobenzidine			0.00E+00	2	50	5	25	1,825	25,550
3-nitroaniline			0.00E+00	2	50	5	25	1,825	25,550
Acenaphthene			ERR	2	50	5	25	1,825	25,550
Acenaphthylene			8.19E-08	2	50	5	25	1,825	25,550
Anthracene			1.17E-08	2	50	5	25	1,825	25,550
Benzo(a)anthracene			7.64E-08	2	50	5	25	1,825	25,550
Benzo(a)pyrene			2.73E-07	2	50	5	25	1,825	25,550
Benzo(b)fluoranthene			4.38E-07	2	50	5	25	1,825	25,550
Benzo(g,h,i)perylene			3.74E-07	2	50	5	25	1,825	25,550
Benzo(k)fluoranthene			2.24E-07	2	50	5	25	1,825	25,550
Carbazole			7.10E-08	2	50	5	25	1,825	25,550
Chrysene			3.28E-07	2	50	5	25	1,825	25,550
Di-n-butylphthalate			2.71E-08	2	50	5	25	1,825	25,550
Dibenz(a,h)anthracene			8.94E-08	2	50	5	25	1,825	25,550
Dibenzofuran			ERR	2	50	5	25	1,825	25,550
Diethylphthalate			6.15E-08	2	50	5	25	1,825	25,550
Fluoranthene			7.22E-10	2	50	5	25	1,825	25,550
Fluorene			4.28E-07	2	50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene			6.58E-08	2	50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			2.11E-07	2	50	5	25	1,825	25,550
Naphthalene			2.19E-08	2	50	5	25	1,825	25,550
Pentachlorophenol			7.42E-08	2	50	5	25	1,825	25,550
Phenanthrene			4.39E-08	2	50	5	25	1,825	25,550
Pyrene			2.78E-07	2	50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			4.80E-07	2	50	5	25	1,825	25,550

TABLE 6-12

CALCULATION OF INTAKE (ONSITE)
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Pesticides									
4,4'-DDD			1.66E-10	2	50	5	25	1,825	25,550
4,4'-DDE			7.02E-10	2	50	5	25	1,825	25,550
4,4'-DDT		2.93E-13	3.74E-10	2	50	5	25	1,825	25,550
Aldrin	0.00E+00	0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
Aroclor-1254		0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
Aroclor-1260			7.27E-10	2	50	5	25	1,825	25,550
Dieldrin		1.49E-13	1.90E-10	2	50	5	25	1,825	25,550
Endosulfan I			5.24E-10	2	50	5	25	1,825	25,550
Endosulfan II			1.73E-10	2	50	5	25	1,825	25,550
Endosulfan sulfate			1.63E-10	2	50	5	25	1,825	25,550
Endrin			2.12E-10	2	50	5	25	1,825	25,550
Endrin aldehyde			9.56E-11	2	50	5	25	1,825	25,550
Endrin ketone			2.12E-10	2	50	5	25	1,825	25,550
Heptachlor		0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
Heptachlor epoxide		5.76E-14	7.35E-11	2	50	5	25	1,825	25,550
Toxaphene		0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
alpha-Chlordane			1.11E-10	2	50	5	25	1,825	25,550
beta-BHC		7.30E-14	9.32E-11	2	50	5	25	1,825	25,550
gamma-BHC (Lindane)			0.00E+00	2	50	5	25	1,825	25,550
gamma-Chlordane			1.21E-10	2	50	5	25	1,825	25,550
Nitroaromatics									
2-amino-4,6-Dinitrotoluene			0.00E+00	2	50	5	25	1,825	25,550
Tetryl			0.00E+00	2	50	5	25	1,825	25,550
Metals									
Antimony			3.00E-10	2	50	5	25	1,825	25,550
Barium	1.58E-07		1.44E-05	2	50	5	25	1,825	25,550
Copper			3.42E-04	2	50	5	25	1,825	25,550
Lead			1.31E-05	2	50	5	25	1,825	25,550
Mercury	4.04E-06		3.69E-04	2	50	5	25	1,825	25,550
Selenium			4.62E-06	2	50	5	25	1,825	25,550
Thallium			6.19E-11	2	50	5	25	1,825	25,550
Zinc			4.18E-09	2	50	5	25	1,825	25,550
Herbicides									
2,4,5-T			0.00E+00	2	50	5	25	1,825	25,550
MCPP			0.00E+00	2	50	5	25	1,825	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:	**Assumptions:**
CA = Chemical Concentration in Air (mg/m³)	Calculated Air EPC Data - RME
IR = Inhalation Rate (m³/day)	2 (RME Child)
EF = Exposure Frequency (days/yr)	50
ED = Exposure Duration (years)	5 (RME)
BW = Bodyweight (kg)	25 (Child)
AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-61

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2-Tetrachloroethane		2.05E-13	NA	2.03E-01		4.16E-14
Acetone			NA	NA		
Benzene		2.40E-13	NA	2.91E-02		6.98E-15
Carbon Disulfide	2.08E-12		2.86E-03	NA	7.29E-10	
Chloroform		5.95E-14	NA	8.05E-02		4.79E-15
Methylene Chloride	8.33E-13	5.95E-14	8.57E-01	1.65E-03	9.72E-13	9.82E-17
Toluene	1.25E-12		1.14E-01	NA	1.09E-11	
Xylene (total)			NA	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Diethylphthalate			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Ethylhexyl)phthalate			NA	NA		

TABLE 6-61

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		2.93E-13	NA	3.40E-01		9.95E-14
Aldrin	0.00E+00	0.00E+00	1.70E+01	1.72E+01	0.00E+00	0.00E+00
Aroclor-1254		0.00E+00	NA	4.00E-01		0.00E+00
Aroclor-1260			NA	NA		
Dieldrin		1.49E-13	NA	1.61E+01		2.39E-12
Endosulfan I			NA	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor		0.00E+00	NA	4.55E+00		0.00E+00
Heptachlor epoxide		5.76E-14	NA	9.10E+00		5.24E-13
Toxaphene		0.00E+00	NA	1.12E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		7.30E-14	NA	1.86E+00		1.35E-13
gamma-BHC (Lindane)			NA	NA		
gamma-Chlordane			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			NA	NA		
Metals						
Antimony			NA	NA		
Barium	1.58E-07		1.43E-04	NA	1.10E-03	
Copper			NA	NA		
Lead			NA	NA		
Mercury	4.04E-06		8.57E-05	NA	4.72E-02	
Selenium			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
Herbicides						
2,4,5-T			NA	NA		
MCPP			NA	NA		
Total HQ & CR					**4.83E-02**	**3.20E-12**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-7A

AMBIENT AIR EXPOSURE POINT CONCENTRATIONS
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

COMPOUND	SURFACE SOIL EPC Data mg/kg	AVERAGE TSP (ug/m³)	CONVERSION FACTOR (kg/ug)	AMBIENT AIR CALCULATED EPC (mg/m³)	MEASURED AIR SAMPLES (mg/m³)		AMBIENT AIR EPC (mg/m³)
Volatile Organics							
1,1,2,2-Tetrachloroethane	6.89E-03	3.80E+01	1.00E-09	2.62E-10			2.62E-10
Acetone	8.08E-03	3.80E+01	1.00E-09	3.07E-10			3.07E-10
Benzene	5.00E-03	3.80E+01	1.00E-09	3.07E-10			3.07E-10
Carbon Disulfide	2.00E-03	3.80E+01	1.00E-09	1.90E-10			1.90E-10
Chloroform	2.00E-03	3.80E+01	1.00E-09	7.60E-11			7.60E-11
Methylene Chloride	3.00E-03	3.80E+01	1.00E-09	7.60E-11			7.60E-11
Toluene	7.02E-03	3.80E+01	1.00E-09	1.14E-10			1.14E-10
Xylene (total)	4.25E-03	3.80E+01	1.00E-09	2.67E-10			2.67E-10
Semivolatile Organics							
2,4-Dinitrotoluene	2.14E+00	3.80E+01	1.00E-09	8.15E-08			8.15E-08
2,6-Dinitrotoluene	1.80E-01	3.80E+01	1.00E-09	6.84E-09			6.84E-09
2-Methylnaphthalene	1.23E+00	3.80E+01	1.00E-09	4.67E-08	7.84E-05	U	4.67E-08
3,3'-Dichlorobenzidine		3.80E+01	1.00E-09	0.00E+00			0.00E+00
3-nitroaniline		3.80E+01	1.00E-09	0.00E+00			0.00E+00
Acenaphthene	2.16E+00	3.80E+01	1.00E-09	ERR	7.84E-05	U	ERR
Acenaphthylene	3.08E-01	3.80E+01	1.00E-09	8.19E-08			8.19E-08
Anthracene	2.01E+00	3.80E+01	1.00E-09	1.17E-08	7.84E-05	U	1.17E-08
Benzo(a)anthracene	7.20E+00	3.80E+01	1.00E-09	7.64E-08			7.64E-08
Benzo(a)pyrene	1.15E+01	3.80E+01	1.00E-09	2.73E-07			2.73E-07
Benzo(b)fluoranthene	9.85E+00	3.80E+01	1.00E-09	4.38E-07			4.38E-07
Benzo(g,h,i)perylene	5.89E+00	3.80E+01	1.00E-09	3.74E-07			3.74E-07
Benzo(k)fluoranthene	4.71E+00	3.80E+01	1.00E-09	2.24E-07			2.24E-07
Carbazole	1.87E+00	3.80E+01	1.00E-09	7.10E-08			7.10E-08
Chrysene	8.64E+00	3.80E+01	1.00E-09	3.28E-07			3.28E-07
Di-n-butylphthalate	7.14E-01	3.80E+01	1.00E-09	2.71E-08	7.84E-05	U	2.71E-08
Dibenz(a,h)anthracene	2.35E+00	3.80E+01	1.00E-09	8.94E-08			8.94E-08
Dibenzofuran	1.62E+00	3.80E+01	1.00E-09	ERR	7.84E-05	U	ERR
Diethylphthalate	1.90E-02	3.80E+01	1.00E-09	6.15E-08	7.84E-05	U	6.15E-08
Fluoranthene	1.13E+01	3.80E+01	1.00E-09	7.22E-10			7.22E-10
Fluorene	1.73E+00	3.80E+01	1.00E-09	4.28E-07	7.84E-05	U	4.28E-07
Indeno(1,2,3-cd)pyrene	5.55E+00	3.80E+01	1.00E-09	6.58E-08			6.58E-08
N-Nitrosodiphenylamine (1)	5.77E-01	3.80E+01	1.00E-09	2.11E-07			2.11E-07
Naphthalene	1.95E+00	3.80E+01	1.00E-09	2.19E-08			2.19E-08
Pentachlorophenol	1.16E+00	3.80E+01	1.00E-09	7.42E-08			7.42E-08
Phenanthrene	7.33E+00	3.80E+01	1.00E-09	4.39E-08	7.84E-05	U	4.39E-08
Pyrene	1.26E+01	3.80E+01	1.00E-09	2.78E-07			2.78E-07
bis(2-Ethylhexyl)phthalate	1.27E+00	3.80E+01	1.00E-09	4.80E-07	7.84E-05	U	4.80E-07

TABLE 6-7A

AMBIENT AIR EXPOSURE POINT CONCENTRATIONS
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

COMPOUND	SURFACE SOIL EPC Data mg/kg	AVERAGE TSP (ug/m³)	CONVERSION FACTOR (kg/ug)	AMBIENT AIR CALCULATED EPC (mg/m³)	MEASURED AIR SAMPLES (mg/m³)	AMBIENT AIR EPC (mg/m³)
Pesticides						
4,4'-DDD	4.38E-03	3.80E+01	1.00E-09	1.66E-10		1.66E-10
4,4'-DDE	1.85E-02	3.80E+01	1.00E-09	7.02E-10		7.02E-10
4,4'-DDT	9.85E-03	3.80E+01	1.00E-09	3.74E-10		3.74E-10
Aldrin		3.80E+01	1.00E-09	0.00E+00		0.00E+00
Aroclor-1254		3.80E+01	1.00E-09	0.00E+00		0.00E+00
Aroclor-1260	1.91E-02	3.80E+01	1.00E-09	7.27E-10		7.27E-10
Dieldrin	4.99E-03	3.80E+01	1.00E-09	1.90E-10		1.90E-10
Endosulfan I	1.38E-02	3.80E+01	1.00E-09	5.24E-10		5.24E-10
Endosulfan II	4.55E-03	3.80E+01	1.00E-09	1.73E-10		1.73E-10
Endosulfan sulfate	4.29E-03	3.80E+01	1.00E-09	1.63E-10		1.63E-10
Endrin	5.59E-03	3.80E+01	1.00E-09	2.12E-10		2.12E-10
Endrin aldehyde	2.51E-03	3.80E+01	1.00E-09	9.56E-11		9.56E-11
Endrin ketone	5.58E-03	3.80E+01	1.00E-09	2.12E-10		2.12E-10
Heptachlor		3.80E+01	1.00E-09	0.00E+00		0.00E+00
Heptachlor epoxide	1.94E-03	3.80E+01	1.00E-09	7.35E-11		7.35E-11
Toxaphene		3.80E+01	1.00E-09	0.00E+00		0.00E+00
alpha-Chlordane	2.93E-03	3.80E+01	1.00E-09	1.11E-10		1.11E-10
beta-BHC	2.45E-03	3.80E+01	1.00E-09	9.32E-11		9.32E-11
gamma-BHC (Lindane)		3.80E+01	1.00E-09	0.00E+00		0.00E+00
gamma-Chlordane	3.17E-03	3.80E+01	1.00E-09	1.21E-10		1.21E-10
Nitroaromatics						
2-amino-4,6-Dinitrotoluene		3.80E+01	1.00E-09	0.00E+00		0.00E+00
Tetryl		3.80E+01	1.00E-09	0.00E+00		0.00E+00
Metals						
Antimony	7.91E-03	3.80E+01	1.00E-09	3.00E-10	9.80E-06 U	3.00E-10
Barium	1.07E-01	3.80E+01	1.00E-09	4.08E-09	1.44E-05	1.44E-05
Copper	7.66E-02	3.80E+01	1.00E-09	2.91E-09	3.42E-04	3.42E-04
Lead	6.30E-01	3.80E+01	1.00E-09	2.39E-08	1.31E-05	1.31E-05
Mercury	5.43E-04	3.80E+01	1.00E-09	2.06E-11	3.69E-04	3.69E-04
Selenium	9.20E-04	3.80E+01	1.00E-09	3.50E-11	4.62E-06	4.62E-06
Thallium	1.63E-03	3.80E+01	1.00E-09	6.19E-11	6.50E-06 U	6.19E-11
Zinc	1.10E-01	3.80E+01	1.00E-09	4.18E-09	6.52E-05 U	4.18E-09
Herbicides						
2,4,5-T		3.80E+01	1.00E-09	0.00E+00		0.00E+00
MCPP		3.80E+01	1.00E-09	0.00E+00		0.00E+00

EQUATION: **Calculated Air EPC (mg/m3) = Soil EPC x TSP x CF**

Variables:	**Assumptions:**
TSP = Total Suspended Particulates	**Average value - 38 ug/m3**
CF = Conversion Factor	**10-9 kg/ug**

U = Compound was not detected above the detection limit shown

TABLE 6-8

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Volatile Organics									
1,1,2,2-Tetrachloroethane		1.46E-12	2.62E-10	20	20	25	70	9,125	25,550
Acetone			3.07E-10	20	20	25	70	9,125	25,550
Benzene		1.72E-12	3.07E-10	20	20	25	70	9,125	25,550
Carbon Disulfide	2.97E-12		1.90E-10	20	20	25	70	9,125	25,550
Chloroform		4.25E-13	7.60E-11	20	20	25	70	9,125	25,550
Methylene Chloride	1.19E-12	4.25E-13	7.60E-11	20	20	25	70	9,125	25,550
Toluene	1.78E-12		1.14E-10	20	20	25	70	9,125	25,550
Xylene (total)			2.67E-10	20	20	25	70	9,125	25,550
Semivolatile Organics									
2,4-Dinitrotoluene			8.15E-08	20	20	25	70	9,125	25,550
2,6-Dinitrotoluene			6.84E-09	20	20	25	70	9,125	25,550
2-Methylnaphthalene			4.67E-08	20	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine			0.00E+00	20	20	25	70	9,125	25,550
3-nitroaniline			0.00E+00	20	20	25	70	9,125	25,550
Acenaphthene			ERR	20	20	25	70	9,125	25,550
Acenaphthylene			8.19E-08	20	20	25	70	9,125	25,550
Anthracene			1.17E-08	20	20	25	70	9,125	25,550
Benzo(a)anthracene			7.64E-08	20	20	25	70	9,125	25,550
Benzo(a)pyrene			2.73E-07	20	20	25	70	9,125	25,550
Benzo(b)fluoranthene			4.38E-07	20	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			3.74E-07	20	20	25	70	9,125	25,550
Benzo(k)fluoranthene			2.24E-07	20	20	25	70	9,125	25,550
Carbazole			7.10E-08	20	20	25	70	9,125	25,550
Chrysene			3.28E-07	20	20	25	70	9,125	25,550
Di-n-butylphthalate			2.71E-08	20	20	25	70	9,125	25,550
Dibenz(a,h)anthracene			8.94E-08	20	20	25	70	9,125	25,550
Dibenzofuran			ERR	20	20	25	70	9,125	25,550
Diethylphthalate			6.15E-08	20	20	25	70	9,125	25,550
Fluoranthene			7.22E-10	20	20	25	70	9,125	25,550
Fluorene			4.28E-07	20	20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			6.58E-08	20	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			2.11E-07	20	20	25	70	9,125	25,550
Naphthalene			2.19E-08	20	20	25	70	9,125	25,550
Pentachlorophenol			7.42E-08	20	20	25	70	9,125	25,550
Phenanthrene			4.39E-08	20	20	25	70	9,125	25,550
Pyrene			2.78E-07	20	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			4.80E-07	20	20	25	70	9,125	25,550

TABLE 6-8

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Pesticides									
4,4'-DDD			1.66E-10	20	20	25	70	9,125	25,550
4,4'-DDE			7.02E-10	20	20	25	70	9,125	25,550
4,4'-DDT		2.09E-12	3.74E-10	20	20	25	70	9,125	25,550
Aldrin	0.00E+00	0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
Aroclor-1254		0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
Aroclor-1260			7.27E-10	20	20	25	70	9,125	25,550
Dieldrin		1.06E-12	1.90E-10	20	20	25	70	9,125	25,550
Endosulfan I			5.24E-10	20	20	25	70	9,125	25,550
Endosulfan II			1.73E-10	20	20	25	70	9,125	25,550
Endosulfan sulfate			1.63E-10	20	20	25	70	9,125	25,550
Endrin			2.12E-10	20	20	25	70	9,125	25,550
Endrin aldehyde			9.56E-11	20	20	25	70	9,125	25,550
Endrin ketone			2.12E-10	20	20	25	70	9,125	25,550
Heptachlor		0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
Heptachlor epoxide		4.11E-13	7.35E-11	20	20	25	70	9,125	25,550
Toxaphene		0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
alpha-Chlordane			1.11E-10	20	20	25	70	9,125	25,550
beta-BHC		5.21E-13	9.32E-11	20	20	25	70	9,125	25,550
gamma-BHC (Lindane)			0.00E+00	20	20	25	70	9,125	25,550
gamma-Chlordane			1.21E-10	20	20	25	70	9,125	25,550
Nitroaromatics									
2-amino-4,6-Dinitrotoluene			0.00E+00	20	20	25	70	9,125	25,550
Tetryl			0.00E+00	20	20	25	70	9,125	25,550
Metals									
Antimony			3.00E-10	20	20	25	70	9,125	25,550
Barium	2.25E-07		1.44E-05	20	20	25	70	9,125	25,550
Copper			3.42E-04	20	20	25	70	9,125	25,550
Lead			1.31E-05	20	20	25	70	9,125	25,550
Mercury	5.78E-06		3.69E-04	20	20	25	70	9,125	25,550
Selenium			4.62E-06	20	20	25	70	9,125	25,550
Thallium			6.19E-11	20	20	25	70	9,125	25,550
Zinc			4.18E-09	20	20	25	70	9,125	25,550
Herbicides									
2,4,5-T			0.00E+00	20	20	25	70	9,125	25,550
MCPP			0.00E+00	20	20	25	70	9,125	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:	**Assumptions:**
CA = Chemical Concentration in Air (mg/m³)	**Calculated Air EPC Data - RME**
IR = Inhalation Rate (m³/day)	**20 (RME All Receptors)**
EF = Exposure Frequency (days/yr)	**20 (RME Site Worker)**
ED = Exposure Duration (years)	**25 (RME Site Worker)**
BW = Bodyweight (kg)	**70 (Adult Male)**
AT = Averaging Time (days)	**25 x 365 (Nc), 70 x 365 (Car)**

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-43

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2-Tetrachloroethane		1.46E-12	NA	2.03E-01		2.97E-13
Acetone			NA	NA		
Benzene		1.72E-12	NA	2.91E-02		4.99E-14
Carbon Disulfide	2.97E-12		2.86E-03	NA	1.04E-09	
Chloroform		4.25E-13	NA	8.05E-02		3.42E-14
Methylene Chloride	1.19E-12	4.25E-13	8.57E-01	1.65E-03	1.39E-12	7.01E-16
Toluene	1.78E-12		1.14E-01	NA	1.56E-11	
Xylene (total)			NA	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Diethylphthalate			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Ethylhexyl)phthalate			NA	NA		

TABLE 6-43

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		2.09E-12	NA	3.40E-01		7.11E-13
Aldrin	0.00E+00	0.00E+00	1.70E+01	1.72E+01	0.00E+00	0.00E+00
Aroclor-1254		0.00E+00	NA	4.00E-01		0.00E+00
Aroclor-1260			NA	NA		
Dieldrin		1.06E-12	NA	1.61E+01		1.71E-11
Endosulfan I			NA	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor		0.00E+00	NA	4.55E+00		0.00E+00
Heptachlor epoxide		4.11E-13	NA	9.10E+00		3.74E-12
Toxaphene		0.00E+00	NA	1.12E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		5.21E-13	NA	1.86E+00		9.67E-13
gamma-BHC (Lindane)			NA	NA		
gamma-Chlordane			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			NA	NA		
Metals						
Antimony			NA	NA		
Barium	2.25E-07		1.43E-04	NA	1.58E-03	
Copper			NA	NA		
Lead			NA	NA		
Mercury	5.78E-06		8.57E-05	NA	6.74E-02	
Selenium			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
Herbicides						
2,4,5-T			NA	NA		
MCPP			NA	NA		
Total HQ & CR					**6.90E-02**	**2.29E-11**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-10

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Volatile Organics									
1,1,2,2-Tetrachloroethane		7.32E-13	2.62E-10	20	250	1	70	365	25,550
Acetone			3.07E-10	20	250	1	70	365	25,550
Benzene		8.58E-13	3.07E-10	20	250	1	70	365	25,550
Carbon Disulfide	3.72E-11		1.90E-10	20	250	1	70	365	25,550
Chloroform		2.12E-13	7.60E-11	20	250	1	70	365	25,550
Methylene Chloride	1.49E-11	2.12E-13	7.60E-11	20	250	1	70	365	25,550
Toluene	2.23E-11		1.14E-10	20	250	1	70	365	25,550
Xylene (total)			2.67E-10	20	250	1	70	365	25,550
Semivolatile Organics									
2,4-Dinitrotoluene			8.15E-08	20	250	1	70	365	25,550
2,6-Dinitrotoluene			6.84E-09	20	250	1	70	365	25,550
2-Methylnaphthalene			4.67E-08	20	250	1	70	365	25,550
3,3'-Dichlorobenzidine			0.00E+00	20	250	1	70	365	25,550
3-nitroaniline			0.00E+00	20	250	1	70	365	25,550
Acenaphthene			ERR	20	250	1	70	365	25,550
Acenaphthylene			8.19E-08	20	250	1	70	365	25,550
Anthracene			1.17E-08	20	250	1	70	365	25,550
Benzo(a)anthracene			7.64E-08	20	250	1	70	365	25,550
Benzo(a)pyrene			2.73E-07	20	250	1	70	365	25,550
Benzo(b)fluoranthene			4.38E-07	20	250	1	70	365	25,550
Benzo(g,h,i)perylene			3.74E-07	20	250	1	70	365	25,550
Benzo(k)fluoranthene			2.24E-07	20	250	1	70	365	25,550
Carbazole			7.10E-08	20	250	1	70	365	25,550
Chrysene			3.28E-07	20	250	1	70	365	25,550
Di-n-butylphthalate			2.71E-08	20	250	1	70	365	25,550
Dibenz(a,h)anthracene			8.94E-08	20	250	1	70	365	25,550
Dibenzofuran			ERR	20	250	1	70	365	25,550
Diethylphthalate			6.15E-08	20	250	1	70	365	25,550
Fluoranthene			7.22E-10	20	250	1	70	365	25,550
Fluorene			4.28E-07	20	250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene			6.58E-08	20	250	1	70	365	25,550
N-Nitrosodiphenylamine (1)			2.11E-07	20	250	1	70	365	25,550
Naphthalene			2.19E-08	20	250	1	70	365	25,550
Pentachlorophenol			7.42E-08	20	250	1	70	365	25,550
Phenanthrene			4.39E-08	20	250	1	70	365	25,550
Pyrene			2.78E-07	20	250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate			4.80E-07	20	250	1	70	365	25,550

TABLE 6-10

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Pesticides									
4,4'-DDD			1.66E-10	20	250	1	70	365	25,550
4,4'-DDE			7.02E-10	20	250	1	70	365	25,550
4,4'-DDT		1.05E-12	3.74E-10	20	250	1	70	365	25,550
Aldrin	0.00E+00	0.00E+00	0.00E+00	20	250	1	70	365	25,550
Aroclor-1254		0.00E+00	0.00E+00	20	250	1	70	365	25,550
Aroclor-1260			7.27E-10	20	250	1	70	365	25,550
Dieldrin		5.30E-13	1.90E-10	20	250	1	70	365	25,550
Endosulfan I			5.24E-10	20	250	1	70	365	25,550
Endosulfan II			1.73E-10	20	250	1	70	365	25,550
Endosulfan sulfate			1.63E-10	20	250	1	70	365	25,550
Endrin			2.12E-10	20	250	1	70	365	25,550
Endrin aldehyde			9.56E-11	20	250	1	70	365	25,550
Endrin ketone			2.12E-10	20	250	1	70	365	25,550
Heptachlor		0.00E+00	0.00E+00	20	250	1	70	365	25,550
Heptachlor epoxide		2.06E-13	7.35E-11	20	250	1	70	365	25,550
Toxaphene		0.00E+00	0.00E+00	20	250	1	70	365	25,550
alpha-Chlordane			1.11E-10	20	250	1	70	365	25,550
beta-BHC		2.61E-13	9.32E-11	20	250	1	70	365	25,550
gamma-BHC (Lindane)			0.00E+00	20	250	1	70	365	25,550
gamma-Chlordane			1.21E-10	20	250	1	70	365	25,550
Nitroaromatics									
2-amino-4,6-Dinitrotoluene			0.00E+00	20	250	1	70	365	25,550
Tetryl			0.00E+00	20	250	1	70	365	25,550
Metals									
Antimony			3.00E-10	20	250	1	70	365	25,550
Barium	2.82E-06		1.44E-05	20	250	1	70	365	25,550
Copper			3.42E-04	20	250	1	70	365	25,550
Lead			1.31E-05	20	250	1	70	365	25,550
Mercury	7.22E-05		3.69E-04	20	250	1	70	365	25,550
Selenium			4.62E-06	20	250	1	70	365	25,550
Thallium			6.19E-11	20	250	1	70	365	25,550
Zinc			4.18E-09	20	250	1	70	365	25,550
Herbicides									
2,4,5-T			0.00E+00	20	250	1	70	365	25,550
MCPP			0.00E+00	20	250	1	70	365	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:

CA = Chemical Concentration in Air (mg/m³)
IR = Inhalation Rate (m³/day)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

Calculated Air EPC Data - RME
20 (all receptors)
250 (RME Construction Workers)
1 (Upper bound period of Construction Worker)
70 (Adult Male)
1 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-55

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2-Tetrachloroethane		7.32E-13	NA	2.03E-01		1.49E-13
Acetone			NA	NA		
Benzene		8.58E-13	NA	2.91E-02		2.49E-14
Carbon Disulfide	3.72E-11		2.86E-03	NA	1.30E-08	
Chloroform		2.12E-13	NA	8.05E-02		1.71E-14
Methylene Chloride	1.49E-11	2.12E-13	8.57E-01	1.65E-03	1.74E-11	3.51E-16
Toluene	2.23E-11		1.14E-01	NA	1.95E-10	
Xylene (total)			NA	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Diethylphthalate			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Ethylhexyl)phthalate			NA	NA		

TABLE 6-55

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		1.05E-12	NA	3.40E-01		3.55E-13
Aldrin	0.00E+00	0.00E+00	1.70E+01	1.72E+01	0.00E+00	0.00E+00
Aroclor-1254		0.00E+00	NA	4.00E-01		0.00E+00
Aroclor-1260			NA	NA		
Dieldrin		5.30E-13	NA	1.61E+01		8.54E-12
Endosulfan I			NA	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor		0.00E+00	NA	4.55E+00		0.00E+00
Heptachlor epoxide		2.06E-13	NA	9.10E+00		1.87E-12
Toxaphene		0.00E+00	NA	1.12E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		2.61E-13	NA	1.86E+00		4.83E-13
gamma-BHC (Lindane)			NA	NA		
gamma-Chlordane			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			NA	NA		
Metals						
Antimony			NA	NA		
Barium	2.82E-06		1.43E-04	NA	1.97E-02	
Copper			NA	NA		
Lead			NA	NA		
Mercury	7.22E-05		8.57E-05	NA	8.42E-01	
Selenium			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
Herbicides						
2,4,5-T			NA	NA		
MCPP			NA	NA		
Total HQ & CR					**8.62E-01**	**1.14E-11**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	1,1,2,2-Tetrachloroethane	UG/KG	31	0	1	3.2%	6.492	3.876	7.750	FALSE	FALSE	7.042	7.042
VOLATILE ORGANICS	2-Butanone	UG/KG	29	2	1	3.4%	5.560	0.611	5.000	FALSE	FALSE	5.742	5.000
VOLATILE ORGANICS	Acetone	UG/KG	31	0	1	3.2%	7.573	8.119	46.000	FALSE	FALSE	8.382	8.382
VOLATILE ORGANICS	Benzene	UG/KG	29	2	4	13.8%	5.250	1.264	5.000	FALSE	FALSE	5.962	5.000
VOLATILE ORGANICS	Carbon disulfide	UG/KG	29	2	2	6.9%	5.362	1.101	2.000	FALSE	FALSE	5.952	2.000
VOLATILE ORGANICS	Chloroform	UG/KG	29	2	2	6.9%	4.060	1.429	2.000	FALSE	FALSE	4.667	2.000
VOLATILE ORGANICS	Methylene chloride	UG/KG	29	2	1	3.4%	5.491	0.769	3.000	FALSE	FALSE	5.774	3.000
VOLATILE ORGANICS	Toluene	UG/KG	31	0	10	32.3%	6.016	4.409	10.000	FALSE	FALSE	7.333	7.333
VOLATILE ORGANICS	Total Xylenes	UG/KG	29	2	1	3.4%	5.543	0.648	4.250	FALSE	FALSE	5.743	4.250
SEMIVOLATILE ORGANIC	2,4-Dinitrotoluene	UG/KG	30	1	5	16.7%	753.133	1295.428	2200.000	FALSE	FALSE	1124.766	1124.766
SEMIVOLATILE ORGANIC	2,6-Dinitrotoluene	UG/KG	20	11	2	10.0%	188.750	22.992	180.000	FALSE	TRUE	197.680	180.000
SEMIVOLATILE ORGANIC	2-Methylnaphthalene	UG/KG	31	0	4	12.9%	1181.194	3532.286	19000.000	FALSE	FALSE	1379.513	1379.513
SEMIVOLATILE ORGANIC	Acenaphthene	UG/KG	31	0	6	19.4%	2876.871	12889.129	72000.000	FALSE	FALSE	2548.938	2548.938
SEMIVOLATILE ORGANIC	Acenaphthylene	UG/KG	25	6	7	28.0%	208.240	123.418	310.000	FALSE	FALSE	281.946	281.946
SEMIVOLATILE ORGANIC	Anthracene	UG/KG	31	0	8	25.8%	4423.935	21485.741	120000.000	FALSE	FALSE	2058.642	2058.642
SEMIVOLATILE ORGANIC	Benzo[a]anthracene	UG/KG	31	0	16	51.6%	7768.903	39409.203	220000.000	FALSE	FALSE	7267.556	7267.556
SEMIVOLATILE ORGANIC	Benzo[a]pyrene	UG/KG	31	0	18	58.1%	7280.452	35796.473	200000.000	FALSE	TRUE	12667.853	12667.853
SEMIVOLATILE ORGANIC	Benzo[b]fluoranthene	UG/KG	31	0	16	51.6%	7352.613	35784.830	200000.000	FALSE	TRUE	10664.034	10664.034
SEMIVOLATILE ORGANIC	Benzo[ghi]perylene	UG/KG	31	0	15	48.4%	4356.516	17915.767	100000.000	FALSE	FALSE	6207.288	6207.288
SEMIVOLATILE ORGANIC	Benzo[k]fluoranthene	UG/KG	31	0	13	41.9%	6104.968	30444.698	170000.000	FALSE	FALSE	4683.030	4683.030
SEMIVOLATILE ORGANIC	Bis(2-Ethylhexyl)phthalate	UG/KG	30	1	4	13.3%	594.817	1292.011	2100.000	FALSE	FALSE	1447.572	1447.572
SEMIVOLATILE ORGANIC	Carbazole	UG/KG	31	0	6	19.4%	3432.710	15929.230	89000.000	FALSE	FALSE	2246.915	2246.915
SEMIVOLATILE ORGANIC	Chrysene	UG/KG	31	0	21	67.7%	7725.065	39417.684	220000.000	FALSE	FALSE	8967.543	8967.543
SEMIVOLATILE ORGANIC	Cresols (-o)	UG/KG	19	12	1	5.3%	185.789	26.991	120.000	FALSE	FALSE	197.736	120.000
SEMIVOLATILE ORGANIC	Di-n-butylphthalate	UG/KG	30	1	7	23.3%	565.967	1261.729	1300.000	FALSE	FALSE	750.058	750.058
SEMIVOLATILE ORGANIC	Dibenz[a,h]anthracene	UG/KG	31	0	11	35.5%	2225.516	8774.376	49000.000	FALSE	FALSE	2449.722	2449.722
SEMIVOLATILE ORGANIC	Dibenzofuran	UG/KG	31	0	3	9.7%	2192.226	8958.863	50000.000	FALSE	FALSE	1902.098	1902.098
SEMIVOLATILE ORGANIC	Diethyl phthalate	UG/KG	19	12	1	5.3%	180.211	44.594	19.000	FALSE	FALSE	249.493	19.000
SEMIVOLATILE ORGANIC	Fluoranthene	UG/KG	31	0	21	67.7%	17755.548	95077.465	530000.000	FALSE	FALSE	10710.489	10710.489
SEMIVOLATILE ORGANIC	Fluorene	UG/KG	31	0	3	9.7%	3097.129	13956.439	78000.000	FALSE	FALSE	2038.211	2038.211
SEMIVOLATILE ORGANIC	Indeno[1,2,3-cd]pyrene	UG/KG	31	0	13	41.9%	4191.258	17874.490	100000.000	FALSE	FALSE	5925.788	5925.788
SEMIVOLATILE ORGANIC	N-Nitrosodiphenylamine	UG/KG	29	2	6	20.7%	381.207	369.913	680.000	FALSE	FALSE	565.592	565.592
SEMIVOLATILE ORGANIC	Naphthalene	UG/KG	31	0	5	16.1%	2694.516	11814.514	66000.000	FALSE	FALSE	2315.511	2315.511
SEMIVOLATILE ORGANIC	Pentachlorophenol	UG/KG	28	3	1	3.6%	878.750	730.309	1200.000	FALSE	FALSE	1103.737	1103.737
SEMIVOLATILE ORGANIC	Phenanthrene	UG/KG	31	0	16	51.6%	16361.710	87912.513	490000.000	FALSE	FALSE	7372.615	7372.615
SEMIVOLATILE ORGANIC	Pyrene	UG/KG	31	0	22	71.0%	12336.323	64537.989	360000.000	FALSE	FALSE	12528.037	12528.037
PESTICIDES/PCB	4,4`-DDD	UG/KG	31	0	2	6.5%	2.937	3.932	5.000	FALSE	FALSE	3.210	3.210
PESTICIDES/PCB	4,4`-DDE	UG/KG	31	0	17	54.8%	12.049	25.404	140.000	FALSE	FALSE	18.076	18.076

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Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
PESTICIDES/PCB	4,4`-DDT	UG/KG	31	0	16	51.6%	6.382	8.473	43.000	FALSE	FALSE	8.713	8.713
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	31	0	4	12.9%	1.911	2.304	8.600	FALSE	FALSE	2.286	2.286
PESTICIDES/PCB	Aroclor-1260	UG/KG	29	2	1	3.4%	18.500	1.488	22.000	FALSE	FALSE	19.145	19.145
PESTICIDES/PCB	Beta-BHC	UG/KG	31	0	1	3.2%	1.824	3.670	20.000	FALSE	FALSE	1.821	1.821
PESTICIDES/PCB	Delta-BHC	UG/KG	31	0	1	3.2%	1.510	2.013	2.200	FALSE	FALSE	1.644	1.644
PESTICIDES/PCB	Dieldrin	UG/KG	31	0	3	9.7%	3.339	4.851	26.000	FALSE	FALSE	3.771	3.771
PESTICIDES/PCB	Endosulfan I	UG/KG	31	0	10	32.3%	17.823	76.864	430.000	FALSE	FALSE	13.988	13.988
PESTICIDES/PCB	Endosulfan II	UG/KG	31	0	3	9.7%	3.050	3.925	5.000	FALSE	FALSE	3.380	3.380
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	31	0	1	3.2%	2.926	4.239	20.000	FALSE	FALSE	3.122	3.122
PESTICIDES/PCB	Endrin	UG/KG	31	0	4	12.9%	4.084	7.883	43.000	FALSE	FALSE	4.333	4.333
PESTICIDES/PCB	Endrin aldehyde	UG/KG	30	1	1	3.3%	2.382	2.870	3.000	FALSE	FALSE	2.543	2.543
PESTICIDES/PCB	Endrin ketone	UG/KG	31	0	4	12.9%	4.719	12.627	71.000	FALSE	FALSE	4.297	4.297
PESTICIDES/PCB	Gamma-Chlordane	UG/KG	31	0	3	9.7%	2.081	2.690	9.400	FALSE	FALSE	2.511	2.511
PESTICIDES/PCB	Heptachlorepoxide	UG/KG	31	0	2	6.5%	1.523	2.011	2.100	FALSE	FALSE	1.666	1.666
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	31	0	30	96.8%	0.250	0.311	1.400	FALSE	TRUE	0.628	0.628
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	31	0	9	29.0%	2810.968	13252.036	74000.000	FALSE	FALSE	1831.574	1831.574
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	31	0	2	6.5%	130.081	256.619	900.000	FALSE	FALSE	131.208	131.208
METALS	Aluminum	MG/KG	31	0	28	90.3%	10295.484	3352.436	14600.000	FALSE	FALSE	12130.212	12130.212
METALS	Antimony	MG/KG	31	0	18	58.1%	2.077	3.112	17.100	FALSE	TRUE	3.772	3.772
METALS	Arsenic	MG/KG	31	0	31	100.0%	4.826	0.980	6.800	TRUE	TRUE	5.124	5.124
METALS	Barium	MG/KG	31	0	31	100.0%	78.582	38.568	168.000	FALSE	TRUE	94.080	94.080
METALS	Beryllium	MG/KG	31	0	31	100.0%	0.407	0.150	0.750	TRUE	FALSE	0.453	0.453
METALS	Cadmium	MG/KG	31	0	19	61.3%	0.215	0.126	0.500	TRUE	FALSE	0.254	0.254
METALS	Calcium	MG/KG	31	0	31	100.0%	45890.645	61481.799	260000.000	FALSE	TRUE	74841.526	74841.526
METALS	Chromium	MG/KG	31	0	30	96.8%	17.529	5.506	28.400	TRUE	TRUE	19.206	19.206
METALS	Cobalt	MG/KG	31	0	31	100.0%	9.655	3.058	17.800	TRUE	TRUE	10.586	10.586
METALS	Copper	MG/KG	31	0	31	100.0%	43.552	35.866	204.000	FALSE	FALSE	51.599	51.599
METALS	Cyanide	MG/KG	31	0	1	3.2%	0.280	0.053	0.520	FALSE	FALSE	0.294	0.294
METALS	Iron	MG/KG	31	0	31	100.0%	21796.129	5444.075	30400.000	FALSE	FALSE	24330.675	24330.675
METALS	Lead	MG/KG	31	0	31	100.0%	114.829	122.639	460.000	FALSE	TRUE	192.212	192.212
METALS	Magnesium	MG/KG	31	0	31	100.0%	8720.806	6551.714	34900.000	FALSE	TRUE	10385.694	10385.694
METALS	Manganese	MG/KG	31	0	31	100.0%	441.387	150.800	948.000	FALSE	TRUE	490.572	490.572
METALS	Mercury	MG/KG	31	0	22	71.0%	0.194	0.305	1.200	FALSE	FALSE	0.389	0.389
METALS	Nickel	MG/KG	31	0	31	100.0%	28.981	10.340	53.500	FALSE	TRUE	32.543	32.543
METALS	Potassium	MG/KG	31	0	31	100.0%	1257.194	370.522	2280.000	TRUE	TRUE	1370.039	1370.039
METALS	Selenium	MG/KG	31	0	18	58.1%	0.588	0.474	1.600	FALSE	TRUE	0.994	0.994
METALS	Silver	MG/KG	31	0	6	19.4%	0.250	0.147	0.370	FALSE	FALSE	0.309	0.309
METALS	Sodium	MG/KG	31	0	22	71.0%	85.258	71.193	383.000	FALSE	TRUE	111.243	111.243

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
METALS	Thallium	MG/KG	31	0	9	29.0%	0.551	0.401	1.700	FALSE	FALSE	0.875	0.875
METALS	Vanadium	MG/KG	31	0	31	100.0%	21.506	6.780	38.100	FALSE	FALSE	24.081	24.081
METALS	Zinc	MG/KG	31	0	31	100.0%	94.427	33.894	219.000	FALSE	TRUE	105.181	105.181

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	1,1,2,2-Tetrachloroethane	UG/KG	31	0	1	3.2%	6.492	3.876	7.750	FALSE	FALSE	7.042	7.042
VOLATILE ORGANICS	2-Butanone	UG/KG	29	2	1	3.4%	5.560	0.611	5.000	FALSE	FALSE	5.742	5.000
VOLATILE ORGANICS	Acetone	UG/KG	31	0	1	3.2%	7.573	8.119	46.000	FALSE	FALSE	8.382	8.382
VOLATILE ORGANICS	Benzene	UG/KG	29	2	4	13.8%	5.250	1.264	5.000	FALSE	FALSE	5.962	5.000
VOLATILE ORGANICS	Carbon disulfide	UG/KG	29	2	2	6.9%	5.362	1.101	2.000	FALSE	FALSE	5.952	2.000
VOLATILE ORGANICS	Chloroform	UG/KG	29	2	2	6.9%	4.060	1.429	2.000	FALSE	FALSE	4.667	2.000
VOLATILE ORGANICS	Methylene chloride	UG/KG	29	2	1	3.4%	5.491	0.769	3.000	FALSE	FALSE	5.774	3.000
VOLATILE ORGANICS	Toluene	UG/KG	31	0	10	32.3%	6.016	4.409	10.000	FALSE	FALSE	7.333	7.333
VOLATILE ORGANICS	Total Xylenes	UG/KG	29	2	1	3.4%	5.543	0.648	4.250	FALSE	FALSE	5.743	4.250
SEMIVOLATILE ORGANIC	2,4-Dinitrotoluene	UG/KG	30	1	5	16.7%	753.133	1295.428	2200.000	FALSE	FALSE	1124.766	1124.766
SEMIVOLATILE ORGANIC	2,6-Dinitrotoluene	UG/KG	20	11	2	10.0%	188.750	22.992	180.000	FALSE	TRUE	197.680	180.000
SEMIVOLATILE ORGANIC	2-Methylnaphthalene	UG/KG	31	0	4	12.9%	1181.194	3532.286	19000.000	FALSE	FALSE	1379.513	1379.513
SEMIVOLATILE ORGANIC	Acenaphthene	UG/KG	31	0	6	19.4%	2876.871	12889.129	72000.000	FALSE	FALSE	2548.938	2548.938
SEMIVOLATILE ORGANIC	Acenaphthylene	UG/KG	25	6	7	28.0%	208.240	123.418	310.000	FALSE	FALSE	281.946	281.946
SEMIVOLATILE ORGANIC	Anthracene	UG/KG	31	0	8	25.8%	4423.935	21485.741	120000.000	FALSE	FALSE	2058.642	2058.642
SEMIVOLATILE ORGANIC	Benzo[a]anthracene	UG/KG	31	0	16	51.6%	7768.903	39409.203	220000.000	FALSE	FALSE	7267.556	7267.556
SEMIVOLATILE ORGANIC	Benzo[a]pyrene	UG/KG	31	0	18	58.1%	7280.452	35796.473	200000.000	FALSE	TRUE	12667.853	12667.853
SEMIVOLATILE ORGANIC	Benzo[b]fluoranthene	UG/KG	31	0	16	51.6%	7352.613	35784.830	200000.000	FALSE	TRUE	10664.034	10664.034
SEMIVOLATILE ORGANIC	Benzo[ghi]perylene	UG/KG	31	0	15	48.4%	4356.516	17915.767	100000.000	FALSE	FALSE	6207.288	6207.288
SEMIVOLATILE ORGANIC	Benzo[k]fluoranthene	UG/KG	31	0	13	41.9%	6104.968	30444.698	170000.000	FALSE	FALSE	4683.030	4683.030
SEMIVOLATILE ORGANIC	Bis(2-Ethylhexyl)phthalate	UG/KG	30	1	4	13.3%	594.817	1292.011	2100.000	FALSE	FALSE	1447.572	1447.572
SEMIVOLATILE ORGANIC	Carbazole	UG/KG	31	0	6	19.4%	3432.710	15929.230	89000.000	FALSE	FALSE	2246.915	2246.915
SEMIVOLATILE ORGANIC	Chrysene	UG/KG	31	0	21	67.7%	7725.065	39417.684	220000.000	FALSE	FALSE	8967.543	8967.543
SEMIVOLATILE ORGANIC	Cresols (-o)	UG/KG	19	12	1	5.3%	185.789	26.991	120.000	FALSE	FALSE	197.736	120.000
SEMIVOLATILE ORGANIC	Di-n-butylphthalate	UG/KG	30	1	7	23.3%	565.967	1261.729	1300.000	FALSE	FALSE	750.058	750.058
SEMIVOLATILE ORGANIC	Dibenz[a,h]anthracene	UG/KG	31	0	11	35.5%	2225.516	8774.376	49000.000	FALSE	FALSE	2449.722	2449.722
SEMIVOLATILE ORGANIC	Dibenzofuran	UG/KG	31	0	3	9.7%	2192.226	8958.863	50000.000	FALSE	FALSE	1902.098	1902.098
SEMIVOLATILE ORGANIC	Diethyl phthalate	UG/KG	19	12	1	5.3%	180.211	44.594	19.000	FALSE	FALSE	249.493	19.000
SEMIVOLATILE ORGANIC	Fluoranthene	UG/KG	31	0	21	67.7%	17755.548	95077.465	530000.000	FALSE	FALSE	10710.489	10710.489
SEMIVOLATILE ORGANIC	Fluorene	UG/KG	31	0	3	9.7%	3097.129	13956.439	78000.000	FALSE	FALSE	2038.211	2038.211
SEMIVOLATILE ORGANIC	Indeno[1,2,3-cd]pyrene	UG/KG	31	0	13	41.9%	4191.258	17874.490	100000.000	FALSE	FALSE	5925.788	5925.788
SEMIVOLATILE ORGANIC	N-Nitrosodiphenylamine	UG/KG	29	2	6	20.7%	381.207	369.913	680.000	FALSE	FALSE	565.592	565.592
SEMIVOLATILE ORGANIC	Naphthalene	UG/KG	31	0	5	16.1%	2694.516	11814.514	66000.000	FALSE	FALSE	2315.511	2315.511
SEMIVOLATILE ORGANIC	Pentachlorophenol	UG/KG	28	3	1	3.6%	878.750	730.309	1200.000	FALSE	FALSE	1103.737	1103.737
SEMIVOLATILE ORGANIC	Phenanthrene	UG/KG	31	0	16	51.6%	16361.710	87912.513	490000.000	FALSE	FALSE	7372.615	7372.615
SEMIVOLATILE ORGANIC	Pyrene	UG/KG	31	0	22	71.0%	12336.323	64537.989	360000.000	FALSE	FALSE	12528.037	12528.037
PESTICIDES/PCB	4,4'-DDD	UG/KG	31	0	2	6.5%	2.937	3.932	5.000	FALSE	FALSE	3.210	3.210
PESTICIDES/PCB	4,4'-DDE	UG/KG	31	0	17	54.8%	12.049	25.404	140.000	FALSE	FALSE	18.076	18.076

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Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
PESTICIDES/PCB	4,4`-DDT	UG/KG	31	0	16	51.6%	6.382	8.473	43.000	FALSE	FALSE	8.713	8.713
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	31	0	4	12.9%	1.911	2.304	8.600	FALSE	FALSE	2.286	2.286
PESTICIDES/PCB	Aroclor-1260	UG/KG	29	2	1	3.4%	18.500	1.488	22.000	FALSE	FALSE	19.145	19.145
PESTICIDES/PCB	Beta-BHC	UG/KG	31	0	1	3.2%	1.824	3.670	20.000	FALSE	FALSE	1.821	1.821
PESTICIDES/PCB	Delta-BHC	UG/KG	31	0	1	3.2%	1.510	2.013	2.200	FALSE	FALSE	1.644	1.644
PESTICIDES/PCB	Dieldrin	UG/KG	31	0	3	9.7%	3.339	4.851	26.000	FALSE	FALSE	3.771	3.771
PESTICIDES/PCB	Endosulfan I	UG/KG	31	0	10	32.3%	17.823	76.864	430.000	FALSE	FALSE	13.988	13.988
PESTICIDES/PCB	Endosulfan II	UG/KG	31	0	3	9.7%	3.050	3.925	5.000	FALSE	FALSE	3.380	3.380
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	31	0	1	3.2%	2.926	4.239	20.000	FALSE	FALSE	3.122	3.122
PESTICIDES/PCB	Endrin	UG/KG	31	0	4	12.9%	4.084	7.883	43.000	FALSE	FALSE	4.333	4.333
PESTICIDES/PCB	Endrin aldehyde	UG/KG	30	1	1	3.3%	2.382	2.870	3.000	FALSE	FALSE	2.543	2.543
PESTICIDES/PCB	Endrin ketone	UG/KG	31	0	4	12.9%	4.719	12.627	71.000	FALSE	FALSE	4.297	4.297
PESTICIDES/PCB	Gamma-Chlordane	UG/KG	31	0	3	9.7%	2.081	2.690	9.400	FALSE	FALSE	2.511	2.511
PESTICIDES/PCB	Heptachlorepoxide	UG/KG	31	0	2	6.5%	1.523	2.011	2.100	FALSE	FALSE	1.666	1.666
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	31	0	30	96.8%	0.250	0.311	1.400	FALSE	TRUE	0.628	0.628
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	31	0	9	29.0%	2810.968	13252.036	74000.000	FALSE	FALSE	1831.574	1831.574
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	31	0	2	6.5%	130.081	256.619	900.000	FALSE	FALSE	131.208	131.208
METALS	Aluminum	MG/KG	31	0	28	90.3%	10295.484	3352.436	14600.000	FALSE	FALSE	12130.212	12130.212
METALS	Antimony	MG/KG	31	0	18	58.1%	2.077	3.112	17.100	FALSE	TRUE	3.772	3.772
METALS	Arsenic	MG/KG	31	0	31	100.0%	4.826	0.980	6.800	TRUE	TRUE	5.124	5.124
METALS	Barium	MG/KG	31	0	31	100.0%	78.582	38.568	168.000	FALSE	TRUE	94.080	94.080
METALS	Beryllium	MG/KG	31	0	31	100.0%	0.407	0.150	0.750	TRUE	FALSE	0.453	0.453
METALS	Cadmium	MG/KG	31	0	19	61.3%	0.215	0.126	0.500	TRUE	FALSE	0.254	0.254
METALS	Calcium	MG/KG	31	0	31	100.0%	45890.645	61481.799	260000.000	FALSE	TRUE	74841.526	74841.526
METALS	Chromium	MG/KG	31	0	30	96.8%	17.529	5.506	28.400	TRUE	TRUE	19.206	19.206
METALS	Cobalt	MG/KG	31	0	31	100.0%	9.655	3.058	17.800	TRUE	TRUE	10.586	10.586
METALS	Copper	MG/KG	31	0	31	100.0%	43.552	35.866	204.000	FALSE	FALSE	51.599	51.599
METALS	Cyanide	MG/KG	31	0	1	3.2%	0.280	0.053	0.520	FALSE	FALSE	0.294	0.294
METALS	Iron	MG/KG	31	0	31	100.0%	21796.129	5444.075	30400.000	FALSE	FALSE	24330.675	24330.675
METALS	Lead	MG/KG	31	0	31	100.0%	114.829	122.639	460.000	FALSE	TRUE	192.212	192.212
METALS	Magnesium	MG/KG	31	0	31	100.0%	8720.806	6551.714	34900.000	FALSE	TRUE	10385.694	10385.694
METALS	Manganese	MG/KG	31	0	31	100.0%	441.387	150.800	948.000	FALSE	TRUE	490.572	490.572
METALS	Mercury	MG/KG	31	0	22	71.0%	0.194	0.305	1.200	FALSE	FALSE	0.389	0.389
METALS	Nickel	MG/KG	31	0	31	100.0%	28.981	10.340	53.500	FALSE	TRUE	32.543	32.543
METALS	Potassium	MG/KG	31	0	31	100.0%	1257.194	370.522	2280.000	TRUE	TRUE	1370.039	1370.039
METALS	Selenium	MG/KG	31	0	18	58.1%	0.588	0.474	1.600	FALSE	TRUE	0.994	0.994
METALS	Silver	MG/KG	31	0	6	19.4%	0.250	0.147	0.370	FALSE	FALSE	0.309	0.309
METALS	Sodium	MG/KG	31	0	22	71.0%	85.258	71.193	383.000	FALSE	TRUE	111.243	111.243

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
METALS	Thallium	MG/KG	31	0	9	29.0%	0.551	0.401	1.700	FALSE	FALSE	0.875	0.875
METALS	Vanadium	MG/KG	31	0	31	100.0%	21.506	6.780	38.100	FALSE	FALSE	24.081	24.081
METALS	Zinc	MG/KG	31	0	31	100.0%	94.427	33.894	219.000	FALSE	TRUE	105.181	105.181

TABLE 6-18

CALCULATION OF INTAKE FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Volatile Organics											
1,1,2,2-Tetrachloroethane		4.72E-10	7.04E-03	480	1.00E-06	1	250	1	70	365	25,550
2-Butanone	2.35E-08		5.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Acetone	3.94E-08		8.38E-03	480	1.00E-06	1	250	1	70	365	25,550
Benzene		3.35E-10	5.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Carbon Disulfide	9.39E-09		2.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Chloroform	9.39E-09	1.34E-10	2.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Methylene Chloride	1.41E-08	2.01E-10	3.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Toluene	3.44E-08		7.33E-03	480	1.00E-06	1	250	1	70	365	25,550
Xylene (total)	2.00E-08		4.25E-03	480	1.00E-06	1	250	1	70	365	25,550
Semivolatile Organics											
2,4-Dinitrotoluene	5.28E-06		1.12E+00	480	1.00E-06	1	250	1	70	365	25,550
2,6-Dinitrotoluene	8.45E-07		1.80E-01	480	1.00E-06	1	250	1	70	365	25,550
2-methylnaphthalene			1.38E+00	480	1.00E-06	1	250	1	70	365	25,550
3,3'-Dichlorobenzidine		0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
3-nitroaniline			0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
Acenaphthene	1.20E-05		2.55E+00	480	1.00E-06	1	250	1	70	365	25,550
Acenaphthylene			2.82E-01	480	1.00E-06	1	250	1	70	365	25,550
Anthracene	9.67E-06		2.06E+00	480	1.00E-06	1	250	1	70	365	25,550
Benzo(a)anthracene		4.88E-07	7.27E+00	480	1.00E-06	1	250	1	70	365	25,550
Benzo(a)pyrene		8.50E-07	1.27E+01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(b)fluoranthene		7.16E-07	1.07E+01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(g,h,i)perylene			6.21E+00	480	1.00E-06	1	250	1	70	365	25,550
Benzo(k)fluoranthene		3.14E-07	4.68E+00	480	1.00E-06	1	250	1	70	365	25,550
Butylbenzylphthalate	0.00E+00		0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
Carbazole		1.51E-07	2.25E+00	480	1.00E-06	1	250	1	70	365	25,550
Chrysene		6.02E-07	8.97E+00	480	1.00E-06	1	250	1	70	365	25,550
Di-n-butylphthalate	3.52E-06		7.50E-01	480	1.00E-06	1	250	1	70	365	25,550
Dibenz(a,h)anthracene		1.64E-07	2.45E+00	480	1.00E-06	1	250	1	70	365	25,550
Dibenzofuran			1.90E+00	480	1.00E-06	1	250	1	70	365	25,550
Diethylphthalate	8.92E-08		1.90E-02	480	1.00E-06	1	250	1	70	365	25,550
Fluoranthene	5.03E-05		1.07E+01	480	1.00E-06	1	250	1	70	365	25,550
Fluorene	9.57E-06		2.04E+00	480	1.00E-06	1	250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene		3.98E-07	5.93E+00	480	1.00E-06	1	250	1	70	365	25,550
N-Nitrosodiphenylamine (1)		3.79E-08	5.66E-01	480	1.00E-06	1	250	1	70	365	25,550
Naphthalene			2.32E+00	480	1.00E-06	1	250	1	70	365	25,550
Pentachlorophenol	5.18E-06	7.41E-08	1.10E+00	480	1.00E-06	1	250	1	70	365	25,550
Phenanthrene			7.37E+00	480	1.00E-06	1	250	1	70	365	25,550
Pyrene	5.88E-05		1.25E+01	480	1.00E-06	1	250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate	6.80E-06	9.71E-08	1.45E+00	480	1.00E-06	1	250	1	70	365	25,550
Pesticides											
4,4'-DDD	1.51E-08	2.15E-10	3.21E-03	480	1.00E-06	1	250	1	70	365	25,550
4,4'-DDE			1.81E-02	480	1.00E-06	1	250	1	70	365	25,550
4,4'-DDT	4.09E-08	5.85E-10	8.71E-03	480	1.00E-06	1	250	1	70	365	25,550
Aldrin	0.00E+00	0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
Aroclor-1254	0.00E+00	0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
Aroclor-1260		1.28E-09	1.91E-02	480	1.00E-06	1	250	1	70	365	25,550
Dieldrin	1.77E-08	2.53E-10	3.77E-03	480	1.00E-06	1	250	1	70	365	25,550
Endosulfan I	6.57E-08		1.40E-02	480	1.00E-06	1	250	1	70	365	25,550
Endosulfan II			3.38E-03	480	1.00E-06	1	250	1	70	365	25,550
Endosulfan sulfate	1.47E-08		3.12E-03	480	1.00E-06	1	250	1	70	365	25,550
Endrin	2.04E-08		4.33E-03	480	1.00E-06	1	250	1	70	365	25,550
Endrin aldehyde			2.54E-03	480	1.00E-06	1	250	1	70	365	25,550
Endrin ketone			4.30E-03	480	1.00E-06	1	250	1	70	365	25,550
Heptachlor	0.00E+00	0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
Heptachlor epoxide	7.83E-09	1.12E-10	1.67E-03	480	1.00E-06	1	250	1	70	365	25,550
Toxaphene		0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
alpha-Chlordane	1.07E-08	1.53E-10	2.29E-03	480	1.00E-06	1	250	1	70	365	25,550
beta-BHC		1.22E-10	1.82E-03	480	1.00E-06	1	250	1	70	365	25,550
gamma-BHC (Lindane)	0.00E+00		0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
gamma-Chlordane			2.51E-03	480	1.00E-06	1	250	1	70	365	25,550
Nitroaromatics											
2-amino-4,6-Dinitrotoluene			0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
Tetryl	0.00E+00		0.00E+00	480	1.00E-06	1	250	1	70	365	25,550

TABLE 6-18

CALCULATION OF INTAKE FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Metals											
Antimony	1.77E-05		3.77E+00	480	1.00E-06	1	250	1	70	365	25,550
Barium	4.42E-04		9.41E+01	480	1.00E-06	1	250	1	70	365	25,550
Copper	2.42E-04		5.16E+01	480	1.00E-06	1	250	1	70	365	25,550
Lead			1.92E+02	480	1.00E-06	1	250	1	70	365	25,550
Mercury	1.36E-06		2.89E-01	480	1.00E-06	1	250	1	70	365	25,550
Selenium	4.67E-06		9.94E-01	480	1.00E-06	1	250	1	70	365	25,550
Thallium	4.11E-06		8.75E-01	480	1.00E-06	1	250	1	70	365	25,550
Zinc	4.94E-04		1.05E+02	480	1.00E-06	1	250	1	70	365	25,550
Herbicides											
2,4,5-T	0.00E+00		0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
MCPP	0.00E+00		0.00E+00	480	1.00E-06	1	250	1	70	365	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC - Total Soil Data (RME)
480 (RME Construction Worker)
10-6
1 (All Receptors)
250 (RME Construction Worker)
1 (Upper bound limit for Construction Worker)
70 (Adult male)
1 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-57

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2-Tetrachloroethane		4.72E-10	NA	2.00E-01		9.45E-11
2-Butanone	2.35E-08		6.00E-01	NA	3.91E-08	
Acetone	3.94E-08		1.00E-01	NA	3.94E-07	
Benzene		3.35E-10	NA	2.90E-02		9.73E-12
Carbon Disulfide	9.39E-09		1.00E-01	NA	9.39E-08	
Chloroform	9.39E-09	1.34E-10	1.00E-02	6.10E-03	9.39E-07	8.19E-13
Methylene Chloride	1.41E-08	2.01E-10	6.00E-02	7.50E-03	2.35E-07	1.51E-12
Toluene	3.44E-08		2.00E-01	NA	1.72E-07	
Xylene (total)	2.00E-08		2.00E+00	NA	9.98E-09	
Semivolatile Organics						
2,4-Dinitrotoluene	5.28E-06		2.00E-03	NA	2.64E-03	
2,6-Dinitrotoluene	8.45E-07		1.00E-03	NA	8.45E-04	
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine		0.00E+00	NA	4.50E-01		0.00E+00
3-nitroaniline			NA	NA		
Acenaphthene	1.20E-05		6.00E-02	NA	2.00E-04	
Acenaphthylene			NA	NA		
Anthracene	9.67E-06		3.00E-01	NA	3.22E-05	
Benzo(a)anthracene		4.88E-07	NA	7.30E-01		3.56E-07
Benzo(a)pyrene		8.50E-07	NA	7.30E+00		6.20E-06
Benzo(b)fluoranthene		7.16E-07	NA	7.30E-01		5.22E-07
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		3.14E-07	NA	7.30E-01		2.29E-07
Butylbenzylphthalate	0.00E+00		2.00E+00	NA	0.00E+00	
Carbazole		1.51E-07	NA	2.00E-02		3.02E-09
Chrysene		6.02E-07	NA	7.30E-02		4.39E-08
Di-n-butylphthalate	3.52E-06		1.00E-01	NA	3.52E-05	
Dibenz(a,h)anthracene		1.64E-07	NA	7.30E+00		1.20E-06
Dibenzofuran			NA	NA		
Diethylphthalate	8.92E-08		8.00E+00	NA	1.12E-08	
Fluoranthene	5.03E-05		4.00E-02	NA	1.26E-03	
Fluorene	9.57E-06		4.00E-02	NA	2.39E-04	
Indeno(1,2,3-cd)pyrene		3.98E-07	NA	7.30E-01		2.90E-07
N-Nitrosodiphenylamine (1)		3.79E-08	NA	4.90E-03		1.86E-10
Naphthalene			NA	NA		
Pentachlorophenol	5.18E-06	7.41E-08	3.00E-02	1.20E-01	1.73E-04	8.89E-09
Phenanthrene			NA	NA		
Pyrene	5.88E-05		3.00E-02	NA	1.96E-03	
bis(2-Ethylhexyl)phthalate	6.80E-06	9.71E-08	2.00E-02	1.40E-02	3.40E-04	1.36E-09

TABLE 6-57

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD	1.51E-08	2.15E-10	5.00E-04	2.40E-01	3.02E-05	5.17E-11
4,4'-DDE			NA	NA		
4,4'-DDT	4.09E-08	5.85E-10	5.00E-04	3.40E-01	8.18E-05	1.99E-10
Aldrin	0.00E+00	0.00E+00	3.00E-05	1.70E+01	0.00E+00	0.00E+00
Aroclor-1254	0.00E+00	0.00E+00	2.00E-05	2.00E+00	0.00E+00	0.00E+00
Aroclor-1260		1.28E-09	NA	7.70E+00		9.89E-09
Dieldrin	1.77E-08	2.53E-10	5.00E-05	1.60E+01	3.54E-04	4.05E-09
Endosulfan I	6.57E-08		6.00E-03	NA	1.09E-05	
Endosulfan II			NA	NA		
Endosulfan sulfate	1.47E-08		5.00E-05	NA	2.93E-04	
Endrin	2.04E-08		3.00E-04	NA	6.78E-05	
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor	0.00E+00	0.00E+00	5.00E-04	4.50E+00	0.00E+00	0.00E+00
Heptachlor epoxide	7.83E-09	1.12E-10	1.30E-05	9.10E+00	6.02E-04	1.02E-09
Toxaphene		0.00E+00	NA	1.10E+00		0.00E+00
alpha-Chlordane	1.07E-08	1.53E-10	6.00E-05	1.30E+00	1.79E-04	1.99E-10
beta-BHC		1.22E-10	NA	1.80E+00		2.20E-10
gamma-BHC (Lindane)	0.00E+00		3.00E-04	NA	0.00E+00	
gamma-Chlordane			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl	0.00E+00		1.00E-02	NA	0.00E+00	
Metals						
Antimony	1.77E-05		4.00E-04	NA	4.43E-02	
Barium	4.42E-04		7.00E-02	NA	6.31E-03	
Copper	2.42E-04		4.00E-02	NA	6.06E-03	
Lead			NA	NA		
Mercury	1.36E-06		3.00E-04	NA	4.52E-03	
Selenium	4.67E-06		5.00E-03	NA	9.34E-04	
Thallium	4.11E-06		7.00E-05	NA	5.87E-02	
Zinc	4.94E-04		3.00E-01	NA	1.65E-03	
Herbicides						
2,4,5-T	0.00E+00		8.00E-03	NA	0.00E+00	
MCPP	0.00E+00		1.00E-03	NA	0.00E+00	
Totals - HQ & CR					**1.32E-01**	**8.88E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-24

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Volatile Organics												
1,1,2,2-Tetrachloroethane			7.04E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
2-Butanone			5.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Acetone			8.38E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzene			5.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Carbon Disulfide			2.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Chloroform			2.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Methylene Chloride			3.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Toluene			7.33E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Xylene (total)			4.25E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Semivolatile Organics												
2,4-Dinitrotoluene			1.12E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
2,6-Dinitrotoluene			1.80E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
2-methylnaphthalene			1.38E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
3,3'-Dichlorobenzidine				1.00E-06	5,800	1.0		250	1	70	365	25,550
3-nitroaniline				1.00E-06	5,800	1.0		250	1	70	365	25,550
Acenaphthene			2.55E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Acenaphthylene			2.82E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Anthracene			2.06E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(a)anthracene			7.27E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(a)pyrene			1.27E+01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(b)fluoranthene			1.07E+01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(g,h,i)perylene			6.21E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(k)fluoranthene			4.68E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Butylbenzylphthalate				1.00E-06	5,800	1.0		250	1	70	365	25,550
Carbazole			2.25E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Chrysene			8.97E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Di-n-butylphthalate			7.50E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Dibenz(a,h)anthracene			2.45E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Dibenzofuran			1.90E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Diethylphthalate			1.90E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Fluoranthene			1.07E+01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Fluorene			2.04E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene			5.93E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
N-Nitrosodiphenylamine (1)			5.66E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Naphthalene			2.32E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pentachlorophenol			1.10E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Phenanthrene			7.37E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pyrene			1.25E+01	1.00E-06	5,800	1.0		250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate			1.45E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pesticides												
4,4'-DDD			3.21E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
4,4'-DDE			1.81E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
4,4'-DDT			8.71E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Aldrin				1.00E-06	5,800	1.0		250	1	70	365	25,550
Aroclor-1254				1.00E-06	5,800	1.0	0.06	250	1	70	365	25,550
Aroclor-1260		9.31E-10	1.91E-02	1.00E-06	5,800	1.0	0.06	250	1	70	365	25,550
Dieldrin			3.77E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan I			1.40E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan II			3.38E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan sulfate			3.12E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin			4.33E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin aldehyde			2.54E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin ketone			4.30E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Heptachlor				1.00E-06	5,800	1.0		250	1	70	365	25,550
Heptachlor epoxide			1.67E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Toxaphene				1.00E-06	5,800	1.0		250	1	70	365	25,550
alpha-Chlordane			2.29E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
beta-BHC			1.82E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
gamma-BHC (Lindane)				1.00E-06	5,800	1.0		250	1	70	365	25,550
gamma-Chlordane			2.51E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Nitroaromatics												
2-amino-4,6-Dinitrotoluene				1.00E-06	5,800	1.0		250	1	70	365	25,550
Tetryl				1.00E-06	5,800	1.0		250	1	70	365	25,550

TABLE 6-24

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Metals												
Antimony			3.77E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Barium			9.41E+01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Copper			5.16E+01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Lead			1.92E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Mercury			2.89E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Selenium			9.94E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Thallium			8.75E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Zinc			1.05E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Herbicides												
2,4,5-T				1.00E-06	5,800	1.0		250	1	70	365	25,550
MCPP				1.00E-06	5,800	1.0		250	1	70	365	25,550

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

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC - Total Soil Data (RME)	EF = Exposure Frequency (days/year)	250 (RME Construction Worker)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	1 (Upper bound limit for CW)
SA = Surface Area Contact (cm²)	5,800 (RME Adult Worker)	BW = Bodyweight (kg)	70 (Adult Male)
AF =Soil to Skin Adherence Factor (mg/cm²)	1.0 (RME - All Receptors)	AT = Averaging Time (days)	1 x 365 (Nc) 70 x 365 (Car)
ABS = Absorption Factor (unitless)	Applicable for PCBs and Cadmium (EPA, 1992b)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-59

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2-Tetrachloroethane			NA	2.00E-01		
2-Butanone			6.00E-01	NA		
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Carbon Disulfide			1.00E-01	NA		
Chloroform			1.00E-02	6.10E-03		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
Xylene (total)			2.00E+00	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Diethylphthalate			8.00E+00	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 6-59

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE) REASONABLE MAXIMUM EXPOSURE (RME) CASE 3

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254			1.90E-05	2.11E+00		
Aroclor-1260		9.31E-10	NA	8.11E+00		7.55E-09
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor			5.00E-04	4.50E+00		
Heptachlor epoxide			1.30E-05	9.10E+00		
Toxaphene			NA	1.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			1.00E-02	NA		
Metals						
Antimony			4.00E-04	NA		
Barium			7.00E-03	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			1.50E-01	NA		
Herbicides						
2,4,5-T			8.00E-03	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR						**7.55E-09**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

Toxicity Values
Surface and Subsurface Soil Medium
REASONABLE MAXIMUM EXPOSURE (RME)
Seneca Army Depot, Romulus, New York - SEAD 16
CASE 3

Analyte	Oral RfD mg/kg/day	Carc. Slope Oral (mg/kg-day)-1	Dermal RfD mg/kg/day	Carc. Slope Dermal (mg/kg-day)-1
Volatile Organics				
Volatile Organics				
1,1,2,2-Tetrachloroethane	NA	2.00E-01	NA	2.00E-01
2-Butanone	6.00E-01	NA	6.00E-01	NA
Acetone	1.00E-01	NA	1.00E-01	NA
Benzene	NA	2.90E-02	NA	2.90E-02
Carbon Disulfide	1.00E-01	NA	1.00E-01	NA
Chloroform	1.00E-02	6.10E-03	1.00E-02	6.10E-03
Methylene Chloride	6.00E-02	7.50E-03	6.00E-02	6.00E-02
Toluene	2.00E-01	NA	1.20E-01	NA
Xylene (total)	2.00E+00	NA	2.00E+00	NA
Semivolatile Organics				
2,4-Dinitrotoluene	2.00E-03	NA	2.00E-03	NA
2,6-Dinitrotoluene	1.00E-03	NA	1.00E-03	NA
2-methylnaphthalene	NA	NA	NA	NA
2-Methylphenol	5.00E-02	NA	5.00E-02	NA
3,3'-Dichlorobenzidine	NA	4.50E-01	NA	4.50E-01
3-nitroaniline	NA	NA	NA	NA
Acenaphthene	6.00E-02	NA	6.00E-02	NA
Acenaphthylene	NA	NA	NA	NA
Anthracene	3.00E-01	NA	3.00E-01	NA
Benzo(a)anthracene	NA	7.30E-01	NA	1.46E+00
Benzo(a)pyrene	NA	7.30E+00	NA	1.46E+01
Benzo(b)fluoranthene	NA	7.30E-01	NA	1.46E+00
Benzo(g,h,i)perylene	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	7.30E-01	NA	1.46E+00
Butylbenzylphthalate	2.00E+00	NA	2.00E+00	NA
Carbazole	NA	2.00E-02	NA	2.00E-02
Chrysene	NA	7.30E-02	NA	1.46E-01
Di-n-butylphthalate	1.00E-01	NA	8.50E-02	NA
Dibenz(a,h)anthracene	NA	7.30E+00	NA	1.46E+01
Dibenzofuran	NA	NA	NA	NA
Diethylphthalate	8.00E+00	NA	8.00E+00	NA
Fluoranthene	4.00E-02	NA	4.00E-02	NA
Fluorene	4.00E-02	NA	4.00E-02	NA
Indeno(1,2,3-cd)pyrene	NA	7.30E-01	NA	1.46E+00
N-Nitrosodiphenylamine (1)	NA	4.90E-03	NA	4.90E-03
Naphthalene	NA	NA	NA	NA
Pentachlorophenol	3.00E-02	1.20E-01	3.00E-02	1.20E-01
Phenanthrene	NA	NA	NA	NA
Pyrene	3.00E-02	NA	3.00E-02	NA
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	2.00E-02	1.40E-02
Pesticides				
4,4'-DDD	5.00E-04	2.40E-01	5.00E-04	2.40E-01
4,4'-DDE	NA	NA	NA	NA
4,4'-DDT	5.00E-04	3.40E-01	5.00E-04	3.40E-01
Aldrin	3.00E-05	1.70E+01	3.00E-05	1.70E+01
Aroclor-1254	2.00E-05	2.00E+00	1.90E-05	2.11E+00
Aroclor-1260	NA	7.70E+00	NA	8.11E+00
Dieldrin	5.00E-05	1.60E+01	5.00E-05	1.60E+01
Endosulfan I	6.00E-03	NA	6.00E-03	NA
Endosulfan II	NA	NA	NA	NA
Endosulfan sulfate	5.00E-05	NA	5.00E-05	NA
Endrin	3.00E-04	NA	3.00E-04	NA
Endrin aldehyde	NA	NA	NA	NA
Endrin ketone	NA	NA	NA	NA
Heptachlor	5.00E-04	4.50E+00	5.00E-04	4.50E+00
Heptachlor epoxide	1.30E-05	9.10E+00	1.30E-05	9.10E+00
Toxaphene	NA	1.10E+00	NA	1.10E+00
alpha-Chlordane	6.00E-05	1.30E+00	6.00E-05	1.30E+00
beta-BHC	NA	1.80E+00	NA	1.80E+00
gamma-BHC (Lindane)	3.00E-04	NA	3.00E-04	NA
gamma-Chlordane	NA	NA	NA	NA
Nitroaromatics				
2-amino-4,6-Dinitrotoluene	NA	NA	NA	NA
Tetryl	1.00E-02	NA	1.00E-02	NA
Metals				
Antimony	4.00E-04	NA	4.00E-04	NA
Barium	7.00E-02	NA	7.00E-03	NA
Copper	4.00E-02	NA	2.00E-02	NA
Lead	NA	NA	NA	NA
Mercury	3.00E-04	NA	4.50E-05	NA
Selenium	5.00E-03	NA	3.00E-03	NA
Thallium	7.00E-05	NA	7.00E-05	NA
Zinc	3.00E-01	NA	1.50E-01	NA
Herbicides				
2,4,5-T	8.00E-03	NA	8.00E-03	NA
MCPP	1.00E-03	NA	1.00E-03	NA

TABLE 6-12

CALCULATION OF INTAKE (ONSITE)
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Volatile Organics									
1,1,2,2-Tetrachloroethane		2.09E-13	2.68E-10	2	50	5	25	1,825	25,550
Acetone			3.19E-10	2	50	5	25	1,825	25,550
Benzene		2.49E-13	3.19E-10	2	50	5	25	1,825	25,550
Carbon Disulfide	2.08E-12		1.90E-10	2	50	5	25	1,825	25,550
Chloroform		5.95E-14	7.60E-11	2	50	5	25	1,825	25,550
Methylene Chloride	8.33E-13	5.95E-14	7.60E-11	2	50	5	25	1,825	25,550
Toluene	1.25E-12		1.14E-10	2	50	5	25	1,825	25,550
Xylene (total)			2.79E-10	2	50	5	25	1,825	25,550
Semivolatile Organics									
2,4-Dinitrotoluene			4.27E-08	2	50	5	25	1,825	25,550
2,6-Dinitrotoluene			6.84E-09	2	50	5	25	1,825	25,550
2-Methylnaphthalene			5.24E-08	2	50	5	25	1,825	25,550
3,3'-Dichlorobenzidine			0.00E+00	2	50	5	25	1,825	25,550
3-nitroaniline			0.00E+00	2	50	5	25	1,825	25,550
Acenaphthene			ERR	2	50	5	25	1,825	25,550
Acenaphthylene			ERR	2	50	5	25	1,825	25,550
Anthracene			9.69E-08	2	50	5	25	1,825	25,550
Benzo(a)anthracene			1.07E-08	2	50	5	25	1,825	25,550
Benzo(a)pyrene			7.82E-08	2	50	5	25	1,825	25,550
Benzo(b)fluoranthene			2.76E-07	2	50	5	25	1,825	25,550
Benzo(g,h,i)perylene			4.81E-07	2	50	5	25	1,825	25,550
Benzo(k)fluoranthene			4.05E-07	2	50	5	25	1,825	25,550
Carbazole			1.78E-07	2	50	5	25	1,825	25,550
Chrysene			8.54E-08	2	50	5	25	1,825	25,550
Di-n-butylphthalate			3.41E-07	2	50	5	25	1,825	25,550
Dibenz(a,h)anthracene			2.85E-08	2	50	5	25	1,825	25,550
Dibenzofuran			ERR	2	50	5	25	1,825	25,550
Diethylphthalate			9.31E-08	2	50	5	25	1,825	25,550
Fluoranthene			7.23E-08	2	50	5	25	1,825	25,550
Fluorene			7.22E-10	2	50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene			4.07E-07	2	50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			7.75E-08	2	50	5	25	1,825	25,550
Naphthalene			2.25E-07	2	50	5	25	1,825	25,550
Pentachlorophenol			2.15E-08	2	50	5	25	1,825	25,550
Phenanthrene			8.80E-08	2	50	5	25	1,825	25,550
Pyrene			4.19E-08	2	50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			2.80E-07	2	50	5	25	1,825	25,550

TABLE 6-12

CALCULATION OF INTAKE (ONSITE)
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Pesticides									
4,4'-DDD			1.22E-10	2	50	5	25	1,825	25,550
4,4'-DDE			6.87E-10	2	50	5	25	1,825	25,550
4,4'-DDT		2.59E-13	3.31E-10	2	50	5	25	1,825	25,550
Aldrin	0.00E+00	0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
Aroclor-1254		0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
Aroclor-1260			7.28E-10	2	50	5	25	1,825	25,550
Dieldrin		1.12E-13	1.43E-10	2	50	5	25	1,825	25,550
Endosulfan I			5.32E-10	2	50	5	25	1,825	25,550
Endosulfan II			1.28E-10	2	50	5	25	1,825	25,550
Endosulfan sulfate			1.19E-10	2	50	5	25	1,825	25,550
Endrin			1.65E-10	2	50	5	25	1,825	25,550
Endrin aldehyde			9.66E-11	2	50	5	25	1,825	25,550
Endrin ketone			1.63E-10	2	50	5	25	1,825	25,550
Heptachlor		0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
Heptachlor epoxide		4.96E-14	6.33E-11	2	50	5	25	1,825	25,550
Toxaphene		0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
alpha-Chlordane			8.69E-11	2	50	5	25	1,825	25,550
beta-BHC		5.42E-14	6.92E-11	2	50	5	25	1,825	25,550
gamma-BHC (Lindane)			0.00E+00	2	50	5	25	1,825	25,550
gamma-Chlordane			9.54E-11	2	50	5	25	1,825	25,550
Nitroaromatics									
2-amino-4,6-Dinitrotoluene			0.00E+00	2	50	5	25	1,825	25,550
Tetryl			0.00E+00	2	50	5	25	1,825	25,550
Metals									
Antimony			1.43E-10	2	50	5	25	1,825	25,550
Barium	1.58E-07		1.44E-05	2	50	5	25	1,825	25,550
Copper			3.42E-04	2	50	5	25	1,825	25,550
Lead			1.31E-05	2	50	5	25	1,825	25,550
Mercury	4.04E-06		3.69E-04	2	50	5	25	1,825	25,550
Selenium			4.62E-06	2	50	5	25	1,825	25,550
Thallium			3.33E-11	2	50	5	25	1,825	25,550
Zinc			4.00E-09	2	50	5	25	1,825	25,550
Herbicides									
2,4,5-T			0.00E+00	2	50	5	25	1,825	25,550
MCPP			0.00E+00	2	50	5	25	1,825	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:	Assumptions:
CA = Chemical Concentration in Air (mg/m³)	Calculated Air EPC Data - RME
IR = Inhalation Rate (m³/day)	2 (RME Child)
EF = Exposure Frequency (days/yr)	50
ED = Exposure Duration (years)	5 (RME)
BW = Bodyweight (kg)	25 (Child)
AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-61

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2-Tetrachloroethane		2.09E-13	NA	2.03E-01		4.25E-14
Acetone			NA	NA		
Benzene		2.49E-13	NA	2.91E-02		7.24E-15
Carbon Disulfide	2.08E-12		2.86E-03	NA	7.29E-10	
Chloroform		5.95E-14	NA	8.05E-02		4.79E-15
Methylene Chloride	8.33E-13	5.95E-14	8.57E-01	1.65E-03	9.72E-13	9.82E-17
Toluene	1.25E-12		1.14E-01	NA	1.09E-11	
Xylene (total)			NA	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Diethylphthalate			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Ethylhexyl)phthalate			NA	NA		

TABLE 6-61

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		2.59E-13	NA	3.40E-01		8.80E-14
Aldrin	0.00E+00	0.00E+00	1.70E+01	1.72E+01	0.00E+00	0.00E+00
Aroclor-1254		0.00E+00	NA	4.00E-01		0.00E+00
Aroclor-1260			NA	NA		
Dieldrin		1.12E-13	NA	1.61E+01		1.81E-12
Endosulfan I			NA	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor		0.00E+00	NA	4.55E+00		0.00E+00
Heptachlor epoxide		4.96E-14	NA	9.10E+00		4.51E-13
Toxaphene		0.00E+00	NA	1.12E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		5.42E-14	NA	1.86E+00		1.00E-13
gamma-BHC (Lindane)			NA	NA		
gamma-Chlordane			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			NA	NA		
Metals						
Antimony			NA	NA		
Barium	1.58E-07		1.43E-04	NA	1.10E-03	
Copper			NA	NA		
Lead			NA	NA		
Mercury	4.04E-06		8.57E-05	NA	4.72E-02	
Selenium			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
Herbicides						
2,4,5-T			NA	NA		
MCPP			NA	NA		
Total HQ & CR					**4.83E-02**	**2.50E-12**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-7A

AMBIENT AIR EXPOSURE POINT CONCENTRATIONS
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

COMPOUND	SURFACE SOIL EPC Data mg/kg	AVERAGE TSP (ug/m³)	CONVERSION FACTOR (kg/ug)	AMBIENT AIR CALCULATED EPC (mg/m³)	MEASURED AIR SAMPLES (mg/m³)		AMBIENT AIR EPC (mg/m³)
Volatile Organics							
1,1,2,2-Tetrachloroethane	7.04E-03	3.80E+01	1.00E-09	2.68E-10			2.68E-10
Acetone	8.38E-03	3.80E+01	1.00E-09	3.19E-10			3.19E-10
Benzene	5.00E-03	3.80E+01	1.00E-09	3.19E-10			3.19E-10
Carbon Disulfide	2.00E-03	3.80E+01	1.00E-09	1.90E-10			1.90E-10
Chloroform	2.00E-03	3.80E+01	1.00E-09	7.60E-11			7.60E-11
Methylene Chloride	3.00E-03	3.80E+01	1.00E-09	7.60E-11			7.60E-11
Toluene	7.33E-03	3.80E+01	1.00E-09	1.14E-10			1.14E-10
Xylene (total)	4.25E-03	3.80E+01	1.00E-09	2.79E-10			2.79E-10
Semivolatile Organics							
2,4-Dinitrotoluene	1.12E+00	3.80E+01	1.00E-09	4.27E-08			4.27E-08
2,6-Dinitrotoluene	1.80E-01	3.80E+01	1.00E-09	6.84E-09			6.84E-09
2-Methylnaphthalene	1.38E+00	3.80E+01	1.00E-09	5.24E-08	7.84E-05	U	5.24E-08
3,3'-Dichlorobenzidine		3.80E+01	1.00E-09	0.00E+00			0.00E+00
3-nitroaniline		3.80E+01	1.00E-09	0.00E+00			0.00E+00
Acenaphthene	2.55E+00	3.80E+01	1.00E-09	ERR	7.84E-05	U	ERR
Acenaphthylene	2.82E-01	3.80E+01	1.00E-09	ERR			ERR
Anthracene	2.06E+00	3.80E+01	1.00E-09	9.69E-08	7.84E-05	U	9.69E-08
Benzo(a)anthracene	7.27E+00	3.80E+01	1.00E-09	1.07E-08			1.07E-08
Benzo(a)pyrene	1.27E+01	3.80E+01	1.00E-09	7.82E-08			7.82E-08
Benzo(b)fluoranthene	1.07E+01	3.80E+01	1.00E-09	2.76E-07			2.76E-07
Benzo(g,h,i)perylene	6.21E+00	3.80E+01	1.00E-09	4.81E-07			4.81E-07
Benzo(k)fluoranthene	4.68E+00	3.80E+01	1.00E-09	4.05E-07			4.05E-07
Carbazole	2.25E+00	3.80E+01	1.00E-09	1.78E-07			1.78E-07
Chrysene	8.97E+00	3.80E+01	1.00E-09	8.54E-08			8.54E-08
Di-n-butylphthalate	7.50E-01	3.80E+01	1.00E-09	3.41E-07	7.84E-05	U	3.41E-07
Dibenz(a,h)anthracene	2.45E+00	3.80E+01	1.00E-09	2.85E-08			2.85E-08
Dibenzofuran	1.90E+00	3.80E+01	1.00E-09	ERR	7.84E-05	U	ERR
Diethylphthalate	1.90E-02	3.80E+01	1.00E-09	9.31E-08	7.84E-05	U	9.31E-08
Fluoranthene	1.07E+01	3.80E+01	1.00E-09	7.23E-08			7.23E-08
Fluorene	2.04E+00	3.80E+01	1.00E-09	7.22E-10	7.84E-05	U	7.22E-10
Indeno(1,2,3-cd)pyrene	5.93E+00	3.80E+01	1.00E-09	4.07E-07			4.07E-07
N-Nitrosodiphenylamine (1)	5.66E-01	3.80E+01	1.00E-09	7.75E-08			7.75E-08
Naphthalene	2.32E+00	3.80E+01	1.00E-09	2.25E-07			2.25E-07
Pentachlorophenol	1.10E+00	3.80E+01	1.00E-09	2.15E-08			2.15E-08
Phenanthrene	7.37E+00	3.80E+01	1.00E-09	8.80E-08	7.84E-05	U	8.80E-08
Pyrene	1.25E+01	3.80E+01	1.00E-09	4.19E-08			4.19E-08
bis(2-Ethylhexyl)phthalate	1.45E+00	3.80E+01	1.00E-09	2.80E-07	7.84E-05	U	2.80E-07

TABLE 6-7A

AMBIENT AIR EXPOSURE POINT CONCENTRATIONS
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

COMPOUND	SURFACE SOIL EPC Data mg/kg	AVERAGE TSP (ug/m³)	CONVERSION FACTOR (kg/ug)	AMBIENT AIR CALCULATED EPC (mg/m³)	MEASURED AIR SAMPLES (mg/m³)	AMBIENT AIR EPC (mg/m³)
Pesticides						
4,4'-DDD	3.21E-03	3.80E+01	1.00E-09	1.22E-10		1.22E-10
4,4'-DDE	1.81E-02	3.80E+01	1.00E-09	6.87E-10		6.87E-10
4,4'-DDT	8.71E-03	3.80E+01	1.00E-09	3.31E-10		3.31E-10
Aldrin		3.80E+01	1.00E-09	0.00E+00		0.00E+00
Aroclor-1254		3.80E+01	1.00E-09	0.00E+00		0.00E+00
Aroclor-1260	1.91E-02	3.80E+01	1.00E-09	7.28E-10		7.28E-10
Dieldrin	3.77E-03	3.80E+01	1.00E-09	1.43E-10		1.43E-10
Endosulfan I	1.40E-02	3.80E+01	1.00E-09	5.32E-10		5.32E-10
Endosulfan II	3.38E-03	3.80E+01	1.00E-09	1.28E-10		1.28E-10
Endosulfan sulfate	3.12E-03	3.80E+01	1.00E-09	1.19E-10		1.19E-10
Endrin	4.33E-03	3.80E+01	1.00E-09	1.65E-10		1.65E-10
Endrin aldehyde	2.54E-03	3.80E+01	1.00E-09	9.66E-11		9.66E-11
Endrin ketone	4.30E-03	3.80E+01	1.00E-09	1.63E-10		1.63E-10
Heptachlor		3.80E+01	1.00E-09	0.00E+00		0.00E+00
Heptachlor epoxide	1.67E-03	3.80E+01	1.00E-09	6.33E-11		6.33E-11
Toxaphene		3.80E+01	1.00E-09	0.00E+00		0.00E+00
alpha-Chlordane	2.29E-03	3.80E+01	1.00E-09	8.69E-11		8.69E-11
beta-BHC	1.82E-03	3.80E+01	1.00E-09	6.92E-11		6.92E-11
gamma-BHC (Lindane)		3.80E+01	1.00E-09	0.00E+00		0.00E+00
gamma-Chlordane	2.51E-03	3.80E+01	1.00E-09	9.54E-11		9.54E-11
Nitroaromatics						
2-amino-4,6-Dinitrotoluene		3.80E+01	1.00E-09	0.00E+00		0.00E+00
Tetryl		3.80E+01	1.00E-09	0.00E+00		0.00E+00
Metals						
Antimony	3.77E-03	3.80E+01	1.00E-09	1.43E-10	9.80E-06 U	1.43E-10
Barium	9.41E-02	3.80E+01	1.00E-09	3.58E-09	1.44E-05	1.44E-05
Copper	5.16E-02	3.80E+01	1.00E-09	1.96E-09	3.42E-04	3.42E-04
Lead	1.92E-01	3.80E+01	1.00E-09	7.30E-09	1.31E-05	1.31E-05
Mercury	3.89E-04	3.80E+01	1.00E-09	1.48E-11	3.69E-04	3.69E-04
Selenium	9.94E-04	3.80E+01	1.00E-09	3.78E-11	4.62E-06	4.62E-06
Thallium	8.75E-04	3.80E+01	1.00E-09	3.33E-11	6.50E-06 U	3.33E-11
Zinc	1.05E-01	3.80E+01	1.00E-09	4.00E-09	6.52E-05 U	4.00E-09
Herbicides						
2,4,5-T		3.80E+01	1.00E-09	0.00E+00		0.00E+00
MCPP		3.80E+01	1.00E-09	0.00E+00		0.00E+00

EQUATION: **Calculated Air EPC (mg/m3) = Soil EPC x TSP x CF**

Variables:	**Assumptions:**
TSP = Total Suspended Particulates	**Average value - 38 ug/m3**
CF = Conversion Factor	**10-9 kg/ug**

U = Compound was not detected above the detection limit shown

TABLE 6-8

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Volatile Organics									
1,1,2,2-Tetrachloroethane		1.50E-12	2.68E-10	20	20	25	70	9,125	25,550
Acetone			3.19E-10	20	20	25	70	9,125	25,550
Benzene		1.78E-12	3.19E-10	20	20	25	70	9,125	25,550
Carbon Disulfide	2.97E-12		1.90E-10	20	20	25	70	9,125	25,550
Chloroform		4.25E-13	7.60E-11	20	20	25	70	9,125	25,550
Methylene Chloride	1.19E-12	4.25E-13	7.60E-11	20	20	25	70	9,125	25,550
Toluene	1.78E-12		1.14E-10	20	20	25	70	9,125	25,550
Xylene (total)			2.79E-10	20	20	25	70	9,125	25,550
Semivolatile Organics									
2,4-Dinitrotoluene			4.27E-08	20	20	25	70	9,125	25,550
2,6-Dinitrotoluene			6.84E-09	20	20	25	70	9,125	25,550
2-Methylnaphthalene			5.24E-08	20	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine			0.00E+00	20	20	25	70	9,125	25,550
3-nitroaniline			0.00E+00	20	20	25	70	9,125	25,550
Acenaphthene			ERR	20	20	25	70	9,125	25,550
Acenaphthylene			ERR	20	20	25	70	9,125	25,550
Anthracene			9.69E-08	20	20	25	70	9,125	25,550
Benzo(a)anthracene			1.07E-08	20	20	25	70	9,125	25,550
Benzo(a)pyrene			7.82E-08	20	20	25	70	9,125	25,550
Benzo(b)fluoranthene			2.76E-07	20	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			4.81E-07	20	20	25	70	9,125	25,550
Benzo(k)fluoranthene			4.05E-07	20	20	25	70	9,125	25,550
Carbazole			1.78E-07	20	20	25	70	9,125	25,550
Chrysene			8.54E-08	20	20	25	70	9,125	25,550
Di-n-butylphthalate			3.41E-07	20	20	25	70	9,125	25,550
Dibenz(a,h)anthracene			2.85E-08	20	20	25	70	9,125	25,550
Dibenzofuran			ERR	20	20	25	70	9,125	25,550
Diethylphthalate			9.31E-08	20	20	25	70	9,125	25,550
Fluoranthene			7.23E-08	20	20	25	70	9,125	25,550
Fluorene			7.22E-10	20	20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			4.07E-07	20	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			7.75E-08	20	20	25	70	9,125	25,550
Naphthalene			2.25E-07	20	20	25	70	9,125	25,550
Pentachlorophenol			2.15E-08	20	20	25	70	9,125	25,550
Phenanthrene			8.80E-08	20	20	25	70	9,125	25,550
Pyrene			4.19E-08	20	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			2.80E-07	20	20	25	70	9,125	25,550

TABLE 6-8

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Pesticides									
4,4'-DDD			1.22E-10	20	20	25	70	9,125	25,550
4,4'-DDE			6.87E-10	20	20	25	70	9,125	25,550
4,4'-DDT		1.85E-12	3.31E-10	20	20	25	70	9,125	25,550
Aldrin	0.00E+00	0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
Aroclor-1254		0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
Aroclor-1260			7.28E-10	20	20	25	70	9,125	25,550
Dieldrin		8.01E-13	1.43E-10	20	20	25	70	9,125	25,550
Endosulfan I			5.32E-10	20	20	25	70	9,125	25,550
Endosulfan II			1.28E-10	20	20	25	70	9,125	25,550
Endosulfan sulfate			1.19E-10	20	20	25	70	9,125	25,550
Endrin			1.65E-10	20	20	25	70	9,125	25,550
Endrin aldehyde			9.66E-11	20	20	25	70	9,125	25,550
Endrin ketone			1.63E-10	20	20	25	70	9,125	25,550
Heptachlor		0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
Heptachlor epoxide		3.54E-13	6.33E-11	20	20	25	70	9,125	25,550
Toxaphene		0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
alpha-Chlordane			8.69E-11	20	20	25	70	9,125	25,550
beta-BHC		3.87E-13	6.92E-11	20	20	25	70	9,125	25,550
gamma-BHC (Lindane)			0.00E+00	20	20	25	70	9,125	25,550
gamma-Chlordane			9.54E-11	20	20	25	70	9,125	25,550
Nitroaromatics									
2-amino-4,6-Dinitrotoluene			0.00E+00	20	20	25	70	9,125	25,550
Tetryl			0.00E+00	20	20	25	70	9,125	25,550
Metals									
Antimony			1.43E-10	20	20	25	70	9,125	25,550
Barium	2.25E-07		1.44E-05	20	20	25	70	9,125	25,550
Copper			3.42E-04	20	20	25	70	9,125	25,550
Lead			1.31E-05	20	20	25	70	9,125	25,550
Mercury	5.78E-06		3.69E-04	20	20	25	70	9,125	25,550
Selenium			4.62E-06	20	20	25	70	9,125	25,550
Thallium			3.33E-11	20	20	25	70	9,125	25,550
Zinc			4.00E-09	20	20	25	70	9,125	25,550
Herbicides									
2,4,5-T			0.00E+00	20	20	25	70	9,125	25,550
MCPP			0.00E+00	20	20	25	70	9,125	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:

CA = Chemical Concentration in Air (mg/m³)
IR = Inhalation Rate (m³/day)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

Calculated Air EPC Data - RME
20 (RME All Receptors)
20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult Male)
25 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-43

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2-Tetrachloroethane		1.50E-12	NA	2.03E-01		3.04E-13
Acetone			NA	NA		
Benzene		1.78E-12	NA	2.91E-02		5.17E-14
Carbon Disulfide	2.97E-12		2.86E-03	NA	1.04E-09	
Chloroform		4.25E-13	NA	8.05E-02		3.42E-14
Methylene Chloride	1.19E-12	4.25E-13	8.57E-01	1.65E-03	1.39E-12	7.01E-16
Toluene	1.78E-12		1.14E-01	NA	1.56E-11	
Xylene (total)			NA	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Diethylphthalate			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Ethylhexyl)phthalate			NA	NA		

TABLE 6-43

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		1.85E-12	NA	3.40E-01		6.29E-13
Aldrin	0.00E+00	0.00E+00	1.70E+01	1.72E+01	0.00E+00	0.00E+00
Aroclor-1254		0.00E+00	NA	4.00E-01		0.00E+00
Aroclor-1260			NA	NA		
Dieldrin		8.01E-13	NA	1.61E+01		1.29E-11
Endosulfan I			NA	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor		0.00E+00	NA	4.55E+00		0.00E+00
Heptachlor epoxide		3.54E-13	NA	9.10E+00		3.22E-12
Toxaphene		0.00E+00	NA	1.12E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		3.87E-13	NA	1.86E+00		7.18E-13
gamma-BHC (Lindane)			NA	NA		
gamma-Chlordane			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			NA	NA		
Metals						
Antimony			NA	NA		
Barium	2.25E-07		1.43E-04	NA	1.58E-03	
Copper			NA	NA		
Lead			NA	NA		
Mercury	5.78E-06		8.57E-05	NA	6.74E-02	
Selenium			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
Herbicides						
2,4,5-T			NA	NA		
MCPP			NA	NA		
Total HQ & CR					**6.90E-02**	**1.79E-11**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-10

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Volatile Organics									
1,1,2,2-Tetrachloroethane		7.48E-13	2.68E-10	20	250	1	70	365	25,550
Acetone			3.19E-10	20	250	1	70	365	25,550
Benzene		8.90E-13	3.19E-10	20	250	1	70	365	25,550
Carbon Disulfide	3.72E-11		1.90E-10	20	250	1	70	365	25,550
Chloroform		2.12E-13	7.60E-11	20	250	1	70	365	25,550
Methylene Chloride	1.49E-11	2.12E-13	7.60E-11	20	250	1	70	365	25,550
Toluene	2.23E-11		1.14E-10	20	250	1	70	365	25,550
Xylene (total)			2.79E-10	20	250	1	70	365	25,550
Semivolatile Organics									
2,4-Dinitrotoluene			4.27E-08	20	250	1	70	365	25,550
2,6-Dinitrotoluene			6.84E-09	20	250	1	70	365	25,550
2-Methylnaphthalene			5.24E-08	20	250	1	70	365	25,550
3,3'-Dichlorobenzidine			0.00E+00	20	250	1	70	365	25,550
3-nitroaniline			0.00E+00	20	250	1	70	365	25,550
Acenaphthene			ERR	20	250	1	70	365	25,550
Acenaphthylene			ERR	20	250	1	70	365	25,550
Anthracene			9.69E-08	20	250	1	70	365	25,550
Benzo(a)anthracene			1.07E-08	20	250	1	70	365	25,550
Benzo(a)pyrene			7.82E-08	20	250	1	70	365	25,550
Benzo(b)fluoranthene			2.76E-07	20	250	1	70	365	25,550
Benzo(g,h,i)perylene			4.81E-07	20	250	1	70	365	25,550
Benzo(k)fluoranthene			4.05E-07	20	250	1	70	365	25,550
Carbazole			1.78E-07	20	250	1	70	365	25,550
Chrysene			8.54E-08	20	250	1	70	365	25,550
Di-n-butylphthalate			3.41E-07	20	250	1	70	365	25,550
Dibenz(a,h)anthracene			2.85E-08	20	250	1	70	365	25,550
Dibenzofuran			ERR	20	250	1	70	365	25,550
Diethylphthalate			9.31E-08	20	250	1	70	365	25,550
Fluoranthene			7.23E-08	20	250	1	70	365	25,550
Fluorene			7.22E-10	20	250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene			4.07E-07	20	250	1	70	365	25,550
N-Nitrosodiphenylamine (1)			7.75E-08	20	250	1	70	365	25,550
Naphthalene			2.25E-07	20	250	1	70	365	25,550
Pentachlorophenol			2.15E-08	20	250	1	70	365	25,550
Phenanthrene			8.80E-08	20	250	1	70	365	25,550
Pyrene			4.19E-08	20	250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate			2.80E-07	20	250	1	70	365	25,550

TABLE 6-10

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m^3)	Inhalation Rate (m^3/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
Pesticides									
4,4'-DDD			1.22E-10	20	250	1	70	365	25,550
4,4'-DDE			6.87E-10	20	250	1	70	365	25,550
4,4'-DDT		9.26E-13	3.31E-10	20	250	1	70	365	25,550
Aldrin	0.00E+00	0.00E+00	0.00E+00	20	250	1	70	365	25,550
Aroclor-1254		0.00E+00	0.00E+00	20	250	1	70	365	25,550
Aroclor-1260			7.28E-10	20	250	1	70	365	25,550
Dieldrin		4.01E-13	1.43E-10	20	250	1	70	365	25,550
Endosulfan I			5.32E-10	20	250	1	70	365	25,550
Endosulfan II			1.28E-10	20	250	1	70	365	25,550
Endosulfan sulfate			1.19E-10	20	250	1	70	365	25,550
Endrin			1.65E-10	20	250	1	70	365	25,550
Endrin aldehyde			9.66E-11	20	250	1	70	365	25,550
Endrin ketone			1.63E-10	20	250	1	70	365	25,550
Heptachlor		0.00E+00	0.00E+00	20	250	1	70	365	25,550
Heptachlor epoxide		1.77E-13	6.33E-11	20	250	1	70	365	25,550
Toxaphene		0.00E+00	0.00E+00	20	250	1	70	365	25,550
alpha-Chlordane			8.69E-11	20	250	1	70	365	25,550
beta-BHC		1.93E-13	6.92E-11	20	250	1	70	365	25,550
gamma-BHC (Lindane)			0.00E+00	20	250	1	70	365	25,550
gamma-Chlordane			9.54E-11	20	250	1	70	365	25,550
Nitroaromatics									
2-amino-4,6-Dinitrotoluene			0.00E+00	20	250	1	70	365	25,550
Tetryl			0.00E+00	20	250	1	70	365	25,550
Metals									
Antimony			1.43E-10	20	250	1	70	365	25,550
Barium	2.82E-06		1.44E-05	20	250	1	70	365	25,550
Copper			3.42E-04	20	250	1	70	365	25,550
Lead			1.31E-05	20	250	1	70	365	25,550
Mercury	7.22E-05		3.69E-04	20	250	1	70	365	25,550
Selenium			4.62E-06	20	250	1	70	365	25,550
Thallium			3.33E-11	20	250	1	70	365	25,550
Zinc			4.00E-09	20	250	1	70	365	25,550
Herbicides									
2,4,5-T			0.00E+00	20	250	1	70	365	25,550
MCPP			0.00E+00	20	250	1	70	365	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:

CA = Chemical Concentration in Air (mg/m^3)
IR = Inhalation Rate (m^3/day)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

Calculated Air EPC Data - RME
20 (all receptors)
250 (RME Construction Workers)
1 (Upper bound period of Construction Worker)
70 (Adult Male)
1 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-55

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2-Tetrachloroethane		7.48E-13	NA	2.03E-01		1.52E-13
Acetone			NA	NA		
Benzene		8.90E-13	NA	2.91E-02		2.59E-14
Carbon Disulfide	3.72E-11		2.86E-03	NA	1.30E-08	
Chloroform		2.12E-13	NA	8.05E-02		1.71E-14
Methylene Chloride	1.49E-11	2.12E-13	8.57E-01	1.65E-03	1.74E-11	3.51E-16
Toluene	2.23E-11		1.14E-01	NA	1.95E-10	
Xylene (total)			NA	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Diethylphthalate			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Ethylhexyl)phthalate			NA	NA		

TABLE 6-55

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		9.26E-13	NA	3.40E-01		3.14E-13
Aldrin	0.00E+00	0.00E+00	1.70E+01	1.72E+01	0.00E+00	0.00E+00
Aroclor-1254		0.00E+00	NA	4.00E-01		0.00E+00
Aroclor-1260			NA	NA		
Dieldrin		4.01E-13	NA	1.61E+01		6.45E-12
Endosulfan I			NA	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor		0.00E+00	NA	4.55E+00		0.00E+00
Heptachlor epoxide		1.77E-13	NA	9.10E+00		1.61E-12
Toxaphene		0.00E+00	NA	1.12E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		1.93E-13	NA	1.86E+00		3.59E-13
gamma-BHC (Lindane)			NA	NA		
gamma-Chlordane			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			NA	NA		
Metals						
Antimony			NA	NA		
Barium	2.82E-06		1.43E-04	NA	1.97E-02	
Copper			NA	NA		
Lead			NA	NA		
Mercury	7.22E-05		8.57E-05	NA	8.42E-01	
Selenium			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
Herbicides						
2,4,5-T			NA	NA		
MCPP			NA	NA		
Total HQ & CR					**8.62E-01**	**8.93E-12**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-20

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Volatile Organics											
1,1,2,2,-Tetrachloroethane		5.51E-10	7.04E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Acetone	9.19E-09		8.38E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Benzene		3.91E-10	5.00E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Carbon Disulfide	2.19E-09		2.00E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Chloroform	2.19E-09	1.57E-10	2.00E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Methylene Chloride	3.29E-09	2.35E-10	3.00E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Toluene	8.04E-09		7.33E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Xylene (total)	4.66E-09		4.25E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Semivolatile Organics											
2,4-Dinitrotoluene	1.23E-06		1.12E+00	200	1.00E-06	1	50	5	25	1,825	25,550
2,6-Dinitrotoluene	1.97E-07		1.80E-01	200	1.00E-06	1	50	5	25	1,825	25,550
2-methylnaphthalene			1.38E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Acenaphthene			2.55E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Acenaphthylene	3.09E-07		2.82E-01	200	1.00E-06	1	50	5	25	1,825	25,550
Anthracene		1.61E-07	2.06E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(a)anthracene		5.69E-07	7.27E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(a)pyrene		9.92E-07	1.27E+01	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(b)fluoranthene			1.07E+01	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(g,h,i)perylene		4.86E-07	6.21E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Benzo(k)fluoranthene		3.67E-07	4.68E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Carbazole		1.76E-07	2.25E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Chrysene	9.83E-06		8.97E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Di-n-butylphthalate		5.87E-08	7.50E-01	200	1.00E-06	1	50	5	25	1,825	25,550
Dibenz(a,h)anthracene			2.45E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Dibenzofuran	2.08E-06		1.90E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Diethylphthalate	2.08E-08		1.90E-02	200	1.00E-06	1	50	5	25	1,825	25,550
Fluoranthene	1.17E-05		1.07E+01	200	1.00E-06	1	50	5	25	1,825	25,550
Fluorene		1.60E-07	2.04E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene		4.64E-07	5.93E+00	200	1.00E-06	1	50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			5.66E-01	200	1.00E-06	1	50	5	25	1,825	25,550
Naphthalene	2.54E-06	1.81E-07	2.32E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Pentachlorophenol			1.10E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Phenanthrene	8.08E-06		7.37E+00	200	1.00E-06	1	50	5	25	1,825	25,550
Pyrene	1.37E-05	9.81E-07	1.25E+01	200	1.00E-06	1	50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate	1.59E-06	1.13E-07	1.45E+00	200	1.00E-06	1	50	5	25	1,825	25,550

TABLE 6-20

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Pesticides											
4,4'-DDD			3.21E-03	200	1.00E-06	1	50	5	25	1,825	25,550
4,4'-DDE	1.98E-08	1.41E-09	1.81E-02	200	1.00E-06	1	50	5	25	1,825	25,550
4,4'-DDT	9.55E-09	6.82E-10	8.71E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Aroclor-1260	2.10E-08	1.50E-09	1.91E-02	200	1.00E-06	1	50	5	25	1,825	25,550
Dieldrin	4.13E-09		3.77E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endosulfan I			1.40E-02	200	1.00E-06	1	50	5	25	1,825	25,550
Endosulfan II	3.70E-09		3.38E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endosulfan sulfate	3.42E-09		3.12E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endrin			4.33E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endrin aldehyde			2.54E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Endrin ketone	4.71E-09	3.36E-10	4.30E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Heptachlor				200	1.00E-06	1	50	5	25	1,825	25,550
Heptachlor epoxide		1.30E-10	1.67E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Toxaphene				200	1.00E-06	1	50	5	25	1,825	25,550
alpha-Chlordane		1.79E-10	2.29E-03	200	1.00E-06	1	50	5	25	1,825	25,550
beta-BHC	2.00E-09		1.82E-03	200	1.00E-06	1	50	5	25	1,825	25,550
gamma-Chlordane			2.51E-03	200	1.00E-06	1	50	5	25	1,825	25,550
delta-BHC	1.80E-09	1.29E-10	1.64E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Metals											
Antimony	4.13E-09		3.77E-03	200	1.00E-06	1	50	5	25	1,825	25,550
Barium	1.03E-07		9.41E-02	200	1.00E-06	1	50	5	25	1,825	25,550
Lead	2.11E-07		1.92E-01	200	1.00E-06	1	50	5	25	1,825	25,550
Mercury	4.26E-10		3.89E-04	200	1.00E-06	1	50	5	25	1,825	25,550
Selenium	1.09E-09		9.94E-04	200	1.00E-06	1	50	5	25	1,825	25,550
Thallium	9.59E-10		8.75E-04	200	1.00E-06	1	50	5	25	1,825	25,550
Zinc	1.15E-07	8.23E-09	1.05E-01	200	1.00E-06	1	50	5	25	1,825	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC Soil Data - RME
IR = Ingestion Rate (mg soil/day)	200 (RME Child)
CF = Conversion Factor (10-6 kg/mg)	10-6
FI = Fraction Ingested (unitless)	1
EF = Exposure Frequency (days/years)	50 (RME)
ED = Exposure Duration (years)	5 (RME)
BW = Bodyweight (kg)	25 (Child)
AT = Averaging Time (days)	5 x 365 (NC), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-63

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane		5.51E-10	NA	2.00E-01		1.10E-10
Acetone	9.19E-09		1.00E-01	NA	9.19E-08	
Benzene		3.91E-10	NA	2.90E-02		1.14E-11
Carbon Disulfide	2.19E-09		1.00E-01	NA	2.19E-08	
Chloroform	2.19E-09	1.57E-10	1.00E-02	6.10E-03	2.19E-07	9.55E-13
Methylene Chloride	3.29E-09	2.35E-10	6.00E-02	7.50E-03	5.48E-08	1.76E-12
Toluene	8.04E-09		2.00E-01	NA	4.02E-08	
Xylene (total)	4.66E-09		2.00E+00	NA	2.33E-09	
Semivolatile Organics						
2,4-Dinitrotoluene	1.23E-06		2.00E-03	NA	6.16E-04	
2,6-Dinitrotoluene	1.97E-07		1.00E-03	NA	1.97E-04	
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene	3.09E-07		NA	NA		
Anthracene		1.61E-07	3.00E-01	NA		
Benzo(a)anthracene		5.69E-07	NA	7.30E-01		4.15E-07
Benzo(a)pyrene		9.92E-07	NA	7.30E+00		7.24E-06
Benzo(b)fluoranthene			NA	7.30E-01		
Benzo(g,h,i)perylene		4.86E-07	NA	NA		
Benzo(k)fluoranthene		3.67E-07	NA	7.30E-01		2.68E-07
Carbazole		1.76E-07	NA	2.00E-02		3.52E-09
Chrysene	9.83E-06		NA	7.30E-02		
Di-n-butylphthalate		5.87E-08	1.00E-01	NA		
Dibenz(a,h)anthracene			NA	7.30E+00		
Dibenzofuran	2.08E-06		NA	NA		
Diethylphthalate	2.08E-08		8.00E+00	NA	2.60E-09	
Fluoranthene	1.17E-05		4.00E-02	NA	2.93E-04	
Fluorene		1.60E-07	4.00E-02	NA		
Indeno(1,2,3-cd)pyrene		4.64E-07	NA	7.30E-01		3.39E-07
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene	2.54E-06	1.81E-07	NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene	8.08E-06		NA	NA		
Pyrene	1.37E-05	9.81E-07	3.00E-02	NA	4.58E-04	
bis(2-Ethylhexyl)phthalate	1.59E-06	1.13E-07	2.00E-02	1.40E-02	7.93E-05	1.59E-09

TABLE 6-63

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE	1.98E-08	1.41E-09	NA	NA		
4,4'-DDT	9.55E-09	6.82E-10	5.00E-04	3.40E-01	1.91E-05	2.32E-10
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254			2.00E-05	2.00E+00		
Aroclor-1260	2.10E-08	1.50E-09	NA	7.70E+00		1.15E-08
Dieldrin	4.13E-09		5.00E-05	1.60E+01	8.27E-05	
Endosulfan I			6.00E-03	NA		
Endosulfan II	3.70E-09		NA	NA		
Endosulfan sulfate	3.42E-09		5.00E-05	NA	6.84E-05	
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone	4.71E-09	3.36E-10	NA	NA		
Heptachlor			5.00E-04	4.50E+00		
Heptachlor epoxide		1.30E-10	1.30E-05	9.10E+00		1.19E-09
Toxaphene			NA	1.10E+00		
alpha-Chlordane		1.79E-10	6.00E-05	1.30E+00		2.33E-10
beta-BHC	2.00E-09		NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
delta-BHC	1.80E-09	1.29E-10	NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			1.00E-02	NA		
Metals						
Antimony	4.13E-09		4.00E-04	NA	1.03E-05	
Barium	1.03E-07		7.00E-02	NA	1.47E-06	
Copper			4.00E-02	NA		
Lead	2.11E-07		NA	NA		
Mercury	4.26E-10		3.00E-04	NA	1.42E-06	
Selenium	1.09E-09		5.00E-03	NA	2.18E-07	
Thallium	9.59E-10		7.00E-05	NA	1.37E-05	
Zinc	1.15E-07	8.23E-09	3.00E-01	NA	3.84E-07	
Herbicides						
2,4,5-T			1.00E-02	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR					**1.84E-03**	**8.28E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Volatile Organics												
1,1,2,2,-Tetrachloroethane			7.04E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acetone			8.38E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzene			5.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Carbon Disulfide			2.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Chloroform			2.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Methylene Chloride			3.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Toluene			7.33E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Xylene (total)			4.25E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Semivolatile Organics												
2,4-Dinitrotoluene			1.12E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2,6-Dinitrotoluene			1.80E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2-methylnaphthalene			1.38E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
3,3'-Dichlorobenzidine				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
3-nitroaniline				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acenaphthene			2.55E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acenaphthylene			2.82E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Anthracene			2.06E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(a)anthracene			7.27E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(a)pyrene			1.27E+01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(b)fluoranthene			1.07E+01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(g,h,i)perylene			6.21E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(k)fluoranthene			4.68E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Carbazole			2.25E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Chrysene			8.97E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Di-n-butylphthalate			7.50E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Dibenz(a,h)anthracene			2.45E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Dibenzofuran			1.90E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Diethylphthalate			1.90E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Fluoranthene			1.07E+01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Fluorene			2.04E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene			5.93E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			5.66E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Naphthalene			2.32E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pentachlorophenol			1.10E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Phenanthrene			7.37E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pyrene			1.25E+01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			1.45E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pesticides												
4,4'-DDD			3.21E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4,4'-DDE			1.81E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4,4'-DDT			8.71E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Aldrin				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Aroclor-1254				1.00E-06	2,300	1.0	0.06	50	5	25	1,825	25,550
Aroclor-1260		1.03E-09	1.91E-02	1.00E-06	2,300	1.0	0.06	50	5	25	1,825	25,550
Dieldrin			3.77E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan I			1.40E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan II			3.38E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan sulfate			3.12E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin			4.33E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin aldehyde			2.54E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin ketone			4.30E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Heptachlor				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Heptachlor epoxide			1.67E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Toxaphene				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
alpha-Chlordane			2.29E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
beta-BHC			1.82E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
gamma-BHC (Lindane)				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
gamma-Chlordane			2.51E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
delta-BHC			1.64E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Nitroaromatics												
2-amino-4,6-Dinitrotoluene				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Tetryl				1.00E-06	2,300	1.0		50	5	25	1,825	25,550

TABLE 6-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Metals												
Antimony			3.77E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Barium			9.41E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Copper			5.16E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Lead			1.92E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Mercury			3.89E-04	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Selenium			9.94E-04	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Thallium			8.75E-04	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Zinc			1.05E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Herbicides												
2,4,5-T				1.00E-06	2,300	1.0		250	5	25	1,825	25,550
MCPP				1.00E-06	2,300	1.0		250	5	25	1,825	25,550

EQUATION:

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

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC Soil Data - RME	EF = Exposure Frequency (events/year)	50 (RME)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	5 (RME)
SA = Surface Area Contact (cm²)	2,300 (RME Child)	BW = Bodyweight (kg)	25 kg (child)
AF =Soil to Skin Adherence Factor (mg/cm²)	1.0 (RME all receptors)	AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (Car)
ABS = Absorption Factor (unitless)	Compound Specific PCBs and Cd (EPA, 1992b) (Default Assumption 0% = 0.0)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-65

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane			NA	2.00E-01		
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Carbon Disulfide			1.00E-01	NA		
Chloroform			1.00E-02	6.10E-03		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
Xylene (total)			2.00E+00	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Diethylphthalate			8.00E+00	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 6-65

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254			1.90E-05	2.11E+00		
Aroclor-1260		1.03E-09	NA	8.11E+00		8.39E-09
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor			5.00E-04	4.50E+00		
Heptachlor epoxide			1.30E-05	9.10E+00		
Toxaphene			NA	1.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			1.00E-02	NA		
Metals						
Antimony			4.00E-04	NA		
Barium			7.00E-03	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			1.50E-01	NA		
Herbicides						
2,4,5-T			1.00E-02	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR						8.39E-09

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Volatile Organics											
1,1,2,2,-Tetrachloroethane		1.97E-10	7.04E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Acetone	6.56E-10		8.38E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Benzene		1.40E-10	5.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Carbon Disulfide	1.57E-10		2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Chloroform	1.57E-10	5.59E-11	2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Methylene Chloride	2.35E-10	8.39E-11	3.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Toluene	5.74E-10		7.33E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Xylene (total)	3.33E-10		4.25E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Semivolatile Organics											
2,4-Dinitrotoluene	8.80E-08		1.12E+00	100	1.00E-06	1	20	25	70	9,125	25,550
2,6-Dinitrotoluene	1.41E-08		1.80E-01	100	1.00E-06	1	20	25	70	9,125	25,550
2-methylnaphthalene			1.38E+00	100	1.00E-06	1	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine		0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
3-nitroaniline			0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthene	2.00E-07		2.55E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthylene			2.82E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Anthracene	1.61E-07		2.06E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)anthracene		2.03E-07	7.27E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)pyrene		3.54E-07	1.27E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(b)fluoranthene		2.98E-07	1.07E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			6.21E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(k)fluoranthene		1.31E-07	4.68E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Carbazole		6.28E-08	2.25E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Chrysene		2.51E-07	8.97E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Di-n-butylphthalate	5.87E-08		7.50E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenz(a,h)anthracene		6.85E-08	2.45E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenzofuran			1.90E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Diethylphthalate	1.49E-09		1.90E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Fluoranthene	8.38E-07		1.07E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Fluorene	1.60E-07		2.04E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene		1.66E-07	5.93E+00	100	1.00E-06	1	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)		1.58E-08	5.66E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Naphthalene			2.32E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pentachlorophenol	8.64E-08	3.09E-08	1.10E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Phenanthrene			7.37E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pyrene	9.81E-07		1.25E+01	100	1.00E-06	1	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate	1.13E-07	4.05E-08	1.45E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pesticides											
4,4'-DDD	2.51E-10	8.98E-11	3.21E-03	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDE			1.81E-02	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDT	6.82E-10	2.44E-10	8.71E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Aldrin	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1254	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1260		5.35E-10	1.91E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Dieldrin	2.95E-10	1.05E-10	3.77E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan I	1.09E-09		1.40E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan II			3.38E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan sulfate	2.44E-10		3.12E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin	3.39E-10		4.33E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin aldehyde			2.54E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin ketone			4.30E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor epoxide	1.30E-10	4.66E-11	1.67E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Toxaphene		0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
alpha-Chlordane	1.79E-10	6.39E-11	2.29E-03	100	1.00E-06	1	20	25	70	9,125	25,550
beta-BHC		5.09E-11	1.82E-03	100	1.00E-06	1	20	25	70	9,125	25,550
gamma-BHC (Lindane)	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
gamma-Chlordane			2.51E-03	100	1.00E-06	1	20	25	70	9,125	25,550
delta-BHC			1.64E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Nitroaromatics											
2-amino-4,6-Dinitrotoluene			0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Tetryl	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550

TABLE 6-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Metals											
Antimony	2.95E-10		3.77E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Barium	7.36E-09		9.41E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Copper	4.04E-09		5.16E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Lead			1.92E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Mercury	3.05E-11		3.89E-04	100	1.00E-06	1	20	25	70	9,125	25,550
Selenium	7.78E-11		9.94E-04	100	1.00E-06	1	20	25	70	9,125	25,550
Thallium	6.85E-11		8.75E-04	100	1.00E-06	1	20	25	70	9,125	25,550
Zinc	8.23E-09		1.05E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Herbicides											
2,4,5-T	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
MCPP	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC Soil Data - RME
100 (RME Site Worker)
10-6
1 (All Receptors)
20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-45

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS (DAILY)
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane		1.97E-10	NA	2.00E-01		3.94E-11
Acetone	6.56E-10		1.00E-01	NA	6.56E-09	
Benzene		1.40E-10	NA	2.90E-02		4.05E-12
Carbon Disulfide	1.57E-10		1.00E-01	NA	1.57E-09	
Chloroform	1.57E-10	5.59E-11	1.00E-02	6.10E-03	1.57E-08	3.41E-13
Methylene Chloride	2.35E-10	8.39E-11	6.00E-02	7.50E-03	3.91E-09	6.29E-13
Toluene	5.74E-10		2.00E-01	NA	2.87E-09	
Xylene (total)	3.33E-10		2.00E+00	NA	1.66E-10	
Semivolatile Organics						
2,4-Dinitrotoluene	8.80E-08		2.00E-03	NA	4.40E-05	
2,6-Dinitrotoluene	1.41E-08		1.00E-03	NA	1.41E-05	
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine		0.00E+00	NA	4.50E-01		0.00E+00
3-nitroaniline			NA	NA		
Acenaphthene	2.00E-07		6.00E-02	NA	3.33E-06	
Acenaphthylene			NA	NA		
Anthracene	1.61E-07		3.00E-01	NA	5.37E-07	
Benzo(a)anthracene		2.03E-07	NA	7.30E-01		1.48E-07
Benzo(a)pyrene		3.54E-07	NA	7.30E+00		2.59E-06
Benzo(b)fluoranthene		2.98E-07	NA	7.30E-01		2.18E-07
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		1.31E-07	NA	7.30E-01		9.56E-08
Carbazole		6.28E-08	NA	2.00E-02		1.26E-09
Chrysene		2.51E-07	NA	7.30E-02		1.83E-08
Di-n-butylphthalate	5.87E-08		1.00E-01	NA	5.87E-07	
Dibenz(a,h)anthracene		6.85E-08	NA	7.30E+00		5.00E-07
Dibenzofuran			NA	NA		
Diethylphthalate	1.49E-09		8.00E+00	NA	1.86E-10	
Fluoranthene	8.38E-07		4.00E-02	NA	2.10E-05	
Fluorene	1.60E-07		4.00E-02	NA	3.99E-06	
Indeno(1,2,3-cd)pyrene		1.66E-07	NA	7.30E-01		1.21E-07
N-Nitrosodiphenylamine (1)		1.58E-08	NA	4.90E-03		7.75E-11
Naphthalene			NA	NA		
Pentachlorophenol	8.64E-08	3.09E-08	3.00E-02	1.20E-01	2.88E-06	3.70E-09
Phenanthrene			NA	NA		
Pyrene	9.81E-07		3.00E-02	NA	3.27E-05	
bis(2-Ethylhexyl)phthalate	1.13E-07	4.05E-08	2.00E-02	1.40E-02	5.67E-06	5.67E-10

TABLE 6-45

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS (DAILY)
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD	2.51E-10	8.98E-11	5.00E-04	2.40E-01	5.03E-07	2.15E-11
4,4'-DDE			NA	NA		
4,4'-DDT	6.82E-10	2.44E-10	5.00E-04	3.40E-01	1.36E-06	8.28E-11
Aldrin	0.00E+00	0.00E+00	3.00E-05	1.70E+01	0.00E+00	0.00E+00
Aroclor-1254	0.00E+00	0.00E+00	2.00E-05	2.00E+00	0.00E+00	0.00E+00
Aroclor-1260		5.35E-10	NA	7.70E+00		4.12E-09
Dieldrin	2.95E-10	1.05E-10	5.00E-05	1.60E+01	5.90E-06	1.69E-09
Endosulfan I	1.09E-09		6.00E-03	NA	1.82E-07	
Endosulfan II			NA	NA		
Endosulfan sulfate	2.44E-10		5.00E-05	NA	4.89E-06	
Endrin	3.39E-10		3.00E-04	NA	1.13E-06	
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor	0.00E+00	0.00E+00	5.00E-04	4.50E+00	0.00E+00	0.00E+00
Heptachlor epoxide	1.30E-10	4.66E-11	1.30E-05	9.10E+00	1.00E-05	4.24E-10
Toxaphene		0.00E+00	NA	1.10E+00		0.00E+00
alpha-Chlordane	1.79E-10	6.39E-11	6.00E-05	1.30E+00	2.98E-06	8.31E-11
beta-BHC		5.09E-11	NA	1.80E+00		9.16E-11
gamma-BHC (Lindane)	0.00E+00		3.00E-04	NA	0.00E+00	
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl	0.00E+00		1.00E-02	NA	0.00E+00	
Metals						
Antimony	2.95E-10		4.00E-04	NA	7.38E-07	
Barium	7.36E-09		7.00E-02	NA	1.05E-07	
Copper	4.04E-09		4.00E-02	NA	1.01E-07	
Lead			NA	NA		
Mercury	3.05E-11		3.00E-04	NA	1.02E-07	
Selenium	7.78E-11		5.00E-03	NA	1.56E-08	
Thallium	6.85E-11		7.00E-05	NA	9.78E-07	
Zinc	8.23E-09		3.00E-01	NA	2.74E-08	
Herbicides						
2,4,5-T	0.00E+00		1.00E-02	NA	0.00E+00	
MCPP	0.00E+00		1.00E-03	NA	0.00E+00	
Totals - HQ & CR					**1.58E-04**	**3.70E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-22

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Volatile Organics												
1,1,2,2,-Tetrachloroethane			7.04E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acetone			8.38E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzene			5.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbon Disulfide			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chloroform			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Methylene Chloride			3.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toluene			7.33E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Xylene (total)			4.25E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Semivolatile Organics												
2,4-Dinitrotoluene			1.12E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2,6-Dinitrotoluene			1.80E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2-methylnaphthalene			1.38E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3,3'-Dichlorobenzidine				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3-nitroaniline				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthene			2.55E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthylene			2.82E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Anthracene			2.06E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)anthracene			7.27E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)pyrene			1.27E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(b)fluoranthene			1.07E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(g,h,i)perylene			6.21E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(k)fluoranthene			4.68E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbazole			2.25E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chrysene			8.97E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Di-n-butylphthalate			7.50E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenz(a,h)anthracene			2.45E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenzofuran			1.90E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Diethylphthalate			1.90E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluoranthene			1.07E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluorene			2.04E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			5.93E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			5.66E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Naphthalene			2.32E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pentachlorophenol			1.10E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Phenanthrene			7.37E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pyrene			1.25E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			1.45E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pesticides												
4,4'-DDD			3.21E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDE			1.81E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDT			8.71E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aldrin				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aroclor-1254				1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Aroclor-1260		1.86E-09	1.91E-02	1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Dieldrin			3.77E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan I			1.40E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan II			3.38E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan sulfate			3.12E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin			4.33E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin aldehyde			2.54E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin ketone			4.30E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor epoxide			1.67E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toxaphene				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
alpha-Chlordane			2.29E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
beta-BHC			1.82E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
gamma-BHC (Lindane)				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
gamma-Chlordane			2.51E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
delta-BHC			1.64E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Nitroaromatics												
2-amino-4,6-Dinitrotoluene				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Tetryl				1.00E-06	5,800	1.0		20	25	70	9,125	25,550

TABLE 6-22

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Metals												
Antimony			3.77E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Barium			9.41E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Copper			5.16E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Lead			1.92E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Mercury			3.89E-04	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Selenium			9.94E-04	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Thallium			8.75E-04	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Zinc			1.05E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Herbicides												
2,4,5-T				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
MCPP				1.00E-06	5,800	1.0		20	25	70	9,125	25,550

EQUATION:

$$\text{Absorbed dose (mg/kg-day)} = \frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
CF = Conversion Factor (10-6 kg/mg)
SA = Surface Area Contact (cm²)
AF =Soil to Skin Adherence Factor (mg/cm²)
ABS = Absorption Factor (unitless)

Assumptions:

EPC Soil Data - RME
10-6
5,800 cm² (RME Site Worker)
1.0 (RME all receptors)
Compound Specific for PCBs and Cd
EPA, 1992b (Default Assumption 0% = 0.0)

Variables:

EF = Exposure Frequency (events/year)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult Male)
25 x 365 (Nc) 70 x 365 Adult (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-47

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL (DAILY)
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane			NA	2.00E-01		
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Carbon Disulfide			1.00E-01	NA		
Chloroform			1.00E-02	6.10E-03		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
Xylene (total)			2.00E+00	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Diethylphthalate			8.00E+00	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 6-47

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL (DAILY)
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-16 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254			1.90E-05	2.11E+00		
Aroclor-1260		1.86E-09	NA	8.11E+00		1.51E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor			5.00E-04	4.50E+00		
Heptachlor epoxide			1.30E-05	9.10E+00		
Toxaphene			NA	1.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			1.00E-02	NA		
Metals						
Antimony			4.00E-04	NA		
Barium			7.00E-03	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			1.50E-01	NA		
Herbicides						
2,4,5-T			1.00E-02	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR						**1.51E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-13
CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 3

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Volatile Organics											
1,1,2,2,-Tetrachloroethane		1.97E-10	7.04E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Acetone	6.56E-10		8.38E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Benzene		1.40E-10	5.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Carbon Disulfide	1.57E-10		2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Chloroform	1.57E-10	5.59E-11	2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Methylene Chloride	2.35E-10	8.39E-11	3.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Toluene	5.74E-10		7.33E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Xylene (total)	3.33E-10		4.25E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Semivolatile Organics											
2,4-Dinitrotoluene	8.80E-08		1.12E+00	100	1.00E-06	1	20	25	70	9,125	25,550
2,6-Dinitrotoluene	1.41E-08		1.80E-01	100	1.00E-06	1	20	25	70	9,125	25,550
2-methylnaphthalene			1.38E+00	100	1.00E-06	1	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine		0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
3-nitroaniline			0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthene	2.00E-07		2.55E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthylene			2.82E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Anthracene	1.61E-07		2.06E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)anthracene		2.03E-07	7.27E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)pyrene		3.54E-07	1.27E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(b)fluoranthene		2.98E-07	1.07E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			6.21E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(k)fluoranthene		1.31E-07	4.68E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Carbazole		6.28E-08	2.25E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Chrysene		2.51E-07	8.97E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Di-n-butylphthalate	5.87E-08		7.50E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenz(a,h)anthracene		6.85E-08	2.45E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenzofuran			1.90E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Diethylphthalate	1.49E-09		1.90E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Fluoranthene	8.38E-07		1.07E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Fluorene	1.60E-07		2.04E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene		1.66E-07	5.93E+00	100	1.00E-06	1	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)		1.58E-08	5.66E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Naphthalene			2.32E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pentachlorophenol	8.64E-08	3.09E-08	1.10E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Phenanthrene			7.37E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pyrene	9.81E-07		1.25E+01	100	1.00E-06	1	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate	1.13E-07	4.05E-08	1.45E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Pesticides											
4,4'-DDD	2.51E-10	8.98E-11	3.21E-03	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDE			1.81E-02	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDT	6.82E-10	2.44E-10	8.71E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Aldrin	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1254	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1260		5.35E-10	1.91E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Dieldrin	2.95E-10	1.05E-10	3.77E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan I	1.09E-09		1.40E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan II			3.38E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan sulfate	2.44E-10		3.12E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin	3.39E-10		4.33E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin aldehyde			2.54E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin ketone			4.30E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor epoxide	1.30E-10	4.66E-11	1.67E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Toxaphene		0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
alpha-Chlordane	1.79E-10	6.39E-11	2.29E-03	100	1.00E-06	1	20	25	70	9,125	25,550
beta-BHC		5.09E-11	1.82E-03	100	1.00E-06	1	20	25	70	9,125	25,550
gamma-BHC (Lindane)	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
gamma-Chlordane			2.51E-03	100	1.00E-06	1	20	25	70	9,125	25,550
delta-BHC			1.64E-03	100	1.00E-06	1	20	25	70	9,125	25,550

TABLE 6-13
CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 3

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Nitroaromatics											
2-amino-4,6-Dinitrotoluene			0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Tetryl	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Metals											
Antimony	2.95E-10		3.77E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Barium	7.36E-09		9.41E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Copper	4.04E-09		5.16E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Lead			1.92E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Mercury	3.05E-11		3.89E-04	100	1.00E-06	1	20	25	70	9,125	25,550
Selenium	7.78E-11		9.94E-04	100	1.00E-06	1	20	25	70	9,125	25,550
Thallium	6.85E-11		8.75E-04	100	1.00E-06	1	20	25	70	9,125	25,550
Zinc	8.23E-09		1.05E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Herbicides											
2,4,5-T	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
MCPP	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC Soil Data - RME
100 (RME Site Worker)
10-6
1 (All Receptors)
20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-44
CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 3

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane		1.97E-10	NA	2.00E-01		3.94E-11
Acetone	6.56E-10		1.00E-01	NA	6.56E-09	
Benzene		1.40E-10	NA	2.90E-02		4.05E-12
Carbon Disulfide	1.57E-10		1.00E-01	NA	1.57E-09	
Chloroform	1.57E-10	5.59E-11	1.00E-02	6.10E-03	1.57E-08	3.41E-13
Methylene Chloride	2.35E-10	8.39E-11	6.00E-02	7.50E-03	3.91E-09	6.29E-13
Toluene	5.74E-10		2.00E-01	NA	2.87E-09	
Xylene (total)	3.33E-10		2.00E+00	NA	1.66E-10	
Semivolatile Organics						
2,4-Dinitrotoluene	8.80E-08		2.00E-03	NA	4.40E-05	
2,6-Dinitrotoluene	1.41E-08		1.00E-03	NA	1.41E-05	
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine		0.00E+00	NA	4.50E-01		0.00E+00
3-nitroaniline			NA	NA		
Acenaphthene	2.00E-07		6.00E-02	NA	3.33E-06	
Acenaphthylene			NA	NA		
Anthracene	1.61E-07		3.00E-01	NA	5.37E-07	
Benzo(a)anthracene		2.03E-07	NA	7.30E-01		1.48E-07
Benzo(a)pyrene		3.54E-07	NA	7.30E+00		2.59E-06
Benzo(b)fluoranthene		2.98E-07	NA	7.30E-01		2.18E-07
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		1.31E-07	NA	7.30E-01		9.56E-08
Carbazole		6.28E-08	NA	2.00E-02		1.26E-09
Chrysene		2.51E-07	NA	7.30E-02		1.83E-08
Di-n-butylphthalate	5.87E-08		1.00E-01	NA	5.87E-07	
Dibenz(a,h)anthracene		6.85E-08	NA	7.30E+00		5.00E-07
Dibenzofuran			NA	NA		
Diethylphthalate	1.49E-09		8.00E+00	NA	1.86E-10	
Fluoranthene	8.38E-07		4.00E-02	NA	2.10E-05	
Fluorene	1.60E-07		4.00E-02	NA	3.99E-06	
Indeno(1,2,3-cd)pyrene		1.66E-07	NA	7.30E-01		1.21E-07
N-Nitrosodiphenylamine (1)		1.58E-08	NA	4.90E-03		7.75E-11
Naphthalene			NA	NA		
Pentachlorophenol	8.64E-08	3.09E-08	3.00E-02	1.20E-01	2.88E-06	3.70E-09
Phenanthrene			NA	NA		
Pyrene	9.81E-07		3.00E-02	NA	3.27E-05	
bis(2-Ethylhexyl)phthalate	1.13E-07	4.05E-08	2.00E-02	1.40E-02	5.67E-06	5.67E-10
Pesticides						
4,4'-DDD	2.51E-10	8.98E-11	5.00E-04	2.40E-01	5.03E-07	2.15E-11
4,4'-DDE			NA	NA		
4,4'-DDT	6.82E-10	2.44E-10	5.00E-04	3.40E-01	1.36E-06	8.28E-11
Aldrin	0.00E+00	0.00E+00	3.00E-05	1.70E+01	0.00E+00	0.00E+00
Aroclor-1254	0.00E+00	0.00E+00	2.00E-05	2.00E+00	0.00E+00	0.00E+00
Aroclor-1260		5.35E-10	NA	7.70E+00		4.12E-09
Dieldrin	2.95E-10	1.05E-10	5.00E-05	1.60E+01	5.90E-06	1.69E-09
Endosulfan I	1.09E-09		6.00E-03	NA	1.82E-07	
Endosulfan II			NA	NA		
Endosulfan sulfate	2.44E-10		5.00E-05	NA	4.89E-06	
Endrin	3.39E-10		3.00E-04	NA	1.13E-06	
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor	0.00E+00	0.00E+00	5.00E-04	4.50E+00	0.00E+00	0.00E+00
Heptachlor epoxide	1.30E-10	4.66E-11	1.30E-05	9.10E+00	1.00E-05	4.24E-10
Toxaphene		0.00E+00	NA	1.10E+00		0.00E+00
alpha-Chlordane	1.79E-10	6.39E-11	6.00E-05	1.30E+00	2.98E-06	8.31E-11
beta-BHC		5.09E-11	NA	1.80E+00		9.16E-11
gamma-BHC (Lindane)	0.00E+00		3.00E-04	NA	0.00E+00	
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		

TABLE 6-44
CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 3

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl	0.00E+00		1.00E-02	NA	0.00E+00	
Metals						
Antimony	2.95E-10		4.00E-04	NA	7.38E-07	
Barium	7.36E-09		7.00E-02	NA	1.05E-07	
Copper	4.04E-09		4.00E-02	NA	1.01E-07	
Lead			NA	NA		
Mercury	3.05E-11		3.00E-04	NA	1.02E-07	
Selenium	7.78E-11		5.00E-03	NA	1.56E-08	
Thallium	6.85E-11		7.00E-05	NA	9.78E-07	
Zinc	8.23E-09		3.00E-01	NA	2.74E-08	
Herbicides						
2,4,5-T	0.00E+00		1.00E-02	NA	0.00E+00	
MCPP	0.00E+00		1.00E-03	NA	0.00E+00	
Totals - HQ & CR					**1.58E-04**	**3.70E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose (Oral)
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor (Oral)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-19
CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 3

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
Volatile Organics												
1,1,2,2,-Tetrachloroethane			7.04E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acetone			8.38E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzene			5.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbon Disulfide			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chloroform			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Methylene Chloride			3.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toluene			7.33E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Xylene (total)			4.25E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Semivolatile Organics												
2,4-Dinitrotoluene			1.12E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2,6-Dinitrotoluene			1.80E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2-methylnaphthalene			1.38E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3,3'-Dichlorobenzidine				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3-nitroaniline				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthene			2.55E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthylene			2.82E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Anthracene			2.06E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)anthracene			7.27E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)pyrene			1.27E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(b)fluoranthene			1.07E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(g,h,i)perylene			6.21E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(k)fluoranthene			4.68E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbazole			2.25E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chrysene			8.97E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Di-n-butylphthalate			7.50E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenz(a,h)anthracene			2.45E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenzofuran			1.90E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Diethylphthalate			1.90E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluoranthene			1.07E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluorene			2.04E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			5.93E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			5.66E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Naphthalene			2.32E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pentachlorophenol			1.10E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Phenanthrene			7.37E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pyrene			1.25E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			1.45E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pesticides												
4,4'-DDD			3.21E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDE			1.81E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDT			8.71E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aldrin				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aroclor-1254				1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Aroclor-1260		1.86E-09	1.91E-02	1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Dieldrin			3.77E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan I			1.40E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan II			3.38E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan sulfate			3.12E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin			4.33E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin aldehyde			2.54E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin ketone			4.30E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor epoxide			1.67E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toxaphene				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
alpha-Chlordane			2.29E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
beta-BHC			1.82E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
gamma-BHC (Lindane)				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
gamma-Chlordane			2.51E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
delta-BHC			1.64E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550

TABLE 6-19
CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 3

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Nitroaromatics												
2-amino-4,6-Dinitrotoluene				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Tetryl				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Metals												
Antimony			3.77E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Barium			9.41E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Copper			5.16E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Lead			1.92E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Mercury			3.89E-04	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Selenium			9.94E-04	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Thallium			8.75E-04	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Zinc			1.05E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Herbicides												
2,4,5-T				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
MCPP				1.00E-06	5,800	1.0		20	25	70	9,125	25,550

EQUATION: Absorbed dose (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
CF = Conversion Factor (10-6 kg/mg)
SA = Surface Area Contact (cm²)
AF = Soil to Skin Adherence Factor (mg/cm²)
ABS = Absorption Factor (unitless)

Assumptions:

EPC Soil Data - RME
10-6
5,800 cm² (RME Site Worker)
1.0 (RME all receptors)
Compound Specific for PCBs and Cd
EPA, 1992b (Default Assumption 0% = 0.0)

Variables:

EF = Exposure Frequency (events/year)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult Male)
25 x 365 (Nc) 70 x 365 Adult (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 6-46
CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL (DAILY)
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 3

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Volatile Organics						
1,1,2,2,-Tetrachloroethane			NA	2.00E-01		
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Carbon Disulfide			1.00E-01	NA		
Chloroform			1.00E-02	6.10E-03		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
Xylene (total)			2.00E+00	NA		
Semivolatile Organics						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-methylnaphthalene			NA	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Diethylphthalate			8.00E+00	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 6-46
CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL (DAILY)
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD 16
CASE 3

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254			1.90E-05	2.11E+00		
Aroclor-1260		1.86E-09	NA	8.11E+00		1.51E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin aldehyde			NA	NA		
Endrin ketone			NA	NA		
Heptachlor			5.00E-04	4.50E+00		
Heptachlor epoxide			1.30E-05	9.10E+00		
Toxaphene			NA	1.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
gamma-BHC (Lindane)			3.00E-04	NA		
gamma-Chlordane			NA	NA		
delta-BHC			NA	NA		
Nitroaromatics						
2-amino-4,6-Dinitrotoluene			NA	NA		
Tetryl			1.00E-02	NA		
Metals						
Antimony			4.00E-04	NA		
Barium			7.00E-03	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			1.50E-01	NA		
Herbicides						
2,4,5-T			1.00E-02	NA		
MCPP			1.00E-03	NA		
Totals - HQ & CR						**1.51E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose (Oral)
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor (Oral)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

SEAD-17

EPC, INTAKE AND

RISK TABLES

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	Acetone	UG/KG	55	0	3	5.5%	6.945	4.515	10.750	FALSE	FALSE	7.278	7.278
VOLATILE ORGANICS	Benzene	UG/KG	55	0	2	3.6%	5.941	0.939	2.000	FALSE	FALSE	6.305	2.000
VOLATILE ORGANICS	Methylene chloride	UG/KG	55	0	1	1.8%	6.023	0.631	4.000	FALSE	FALSE	6.175	4.000
VOLATILE ORGANICS	Toluene	UG/KG	55	0	5	9.1%	5.905	1.153	8.000	FALSE	FALSE	6.469	6.469
SEMIVOLATILE ORGANICS	2,4-Dinitrotoluene	UG/KG	55	0	6	10.9%	244.909	228.021	1400.000	FALSE	FALSE	273.213	273.213
SEMIVOLATILE ORGANICS	2,6-Dinitrotoluene	UG/KG	54	1	1	1.9%	193.519	22.895	70.000	FALSE	FALSE	201.453	70.000
SEMIVOLATILE ORGANICS	2-Methylnaphthalene	UG/KG	54	1	2	3.7%	192.556	28.530	130.000	FALSE	FALSE	209.105	130.000
SEMIVOLATILE ORGANICS	3,3`-Dichlorobenzidine	UG/KG	55	0	1	1.8%	217.091	132.195	410.000	FALSE	FALSE	225.892	225.892
SEMIVOLATILE ORGANICS	3-Nitroaniline	UG/KG	55	0	1	1.8%	525.136	315.413	990.000	FALSE	FALSE	546.431	546.431
SEMIVOLATILE ORGANICS	4-Nitroaniline	UG/KG	55	0	1	1.8%	525.136	315.413	990.000	FALSE	FALSE	546.431	546.431
SEMIVOLATILE ORGANICS	Acenaphthene	UG/KG	54	1	2	3.7%	190.204	35.893	33.000	FALSE	FALSE	218.404	33.000
SEMIVOLATILE ORGANICS	Acenaphthylene	UG/KG	54	1	2	3.7%	192.056	29.551	96.000	FALSE	FALSE	206.950	96.000
SEMIVOLATILE ORGANICS	Anthracene	UG/KG	54	1	3	5.6%	190.611	31.057	130.000	FALSE	FALSE	209.727	130.000
SEMIVOLATILE ORGANICS	Benzo[a]anthracene	UG/KG	55	0	17	30.9%	185.273	175.357	720.000	FALSE	FALSE	276.034	276.034
SEMIVOLATILE ORGANICS	Benzo[a]pyrene	UG/KG	55	0	18	32.7%	188.364	196.483	940.000	FALSE	FALSE	280.826	280.826
SEMIVOLATILE ORGANICS	Benzo[b]fluoranthene	UG/KG	55	0	17	30.9%	216.855	316.542	2200.000	FALSE	FALSE	287.067	287.067
SEMIVOLATILE ORGANICS	Benzo[ghi]perylene	UG/KG	55	0	14	25.5%	197.964	169.840	710.000	FALSE	FALSE	254.029	254.029
SEMIVOLATILE ORGANICS	Benzo[k]fluoranthene	UG/KG	55	0	14	25.5%	183.573	158.117	530.000	FALSE	FALSE	259.062	259.062
SEMIVOLATILE ORGANICS	Bis(2-Chloroisopropyl)ether	UG/KG	23	0	1	4.3%	200.870	46.968	410.000	FALSE	FALSE	213.496	213.496
SEMIVOLATILE ORGANICS	Bis(2-Ethylhexyl)phthalate	UG/KG	55	0	18	32.7%	276.345	264.694	1300.000	FALSE	FALSE	347.543	347.543
SEMIVOLATILE ORGANICS	Butylbenzylphthalate	UG/KG	54	1	2	3.7%	191.167	33.001	46.000	FALSE	FALSE	209.324	46.000
SEMIVOLATILE ORGANICS	Carbazole	UG/KG	55	0	3	5.5%	213.091	135.238	410.000	FALSE	FALSE	229.562	229.562
SEMIVOLATILE ORGANICS	Chrysene	UG/KG	55	0	27	49.1%	156.409	182.734	670.000	FALSE	TRUE	238.449	238.449
SEMIVOLATILE ORGANICS	Cresols (-o)	UG/KG	54	1	1	1.9%	194.444	18.369	120.000	FALSE	FALSE	199.192	120.000
SEMIVOLATILE ORGANICS	Di-n-butylphthalate	UG/KG	55	0	20	36.4%	216.773	186.387	1200.000	FALSE	FALSE	266.596	266.596
SEMIVOLATILE ORGANICS	Dibenz[a,h]anthracene	UG/KG	55	0	8	14.5%	202.727	144.855	470.000	FALSE	FALSE	242.255	242.255
SEMIVOLATILE ORGANICS	Dibenzofuran	UG/KG	54	1	1	1.9%	193.444	26.467	36.000	FALSE	FALSE	207.136	36.000
SEMIVOLATILE ORGANICS	Fluoranthene	UG/KG	55	0	32	58.2%	160.055	215.284	1000.000	FALSE	TRUE	223.029	223.029
SEMIVOLATILE ORGANICS	Fluorene	UG/KG	54	1	1	1.9%	193.481	26.243	38.000	FALSE	FALSE	206.634	38.000
SEMIVOLATILE ORGANICS	Indeno[1,2,3-cd]pyrene	UG/KG	55	0	11	20.0%	206.400	170.914	790.000	FALSE	FALSE	263.081	263.081
SEMIVOLATILE ORGANICS	N-Nitrosodiphenylamine	UG/KG	54	1	4	7.4%	187.037	39.556	95.000	FALSE	FALSE	209.973	95.000
SEMIVOLATILE ORGANICS	Naphthalene	UG/KG	54	1	3	5.6%	188.000	41.808	37.000	FALSE	FALSE	223.615	37.000
SEMIVOLATILE ORGANICS	Pentachlorophenol	UG/KG	55	0	2	3.6%	524.282	325.004	990.000	FALSE	FALSE	585.292	585.292
SEMIVOLATILE ORGANICS	Phenanthrene	UG/KG	55	0	19	34.5%	172.945	157.847	360.000	FALSE	FALSE	251.632	251.632
SEMIVOLATILE ORGANICS	Pyrene	UG/KG	55	0	31	56.4%	163.773	222.725	1200.000	FALSE	TRUE	217.601	217.601
PESTICIDES/PCB	4,4`-DDD	UG/KG	55	0	4	7.3%	2.546	2.727	15.000	FALSE	FALSE	2.621	2.621
PESTICIDES/PCB	4,4`-DDE	UG/KG	55	0	20	36.4%	7.475	19.553	140.000	FALSE	FALSE	7.053	7.053
PESTICIDES/PCB	4,4`-DDT	UG/KG	55	0	10	18.2%	3.335	3.652	16.000	FALSE	FALSE	3.583	3.583
PESTICIDES/PCB	Aldrin	UG/KG	55	0	1	1.8%	1.178	1.083	1.900	FALSE	FALSE	1.208	1.208
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	54	1	1	1.9%	1.017	0.077	1.100	TRUE	TRUE	1.035	1.035
PESTICIDES/PCB	Aroclor-1254	UG/KG	55	0	1	1.8%	23.273	21.621	61.000	FALSE	FALSE	23.979	23.979

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
PESTICIDES/PCB	Aroclor-1260	UG/KG	55	0	3	5.5%	22.818	21.010	28.000	FALSE	FALSE	23.393	23.393
PESTICIDES/PCB	Beta-BHC	UG/KG	55	0	1	1.8%	1.360	2.561	20.000	FALSE	FALSE	1.285	1.285
PESTICIDES/PCB	Delta-BHC	UG/KG	55	0	1	1.8%	1.182	1.088	2.200	FALSE	FALSE	1.215	1.215
PESTICIDES/PCB	Dieldrin	UG/KG	55	0	7	12.7%	5.644	13.443	80.000	FALSE	FALSE	5.101	5.101
PESTICIDES/PCB	Endosulfan I	UG/KG	55	0	5	9.1%	9.047	57.832	430.000	FALSE	FALSE	2.325	2.325
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	55	0	1	1.8%	2.296	2.436	20.000	FALSE	FALSE	2.331	2.331
PESTICIDES/PCB	Endrin	UG/KG	55	0	3	5.5%	2.786	5.546	43.000	FALSE	FALSE	2.615	2.615
PESTICIDES/PCB	Endrin ketone	UG/KG	55	0	2	3.6%	3.280	9.309	71.000	FALSE	FALSE	2.752	2.752
PESTICIDES/PCB	Heptachlorepoxide	UG/KG	54	1	1	1.9%	1.014	0.077	1.100	TRUE	TRUE	1.032	1.032
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	55	0	55	100.0%	0.437	0.727	3.800	FALSE	TRUE	0.537	0.537
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	55	0	4	7.3%	70.882	39.478	330.000	FALSE	FALSE	74.141	74.141
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	55	0	1	1.8%	78.182	112.893	900.000	FALSE	FALSE	76.953	76.953
METALS	Aluminum	MG/KG	55	0	55	100.0%	13215.455	3309.012	19300.000	FALSE	FALSE	14491.312	14491.312
METALS	Antimony	MG/KG	55	0	26	47.3%	6.473	9.550	52.000	FALSE	FALSE	9.516	9.516
METALS	Arsenic	MG/KG	55	0	55	100.0%	5.861	2.024	16.100	FALSE	FALSE	6.243	6.243
METALS	Barium	MG/KG	55	0	40	72.7%	133.800	95.455	524.000	FALSE	TRUE	154.126	154.126
METALS	Beryllium	MG/KG	55	0	55	100.0%	0.579	0.173	0.990	TRUE	FALSE	0.618	0.618
METALS	Cadmium	MG/KG	55	0	42	76.4%	3.262	4.737	25.500	FALSE	TRUE	6.783	6.783
METALS	Calcium	MG/KG	55	0	55	100.0%	41717.455	57950.097	#########	FALSE	TRUE	87148.232	87148.232
METALS	Chromium	MG/KG	55	0	55	100.0%	19.963	4.144	27.900	FALSE	FALSE	21.238	21.238
METALS	Cobalt	MG/KG	55	0	55	100.0%	10.155	3.334	21.900	FALSE	TRUE	10.955	10.955
METALS	Copper	MG/KG	55	0	55	100.0%	134.120	184.261	837.000	FALSE	TRUE	179.232	179.232
METALS	Cyanide	MG/KG	52	0	2	3.8%	0.316	0.191	1.500	FALSE	FALSE	0.355	0.355
METALS	Iron	MG/KG	55	0	55	100.0%	23087.818	5560.503	38700.000	FALSE	FALSE	24851.567	24851.567
METALS	Lead	MG/KG	55	0	54	98.2%	760.433	1164.316	6270.000	FALSE	TRUE	2498.470	2498.470
METALS	Magnesium	MG/KG	55	0	55	100.0%	5952.455	3084.811	18100.000	FALSE	TRUE	6614.990	6614.990
METALS	Manganese	MG/KG	55	0	55	100.0%	526.591	199.950	1080.000	TRUE	TRUE	571.731	571.731
METALS	Mercury	MG/KG	55	0	50	90.9%	0.108	0.184	1.000	FALSE	FALSE	0.116	0.116
METALS	Nickel	MG/KG	55	0	55	100.0%	27.825	8.641	50.800	TRUE	TRUE	29.775	29.775
METALS	Potassium	MG/KG	55	0	55	100.0%	1382.618	282.451	1960.000	TRUE	TRUE	1446.383	1446.383
METALS	Selenium	MG/KG	55	0	34	61.8%	0.573	0.493	1.700	TRUE	TRUE	0.684	0.684
METALS	Silver	MG/KG	55	0	16	29.1%	1.191	1.720	9.000	FALSE	TRUE	1.676	1.676
METALS	Sodium	MG/KG	55	0	41	74.5%	94.329	75.921	383.000	FALSE	TRUE	115.953	115.953
METALS	Thallium	MG/KG	55	0	11	20.0%	0.404	0.388	1.500	FALSE	TRUE	0.533	0.533
METALS	Vanadium	MG/KG	55	0	55	100.0%	22.510	5.193	30.700	TRUE	FALSE	23.682	23.682
METALS	Zinc	MG/KG	55	0	55	100.0%	253.235	300.841	1475.000	FALSE	TRUE	306.138	306.138
HERBICIDES	MCPA	UG/KG	32	0	4	12.5%	5573.438	7708.583	34000.000	FALSE	FALSE	6261.917	6261.917

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	Acetone	UG/KG	55	0	3	5.5%	6.945	4.515	10.750	FALSE	FALSE	7.278	7.278
VOLATILE ORGANICS	Benzene	UG/KG	55	0	2	3.6%	5.941	0.939	2.000	FALSE	FALSE	6.305	2.000
VOLATILE ORGANICS	Methylene chloride	UG/KG	55	0	1	1.8%	6.023	0.631	4.000	FALSE	FALSE	6.175	4.000
VOLATILE ORGANICS	Toluene	UG/KG	55	0	5	9.1%	5.905	1.153	8.000	FALSE	FALSE	6.469	6.469
SEMIVOLATILE ORGANICS	2,4-Dinitrotoluene	UG/KG	55	0	6	10.9%	244.909	228.021	1400.000	FALSE	FALSE	273.213	273.213
SEMIVOLATILE ORGANICS	2,6-Dinitrotoluene	UG/KG	54	1	1	1.9%	193.519	22.895	70.000	FALSE	FALSE	201.453	70.000
SEMIVOLATILE ORGANICS	2-Methylnaphthalene	UG/KG	54	1	2	3.7%	192.556	28.530	130.000	FALSE	FALSE	209.105	130.000
SEMIVOLATILE ORGANICS	3,3`-Dichlorobenzidine	UG/KG	55	0	1	1.8%	217.091	132.195	410.000	FALSE	FALSE	225.892	225.892
SEMIVOLATILE ORGANICS	3-Nitroaniline	UG/KG	55	0	1	1.8%	525.136	315.413	990.000	FALSE	FALSE	546.431	546.431
SEMIVOLATILE ORGANICS	4-Nitroaniline	UG/KG	55	0	1	1.8%	525.136	315.413	990.000	FALSE	FALSE	546.431	546.431
SEMIVOLATILE ORGANICS	Acenaphthene	UG/KG	54	1	2	3.7%	190.204	35.893	33.000	FALSE	FALSE	218.404	33.000
SEMIVOLATILE ORGANICS	Acenaphthylene	UG/KG	54	1	2	3.7%	192.056	29.551	96.000	FALSE	FALSE	206.950	96.000
SEMIVOLATILE ORGANICS	Anthracene	UG/KG	54	1	3	5.6%	190.611	31.057	130.000	FALSE	FALSE	209.727	130.000
SEMIVOLATILE ORGANICS	Benzo[a]anthracene	UG/KG	55	0	17	30.9%	185.273	175.357	720.000	FALSE	FALSE	276.034	276.034
SEMIVOLATILE ORGANICS	Benzo[a]pyrene	UG/KG	55	0	18	32.7%	188.364	196.483	940.000	FALSE	FALSE	280.826	280.826
SEMIVOLATILE ORGANICS	Benzo[b]fluoranthene	UG/KG	55	0	17	30.9%	216.855	316.542	2200.000	FALSE	FALSE	287.067	287.067
SEMIVOLATILE ORGANICS	Benzo[ghi]perylene	UG/KG	55	0	14	25.5%	197.964	169.840	710.000	FALSE	FALSE	254.029	254.029
SEMIVOLATILE ORGANICS	Benzo[k]fluoranthene	UG/KG	55	0	14	25.5%	183.573	158.117	530.000	FALSE	FALSE	259.062	259.062
SEMIVOLATILE ORGANICS	Bis(2-Chloroisopropyl)ether	UG/KG	23	0	1	4.3%	200.870	46.968	410.000	FALSE	FALSE	213.496	213.496
SEMIVOLATILE ORGANICS	Bis(2-Ethylhexyl)phthalate	UG/KG	55	0	18	32.7%	276.345	264.694	1300.000	FALSE	FALSE	347.543	347.543
SEMIVOLATILE ORGANICS	Butylbenzylphthalate	UG/KG	54	1	2	3.7%	191.167	33.001	46.000	FALSE	FALSE	209.324	46.000
SEMIVOLATILE ORGANICS	Carbazole	UG/KG	55	0	3	5.5%	213.091	135.238	410.000	FALSE	FALSE	229.562	229.562
SEMIVOLATILE ORGANICS	Chrysene	UG/KG	55	0	27	49.1%	156.409	182.734	670.000	FALSE	TRUE	238.449	238.449
SEMIVOLATILE ORGANICS	Cresols (-o)	UG/KG	54	1	1	1.9%	194.444	18.369	120.000	FALSE	FALSE	199.192	120.000
SEMIVOLATILE ORGANICS	Di-n-butylphthalate	UG/KG	55	0	20	36.4%	216.773	186.387	1200.000	FALSE	FALSE	266.596	266.596
SEMIVOLATILE ORGANICS	Dibenz[a,h]anthracene	UG/KG	55	0	8	14.5%	202.727	144.855	470.000	FALSE	FALSE	242.255	242.255
SEMIVOLATILE ORGANICS	Dibenzofuran	UG/KG	54	1	1	1.9%	193.444	26.467	36.000	FALSE	FALSE	207.136	36.000
SEMIVOLATILE ORGANICS	Fluoranthene	UG/KG	55	0	32	58.2%	160.055	215.284	1000.000	FALSE	TRUE	223.029	223.029
SEMIVOLATILE ORGANICS	Fluorene	UG/KG	54	1	1	1.9%	193.481	26.243	38.000	FALSE	FALSE	206.634	38.000
SEMIVOLATILE ORGANICS	Indeno[1,2,3-cd]pyrene	UG/KG	55	0	11	20.0%	206.400	170.914	790.000	FALSE	FALSE	263.081	263.081
SEMIVOLATILE ORGANICS	N-Nitrosodiphenylamine	UG/KG	54	1	4	7.4%	187.037	39.556	95.000	FALSE	FALSE	209.973	95.000
SEMIVOLATILE ORGANICS	Naphthalene	UG/KG	54	1	3	5.6%	188.000	41.808	37.000	FALSE	FALSE	223.615	37.000
SEMIVOLATILE ORGANICS	Pentachlorophenol	UG/KG	55	0	2	3.6%	524.282	325.004	990.000	FALSE	FALSE	585.292	585.292
SEMIVOLATILE ORGANICS	Phenanthrene	UG/KG	55	0	19	34.5%	172.945	157.847	360.000	FALSE	FALSE	251.632	251.632
SEMIVOLATILE ORGANICS	Pyrene	UG/KG	55	0	31	56.4%	163.773	222.725	1200.000	FALSE	TRUE	217.601	217.601
PESTICIDES/PCB	4,4`-DDD	UG/KG	55	0	4	7.3%	2.546	2.727	15.000	FALSE	FALSE	2.621	2.621
PESTICIDES/PCB	4,4`-DDE	UG/KG	55	0	20	36.4%	7.475	19.553	140.000	FALSE	FALSE	7.053	7.053
PESTICIDES/PCB	4,4`-DDT	UG/KG	55	0	10	18.2%	3.335	3.652	16.000	FALSE	FALSE	3.583	3.583
PESTICIDES/PCB	Aldrin	UG/KG	55	0	1	1.8%	1.178	1.083	1.900	FALSE	FALSE	1.208	1.208
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	54	1	1	1.9%	1.017	0.077	1.100	TRUE	TRUE	1.035	1.035
PESTICIDES/PCB	Aroclor-1254	UG/KG	55	0	1	1.8%	23.273	21.621	61.000	FALSE	FALSE	23.979	23.979

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
PESTICIDES/PCB	Aroclor-1260	UG/KG	55	0	3	5.5%	22.818	21.010	28.000	FALSE	FALSE	23.393	23.393
PESTICIDES/PCB	Beta-BHC	UG/KG	55	0	1	1.8%	1.360	2.561	20.000	FALSE	FALSE	1.285	1.285
PESTICIDES/PCB	Delta-BHC	UG/KG	55	0	1	1.8%	1.182	1.088	2.200	FALSE	FALSE	1.215	1.215
PESTICIDES/PCB	Dieldrin	UG/KG	55	0	7	12.7%	5.644	13.443	80.000	FALSE	FALSE	5.101	5.101
PESTICIDES/PCB	Endosulfan I	UG/KG	55	0	5	9.1%	9.047	57.832	430.000	FALSE	FALSE	2.325	2.325
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	55	0	1	1.8%	2.296	2.436	20.000	FALSE	FALSE	2.331	2.331
PESTICIDES/PCB	Endrin	UG/KG	55	0	3	5.5%	2.786	5.546	43.000	FALSE	FALSE	2.615	2.615
PESTICIDES/PCB	Endrin ketone	UG/KG	55	0	2	3.6%	3.280	9.309	71.000	FALSE	FALSE	2.752	2.752
PESTICIDES/PCB	Heptachlorepoxide	UG/KG	54	1	1	1.9%	1.014	0.077	1.100	TRUE	TRUE	1.032	1.032
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	55	0	55	100.0%	0.437	0.727	3.800	FALSE	TRUE	0.537	0.537
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	55	0	4	7.3%	70.882	39.478	330.000	FALSE	FALSE	74.141	74.141
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	55	0	1	1.8%	78.182	112.893	900.000	FALSE	FALSE	76.953	76.953
METALS	Aluminum	MG/KG	55	0	55	100.0%	13215.455	3309.012	19300.000	FALSE	FALSE	14491.312	14491.312
METALS	Antimony	MG/KG	55	0	26	47.3%	6.473	9.550	52.000	FALSE	FALSE	9.516	9.516
METALS	Arsenic	MG/KG	55	0	55	100.0%	5.861	2.024	16.100	FALSE	FALSE	6.243	6.243
METALS	Barium	MG/KG	55	0	40	72.7%	133.800	95.455	524.000	FALSE	TRUE	154.126	154.126
METALS	Beryllium	MG/KG	55	0	55	100.0%	0.579	0.173	0.990	TRUE	FALSE	0.618	0.618
METALS	Cadmium	MG/KG	55	0	42	76.4%	3.262	4.737	25.500	FALSE	TRUE	6.783	6.783
METALS	Calcium	MG/KG	55	0	55	100.0%	41717.455	57950.097	229000.000	FALSE	TRUE	87148.232	87148.232
METALS	Chromium	MG/KG	55	0	55	100.0%	19.963	4.144	27.900	FALSE	FALSE	21.238	21.238
METALS	Cobalt	MG/KG	55	0	55	100.0%	10.155	3.334	21.900	FALSE	TRUE	10.955	10.955
METALS	Copper	MG/KG	55	0	55	100.0%	134.120	184.261	837.000	FALSE	TRUE	179.232	179.232
METALS	Cyanide	MG/KG	52	0	2	3.8%	0.316	0.191	1.500	FALSE	FALSE	0.355	0.355
METALS	Iron	MG/KG	55	0	55	100.0%	23087.818	5560.503	38700.000	FALSE	FALSE	24851.567	24851.567
METALS	Lead	MG/KG	55	0	54	98.2%	760.433	1164.316	6270.000	FALSE	TRUE	2498.470	2498.470
METALS	Magnesium	MG/KG	55	0	55	100.0%	5952.455	3084.811	18100.000	FALSE	TRUE	6614.990	6614.990
METALS	Manganese	MG/KG	55	0	55	100.0%	526.591	199.950	1080.000	TRUE	TRUE	571.731	571.731
METALS	Mercury	MG/KG	55	0	50	90.9%	0.108	0.184	1.000	FALSE	FALSE	0.116	0.116
METALS	Nickel	MG/KG	55	0	55	100.0%	27.825	8.641	50.800	TRUE	TRUE	29.775	29.775
METALS	Potassium	MG/KG	55	0	55	100.0%	1382.618	282.451	1960.000	TRUE	TRUE	1446.383	1446.383
METALS	Selenium	MG/KG	55	0	34	61.8%	0.573	0.493	1.700	TRUE	TRUE	0.684	0.684
METALS	Silver	MG/KG	55	0	16	29.1%	1.191	1.720	9.000	FALSE	TRUE	1.676	1.676
METALS	Sodium	MG/KG	55	0	41	74.5%	94.329	75.921	383.000	FALSE	TRUE	115.953	115.953
METALS	Thallium	MG/KG	55	0	11	20.0%	0.404	0.388	1.500	FALSE	TRUE	0.533	0.533
METALS	Vanadium	MG/KG	55	0	55	100.0%	22.510	5.193	30.700	TRUE	FALSE	23.682	23.682
METALS	Zinc	MG/KG	55	0	55	100.0%	253.235	300.841	1475.000	FALSE	TRUE	306.138	306.138
HERBICIDES	MCPA	UG/KG	32	0	4	12.5%	5573.438	7708.583	34000.000	FALSE	FALSE	6261.917	6261.917

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	Acetone	UG/KG	10	0	3	30.0%	10.550	6.025	26.000	FALSE	FALSE	14.388	14.388
VOLATILE ORGANICS	Toluene	UG/KG	10	0	1	10.0%	7.600	1.329	8.000	FALSE	FALSE	8.401	8.000
SEMIVOLATILE ORGANICS	2,4-Dimethylphenol	UG/KG	10	0	1	10.0%	235.200	76.328	32.000	FALSE	FALSE	450.613	32.000
SEMIVOLATILE ORGANICS	2,4-Dinitrotoluene	UG/KG	10	0	1	10.0%	275.000	67.700	450.000	FALSE	TRUE	314.342	314.342
SEMIVOLATILE ORGANICS	Benzo[a]anthracene	UG/KG	10	0	1	10.0%	232.500	78.218	25.000	FALSE	FALSE	504.850	25.000
SEMIVOLATILE ORGANICS	Benzo[a]pyrene	UG/KG	10	0	1	10.0%	233.000	76.746	30.000	FALSE	FALSE	459.333	30.000
SEMIVOLATILE ORGANICS	Benzo[b]fluoranthene	UG/KG	10	0	1	10.0%	234.300	72.941	43.000	FALSE	FALSE	390.528	43.000
SEMIVOLATILE ORGANICS	Benzo[ghi]perylene	UG/KG	10	0	1	10.0%	233.100	76.453	31.000	FALSE	FALSE	452.046	31.000
SEMIVOLATILE ORGANICS	Benzo[k]fluoranthene	UG/KG	10	0	1	10.0%	233.300	75.865	33.000	FALSE	FALSE	438.746	33.000
SEMIVOLATILE ORGANICS	Bis(2-Ethylhexyl)phthalate	UG/KG	10	0	3	30.0%	193.200	97.726	77.000	FALSE	FALSE	424.382	77.000
SEMIVOLATILE ORGANICS	Chrysene	UG/KG	10	0	1	10.0%	234.800	71.487	48.000	FALSE	FALSE	373.930	48.000
SEMIVOLATILE ORGANICS	Fluoranthene	UG/KG	10	0	2	20.0%	219.100	91.240	70.000	FALSE	FALSE	444.591	70.000
SEMIVOLATILE ORGANICS	Indeno[1,2,3-cd]pyrene	UG/KG	10	0	1	10.0%	232.400	78.513	24.000	FALSE	FALSE	516.219	24.000
SEMIVOLATILE ORGANICS	Phenanthrene	UG/KG	10	0	1	10.0%	233.500	75.279	35.000	FALSE	FALSE	426.909	35.000
SEMIVOLATILE ORGANICS	Pyrene	UG/KG	10	0	2	20.0%	215.800	97.732	47.000	FALSE	FALSE	567.092	47.000
PESTICIDES/PCB	4,4`-DDD	UG/KG	10	0	3	30.0%	4.080	3.562	13.000	FALSE	FALSE	6.461	6.461
PESTICIDES/PCB	4,4`-DDE	UG/KG	10	0	6	60.0%	12.475	19.212	62.000	FALSE	FALSE	48.172	48.172
PESTICIDES/PCB	4,4`-DDT	UG/KG	10	0	2	20.0%	3.490	3.007	12.000	FALSE	FALSE	4.897	4.897
PESTICIDES/PCB	Dieldrin	UG/KG	10	0	1	10.0%	2.805	0.814	5.000	FALSE	FALSE	3.255	3.255
PESTICIDES/PCB	Endosulfan I	UG/KG	10	0	1	10.0%	1.330	0.170	1.600	TRUE	TRUE	1.428	1.428
PESTICIDES/PCB	Endosulfan II	UG/KG	10	0	2	20.0%	2.685	0.592	3.800	FALSE	FALSE	3.048	3.048
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	10	0	10	100.0%	0.077	0.062	0.240	FALSE	TRUE	0.133	0.133
OTHER ANALYSES	Total Organic Carbon	MG/KG	10	0	9	90.0%	11102.050	10065.444	36100.000	FALSE	FALSE	339623.717	36100.000
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	10	0	0	0.0%	60.000	0.000	0.000	FALSE	FALSE	64.034	0.000
METALS	Aluminum	MG/KG	10	0	10	100.0%	16370.000	3287.028	22100.000	TRUE	TRUE	18253.483	18253.483
METALS	Antimony	MG/KG	10	0	4	40.0%	1.636	1.923	5.500	FALSE	FALSE	5.590	5.500
METALS	Arsenic	MG/KG	10	0	10	100.0%	5.290	1.405	7.500	TRUE	TRUE	6.095	6.095
METALS	Barium	MG/KG	10	0	10	100.0%	111.770	34.514	162.000	TRUE	TRUE	131.547	131.547
METALS	Beryllium	MG/KG	10	0	10	100.0%	0.642	0.213	0.990	TRUE	TRUE	0.764	0.764
METALS	Cadmium	MG/KG	10	0	10	100.0%	1.573	1.448	4.800	TRUE	TRUE	2.403	2.403
METALS	Calcium	MG/KG	10	0	10	100.0%	6031.000	6852.533	25000.000	FALSE	TRUE	10822.064	10822.064
METALS	Chromium	MG/KG	10	0	10	100.0%	22.160	4.368	27.700	TRUE	TRUE	24.663	24.663
METALS	Cobalt	MG/KG	10	0	10	100.0%	10.810	3.041	17.800	TRUE	TRUE	12.553	12.553
METALS	Copper	MG/KG	10	0	10	100.0%	73.320	85.855	309.000	FALSE	FALSE	133.422	133.422
METALS	Iron	MG/KG	10	0	10	100.0%	26540.000	5054.635	35000.000	TRUE	TRUE	29436.330	29436.330
METALS	Lead	MG/KG	10	0	10	100.0%	270.320	329.896	1050.000	FALSE	TRUE	683.420	683.420
METALS	Magnesium	MG/KG	10	0	10	100.0%	4890.000	1127.987	6490.000	TRUE	FALSE	5536.342	5536.342
METALS	Manganese	MG/KG	10	0	10	100.0%	445.100	151.769	768.000	TRUE	TRUE	532.064	532.064
METALS	Mercury	MG/KG	10	0	4	40.0%	0.043	0.044	0.160	FALSE	TRUE	0.081	0.081
METALS	Nickel	MG/KG	10	0	10	100.0%	27.200	6.366	31.600	FALSE	FALSE	34.349	31.600
METALS	Potassium	MG/KG	10	0	10	100.0%	1899.000	499.098	2630.000	TRUE	TRUE	2184.986	2184.986

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
METALS	Selenium	MG/KG	10	0	3	30.0%	0.853	0.507	1.900	FALSE	TRUE	1.266	1.266
METALS	Sodium	MG/KG	10	0	8	80.0%	180.615	160.693	452.000	FALSE	TRUE	427.232	427.232
METALS	Thallium	MG/KG	10	0	2	20.0%	0.659	0.288	1.300	TRUE	TRUE	0.824	0.824
METALS	Vanadium	MG/KG	10	0	10	100.0%	26.770	5.196	33.800	TRUE	TRUE	29.747	29.747
METALS	Zinc	MG/KG	10	0	10	100.0%	130.030	73.599	278.000	FALSE	TRUE	188.428	188.428

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
SEMIVOLATILE ORGANICS	Bis(2-Ethylhexyl)phthalate	UG/L	10	0	2	20.0%	4.300	1.494	2.000	FALSE	FALSE	6.957	2.000
OTHER ANALYSES	Total Organic Carbon	MG/L	10	0	10	100.0%	7.500	2.770	11.600	TRUE	TRUE	9.087	9.087
OTHER ANALYSES	pH	MG/L	10	0	10	100.0%	7.646	0.181	7.890	TRUE	TRUE	7.750	7.750
METALS	Antimony	UG/L	10	0	4	40.0%	5.170	7.457	23.600	FALSE	FALSE	22.095	22.095
METALS	Arsenic	UG/L	10	0	6	60.0%	2.780	1.311	4.600	FALSE	FALSE	4.264	4.264
METALS	Barium	UG/L	10	0	10	100.0%	47.010	27.322	100.000	FALSE	TRUE	72.197	72.197
METALS	Cadmium	UG/L	10	0	5	50.0%	0.391	0.363	1.300	FALSE	FALSE	0.782	0.782
METALS	Calcium	UG/L	10	0	10	100.0%	53640.000	16622.755	73500.000	TRUE	TRUE	63164.917	63164.917
METALS	Chromium	UG/L	10	0	1	10.0%	0.550	0.158	1.000	FALSE	FALSE	0.631	0.631
METALS	Copper	UG/L	10	0	10	100.0%	13.040	8.079	32.700	FALSE	TRUE	19.253	19.253
METALS	Iron	UG/L	10	0	10	100.0%	146.300	82.062	322.000	TRUE	TRUE	193.322	193.322
METALS	Lead	UG/L	10	0	6	60.0%	7.210	11.515	37.100	FALSE	TRUE	44.167	37.100
METALS	Magnesium	UG/L	10	0	10	100.0%	5904.000	2882.727	9280.000	FALSE	FALSE	8904.835	8904.835
METALS	Manganese	UG/L	10	0	10	100.0%	8.430	6.200	19.600	TRUE	TRUE	11.983	11.983
METALS	Nickel	UG/L	10	0	1	10.0%	0.890	0.285	1.700	FALSE	FALSE	1.034	1.034
METALS	Potassium	UG/L	10	0	10	100.0%	3007.000	896.562	4380.000	TRUE	TRUE	3520.734	3520.734
METALS	Selenium	UG/L	10	0	5	50.0%	2.170	1.061	3.500	FALSE	FALSE	3.228	3.228
METALS	Sodium	UG/L	10	0	10	100.0%	5209.000	3180.651	9460.000	TRUE	TRUE	7031.528	7031.528
METALS	Vanadium	UG/L	10	0	1	10.0%	0.720	0.379	1.800	FALSE	FALSE	0.900	0.900
METALS	Zinc	UG/L	10	0	10	100.0%	24.130	21.177	61.700	TRUE	TRUE	36.264	36.264

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
SEMIVOLATILE ORGANICS	Benzo[a]pyrene	UG/L	11	0	1	9.1%	4.745	1.361	0.700	FALSE	FALSE	8.018	0.700
SEMIVOLATILE ORGANICS	Benzo[ghi]perylene	UG/L	11	0	1	9.1%	4.818	1.124	1.500	FALSE	FALSE	6.273	1.500
SEMIVOLATILE ORGANICS	Dibenz[a,h]anthracene	UG/L	11	0	1	9.1%	4.768	1.287	0.950	FALSE	FALSE	7.172	0.950
SEMIVOLATILE ORGANICS	Indeno[1,2,3-cd]pyrene	UG/L	11	0	1	9.1%	4.818	1.124	1.500	FALSE	FALSE	6.273	1.500
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/L	11	0	11	100.0%	0.103	0.089	0.260	FALSE	TRUE	0.257	0.257
NITROAROMATICS	Tetryl	UG/L	6	0	1	16.7%	0.089	0.032	0.080	FALSE	FALSE	0.128	0.080
METALS	Aluminum	UG/L	10	1	7	70.0%	2043.090	3784.878	10800.000	FALSE	TRUE	692383.106	10800.000
METALS	Arsenic	UG/L	11	0	3	27.3%	2.206	1.394	5.800	FALSE	TRUE	3.440	3.440
METALS	Barium	UG/L	11	0	6	54.5%	54.377	41.600	147.000	TRUE	TRUE	76.904	76.904
METALS	Beryllium	UG/L	11	0	4	36.4%	0.208	0.139	0.520	FALSE	FALSE	0.325	0.325
METALS	Cadmium	UG/L	7	4	1	14.3%	0.269	0.058	0.230	FALSE	FALSE	0.339	0.230
METALS	Calcium	UG/L	11	0	11	100.0%	114736.364	24802.108	170000.000	TRUE	TRUE	128167.061	128167.061
METALS	Chromium	UG/L	11	0	3	27.3%	3.345	5.903	17.300	FALSE	FALSE	12.924	12.924
METALS	Cobalt	UG/L	11	0	3	27.3%	2.545	3.484	11.400	FALSE	FALSE	6.553	6.553
METALS	Copper	UG/L	11	0	4	36.4%	3.945	5.675	18.000	FALSE	TRUE	15.145	15.145
METALS	Iron	UG/L	11	0	9	81.8%	3147.850	6163.169	18300.000	FALSE	TRUE	248669.470	18300.000
METALS	Lead	UG/L	11	0	4	36.4%	4.529	9.505	32.300	FALSE	FALSE	14.168	14.168
METALS	Magnesium	UG/L	11	0	11	100.0%	20109.091	7650.419	40200.000	FALSE	TRUE	24529.529	24529.529
METALS	Manganese	UG/L	10	1	9	90.0%	189.850	215.756	550.000	FALSE	TRUE	48711.666	550.000
METALS	Mercury	UG/L	11	0	2	18.2%	0.048	0.012	0.070	FALSE	FALSE	0.059	0.059
METALS	Nickel	UG/L	11	0	4	36.4%	4.950	7.672	24.400	FALSE	FALSE	12.134	12.134
METALS	Potassium	UG/L	11	0	7	63.6%	2466.682	2257.774	5820.000	FALSE	FALSE	9340.819	5820.000
METALS	Selenium	UG/L	8	3	1	12.5%	1.274	0.874	2.000	TRUE	TRUE	1.848	1.848
METALS	Silver	UG/L	8	3	1	12.5%	0.997	0.517	1.475	FALSE	FALSE	1.423	1.423
METALS	Sodium	UG/L	11	0	11	100.0%	20480.455	14017.160	46100.000	FALSE	TRUE	34092.579	34092.579
METALS	Thallium	UG/L	11	0	2	18.2%	2.468	1.808	5.750	TRUE	TRUE	3.447	3.447
METALS	Vanadium	UG/L	11	0	3	27.3%	3.818	6.410	19.900	FALSE	FALSE	11.832	11.832
METALS	Zinc	UG/L	10	1	5	50.0%	24.103	33.081	100.000	FALSE	TRUE	221.372	100.000

TABLE 7-14

CALCULATION OF INTAKE (ONSITE)
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
METALS									
Arsenic		1.96E-10	2.50E-07	2	50	5	25	1,825	25,550
Barium	7.07E-08		6.46E-06	2	50	5	25	1,825	25,550
Cadmium		2.38E-10	3.04E-07	2	50	5	25	1,825	25,550
Copper			8.77E-06	2	50	5	25	1,825	25,550
Lead			1.06E-04	2	50	5	25	1,825	25,550
Mercury	5.00E-11		4.56E-09	2	50	5	25	1,825	25,550
Selenium			2.95E-08	2	50	5	25	1,825	25,550
Silver			7.55E-08	2	50	5	25	1,825	25,550
Thallium			1.93E-08	2	50	5	25	1,825	25,550
Zinc			1.42E-05	2	50	5	25	1,825	25,550
HERBICIDES									
MCPA			2.58E-04	2	50	5	25	1,825	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:

CA = Chemical Concentration in Air (mg/m³)
IR = Inhalation Rate (m³/day)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

Calculated EPC Air Data - RME
2 (RME Child)
50
5
25 (Child)
5 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-61

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			NA	NA		
Benzene		1.90E-13	NA	2.91E-02		5.53E-15
Methylene Chloride	2.61E-12	1.87E-13	8.57E-01	1.65E-03	3.05E-12	3.08E-16
Toluene	2.78E-12		1.14E-01	NA	2.43E-11	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Butylbenzylphthalate			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Chloroisopropyl) ether	9.43E-11		1.00E-03	NA	9.43E-08	
bis(2-Ethylhexyl)phthalate			NA	NA		
PESTICIDES/PCB						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		9.52E-14	NA	3.40E-01		3.23E-14
Aldrin	4.48E-13	3.20E-14	1.70E+01	1.72E+01	2.63E-14	5.49E-13
Aroclor-1260			NA	NA		
Dieldrin		1.70E-13	NA	1.61E+01		2.74E-12
Endosulfan I			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide		3.12E-14	NA	9.10E+00		2.84E-13
alpha-Chlordane			NA	NA		
beta-BHC		0.00E+00	NA	1.86E+00		0.00E+00
delta-BHC			NA	NA		

TABLE 7-61

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic		1.96E-10	NA	1.51E+01		2.95E-09
Barium	7.07E-08		1.43E-04	NA	4.95E-04	
Cadmium		2.38E-10	NA	6.30E+00		1.50E-09
Copper			NA	NA		
Lead			NA	NA		
Mercury	5.00E-11		8.57E-05	NA	5.83E-07	
Selenium			NA	NA		
Silver			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
HERBICIDES						
MCPA			NA	NA		
Total HQ & CR					**4.96E-04**	**4.45E-09**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-7A

AMBIENT AIR EXPOSURE POINT CONCENTRATIONS
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

COMPOUND	SURFACE SOIL EPC Data mg/kg	AVERAGE TSP (ug/m³)	CONVERSION FACTOR (kg/ug)	AIR CALCULATED EPC (mg/m³)
VOLATILE ORGANICS				
Acetone	7.67E-03	3.80E+01	1.00E-09	2.91E-10
Benzene	6.39E-03	3.80E+01	1.00E-09	2.43E-10
Methylene Chloride	6.27E-03	3.80E+01	1.00E-09	2.38E-10
Toluene	6.67E-03	3.80E+01	1.00E-09	2.53E-10
SEMIVOLATILE ORGANICS				
2,4-Dinitrotoluene	2.69E-01	3.80E+01	1.00E-09	1.02E-08
2,6-Dinitrotoluene	2.04E-01	3.80E+01	1.00E-09	7.77E-09
2-Methylnaphthalene	2.02E-01	3.80E+01	1.00E-09	7.68E-09
2-Methylphenol	0.00E+00	3.80E+01	1.00E-09	0.00E+00
3,3'-Dichlorobenzidine	2.35E-01	3.80E+01	1.00E-09	8.93E-09
3-Nitroaniline	5.68E-01	3.80E+01	1.00E-09	2.16E-08
4-Nitroaniline	5.68E-01	3.80E+01	1.00E-09	2.16E-08
Acenaphthene	0.00E+00	3.80E+01	1.00E-09	0.00E+00
Acenaphthylene	0.00E+00	3.80E+01	1.00E-09	0.00E+00
Anthracene	2.17E-01	3.80E+01	1.00E-09	8.25E-09
Benzo(a)anthracene	2.45E-01	3.80E+01	1.00E-09	9.30E-09
Benzo(a)pyrene	2.39E-01	3.80E+01	1.00E-09	9.07E-09
Benzo(b)fluoranthene	2.27E-01	3.80E+01	1.00E-09	8.64E-09
Benzo(g,h,i)perylene	2.23E-01	3.80E+01	1.00E-09	8.49E-09
Benzo(k)fluoranthene	2.50E-01	3.80E+01	1.00E-09	9.49E-09
Butylbenzylphthalate	2.15E-01	3.80E+01	1.00E-09	8.16E-09
Carbazole	2.35E-01	3.80E+01	1.00E-09	8.93E-09
Chrysene	1.93E-01	3.80E+01	1.00E-09	7.33E-09
Di-n-butylphthalate	2.94E-01	3.80E+01	1.00E-09	1.12E-08
Dibenz(a,h)anthracene	2.11E-01	3.80E+01	1.00E-09	8.02E-09
Dibenzofuran	0.00E+00	3.80E+01	1.00E-09	0.00E+00
Fluoranthene	1.87E-01	3.80E+01	1.00E-09	7.11E-09
Fluorene	0.00E+00	3.80E+01	1.00E-09	0.00E+00
Indeno(1,2,3-cd)pyrene	2.24E-01	3.80E+01	1.00E-09	8.51E-09
N-Nitrosodiphenylamine (1)	2.15E-01	3.80E+01	1.00E-09	8.16E-09
Naphthalene	2.12E-01	3.80E+01	1.00E-09	8.04E-09
Pentachlorophenol	6.21E-01	3.80E+01	1.00E-09	2.36E-08
Phenanthrene	2.32E-01	3.80E+01	1.00E-09	8.82E-09
Pyrene	1.57E-01	3.80E+01	1.00E-09	5.96E-09
bis(2-Chloroisopropyl) ether	2.26E-01	3.80E+01	1.00E-09	8.60E-09
bis(2-Ethylhexyl)phthalate	3.81E-01	3.80E+01	1.00E-09	1.45E-08
PESTICIDES/PCB				
4,4'-DDD	2.45E-03	3.80E+01	1.00E-09	9.33E-11
4,4'-DDE	6.17E-03	3.80E+01	1.00E-09	2.34E-10
4,4'-DDT	3.20E-03	3.80E+01	1.00E-09	1.22E-10
Aldrin	1.08E-03	3.80E+01	1.00E-09	4.09E-11
Aroclor-1260	2.08E-02	3.80E+01	1.00E-09	7.89E-10
Dieldrin	5.71E-03	3.80E+01	1.00E-09	2.17E-10
Endosulfan I	1.09E-03	3.80E+01	1.00E-09	4.14E-11
Endosulfan sulfate	0.00E+00	3.80E+01	1.00E-09	0.00E+00
Endrin	2.04E-03	3.80E+01	1.00E-09	7.75E-11
Endrin ketone	0.00E+00	3.80E+01	1.00E-09	0.00E+00
Heptachlor epoxide	1.05E-03	3.80E+01	1.00E-09	3.99E-11
alpha-Chlordane	0.00E+00	3.80E+01	1.00E-09	0.00E+00
beta-BHC	0.00E+00	3.80E+01	1.00E-09	0.00E+00
delta-BHC	0.00E+00	3.80E+01	1.00E-09	0.00E+00

TABLE 7-7A

AMBIENT AIR EXPOSURE POINT CONCENTRATIONS
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

COMPOUND	SURFACE SOIL EPC Data mg/kg	AVERAGE TSP (ug/m^3)	CONVERSION FACTOR (kg/ug)	AIR CALCULATED EPC (mg/m^3)
METALS				
Arsenic	6.59E+00	3.80E+01	1.00E-09	2.50E-07
Barium	1.70E+02	3.80E+01	1.00E-09	6.46E-06
Cadmium	8.00E+00	3.80E+01	1.00E-09	3.04E-07
Copper	2.31E+02	3.80E+01	1.00E-09	8.77E-06
Lead	2.78E+03	3.80E+01	1.00E-09	1.06E-04
Mercury	1.20E-01	3.80E+01	1.00E-09	4.56E-09
Selenium	7.75E-01	3.80E+01	1.00E-09	2.95E-08
Silver	1.99E+00	3.80E+01	1.00E-09	7.55E-08
Thallium	5.07E-01	3.80E+01	1.00E-09	1.93E-08
Zinc	3.74E+02	3.80E+01	1.00E-09	1.42E-05
HERBICIDES				
MCPA	6.78E+03	3.80E+01	1.00E-09	2.58E-04

EQUATION: **Calculated Air EPC (mg/m3) = Soil EPC x TSP x CF**

Variables:	**Assumptions:**
TSP = Total Suspended Particulates	**Average value - 38 ug/m3**
CF = Conversion Factor	**10-9 kg/ug**

TABLE 7-8

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
VOLATILE ORGANICS									
Acetone			2.91E-10	20	20	25	70	9,125	25,550
Benzene		1.36E-12	2.43E-10	20	20	25	70	9,125	25,550
Methylene Chloride	3.73E-12	1.33E-12	2.38E-10	20	20	25	70	9,125	25,550
Toluene	3.97E-12		2.53E-10	20	20	25	70	9,125	25,550
SEMIVOLATILE ORGANICS									
2,4-Dinitrotoluene			1.02E-08	20	20	25	70	9,125	25,550
2,6-Dinitrotoluene			7.77E-09	20	20	25	70	9,125	25,550
2-Methylnaphthalene			7.68E-09	20	20	25	70	9,125	25,550
2-Methylphenol			0.00E+00	20	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine			8.93E-09	20	20	25	70	9,125	25,550
3-Nitroaniline			2.16E-08	20	20	25	70	9,125	25,550
4-Nitroaniline			2.16E-08	20	20	25	70	9,125	25,550
Acenaphthene			0.00E+00	20	20	25	70	9,125	25,550
Acenaphthylene			0.00E+00	20	20	25	70	9,125	25,550
Anthracene			8.25E-09	20	20	25	70	9,125	25,550
Benzo(a)anthracene			9.30E-09	20	20	25	70	9,125	25,550
Benzo(a)pyrene			9.07E-09	20	20	25	70	9,125	25,550
Benzo(b)fluoranthene			8.64E-09	20	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			8.49E-09	20	20	25	70	9,125	25,550
Benzo(k)fluoranthene			9.49E-09	20	20	25	70	9,125	25,550
Butylbenzylphthalate			8.16E-09	20	20	25	70	9,125	25,550
Carbazole			8.93E-09	20	20	25	70	9,125	25,550
Chrysene			7.33E-09	20	20	25	70	9,125	25,550
Di-n-butylphthalate			1.12E-08	20	20	25	70	9,125	25,550
Dibenz(a,h)anthracene			8.02E-09	20	20	25	70	9,125	25,550
Dibenzofuran			0.00E+00	20	20	25	70	9,125	25,550
Fluoranthene			7.11E-09	20	20	25	70	9,125	25,550
Fluorene			0.00E+00	20	20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			8.51E-09	20	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			8.16E-09	20	20	25	70	9,125	25,550
Naphthalene			8.04E-09	20	20	25	70	9,125	25,550
Pentachlorophenol			2.36E-08	20	20	25	70	9,125	25,550
Phenanthrene			8.82E-09	20	20	25	70	9,125	25,550
Pyrene			5.96E-09	20	20	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether	1.35E-10		8.60E-09	20	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			1.45E-08	20	20	25	70	9,125	25,550
PESTICIDES/PCB									
4,4'-DDD			9.33E-11	20	20	25	70	9,125	25,550
4,4'-DDE			2.34E-10	20	20	25	70	9,125	25,550
4,4'-DDT		6.80E-13	1.22E-10	20	20	25	70	9,125	25,550
Aldrin	6.40E-13	2.28E-13	4.09E-11	20	20	25	70	9,125	25,550
Aroclor-1260			7.89E-10	20	20	25	70	9,125	25,550
Dieldrin		1.21E-12	2.17E-10	20	20	25	70	9,125	25,550
Endosulfan I			4.14E-11	20	20	25	70	9,125	25,550
Endosulfan sulfate			0.00E+00	20	20	25	70	9,125	25,550
Endrin			7.75E-11	20	20	25	70	9,125	25,550
Endrin ketone			0.00E+00	20	20	25	70	9,125	25,550
Heptachlor epoxide		2.23E-13	3.99E-11	20	20	25	70	9,125	25,550
alpha-Chlordane			0.00E+00	20	20	25	70	9,125	25,550
beta-BHC		0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
delta-BHC			0.00E+00	20	20	25	70	9,125	25,550

TABLE 7-8

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
METALS									
Arsenic		1.40E-09	2.50E-07	20	20	25	70	9,125	25,550
Barium	1.01E-07		6.46E-06	20	20	25	70	9,125	25,550
Cadmium		1.70E-09	3.04E-07	20	20	25	70	9,125	25,550
Copper			8.77E-06	20	20	25	70	9,125	25,550
Lead			1.06E-04	20	20	25	70	9,125	25,550
Mercury	7.14E-11		4.56E-09	20	20	25	70	9,125	25,550
Selenium			2.95E-08	20	20	25	70	9,125	25,550
Silver			7.55E-08	20	20	25	70	9,125	25,550
Thallium			1.93E-08	20	20	25	70	9,125	25,550
Zinc			1.42E-05	20	20	25	70	9,125	25,550
HERBICIDES									
MCPA			2.58E-04	20	20	25	70	9,125	25,550

EQUATION: Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:

- CA = Chemical Concentration in Air (mg/m³)
- IR = Inhalation Rate (m³/day)
- EF = Exposure Frequency (days/yr)
- ED = Exposure Duration (years)
- BW = Bodyweight (kg)
- AT = Averaging Time (days)

Assumptions:

- Calculated EPC Air Data - RME
- 20 (RME All Receptors)
- 20 (RME Site Worker)
- 25 (RME Site Worker)
- 70 (Adult Male)
- 25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-43

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			NA	NA		
Benzene		1.36E-12	NA	2.91E-02		3.95E-14
Methylene Chloride	3.73E-12	1.33E-12	8.57E-01	1.65E-03	4.36E-12	2.20E-15
Toluene	3.97E-12		1.14E-01	NA	3.47E-11	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Butylbenzylphthalate			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Chloroisopropyl) ether	1.35E-10		1.00E-03	NA	1.35E-07	
bis(2-Ethylhexyl)phthalate			NA	NA		
PESTICIDES/PCB						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		6.80E-13	NA	3.40E-01		2.31E-13
Aldrin	6.40E-13	2.28E-13	1.70E+01	1.72E+01	3.76E-14	3.92E-12
Aroclor-1260			NA	NA		
Dieldrin		1.21E-12	NA	1.61E+01		1.95E-11
Endosulfan I			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide		2.23E-13	NA	9.10E+00		2.03E-12
alpha-Chlordane			NA	NA		
beta-BHC		0.00E+00	NA	1.86E+00		0.00E+00
delta-BHC			NA	NA		

TABLE 7-43

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic		1.40E-09	NA	1.51E+01		2.11E-08
Barium	1.01E-07		1.43E-04	NA	7.07E-04	
Cadmium		1.70E-09	NA	6.30E+00		1.07E-08
Copper			NA	NA		
Lead			NA	NA		
Mercury	7.14E-11		8.57E-05	NA	8.33E-07	
Selenium			NA	NA		
Silver			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
HERBICIDES						
MCPA			NA	NA		
Total HQ & CR					**7.08E-04**	**3.18E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-12

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
VOLATILE ORGANICS									
Acetone			2.91E-10	20	250	1	70	365	25,550
Benzene		6.79E-13	2.43E-10	20	250	1	70	365	25,550
Methylene Chloride	4.67E-11	6.67E-13	2.38E-10	20	250	1	70	365	25,550
Toluene	4.96E-11		2.53E-10	20	250	1	70	365	25,550
SEMIVOLATILE ORGANICS									
2,4-Dinitrotoluene			1.02E-08	20	250	1	70	365	25,550
2,6-Dinitrotoluene			7.77E-09	20	250	1	70	365	25,550
2-Methylnaphthalene			7.68E-09	20	250	1	70	365	25,550
2-Methylphenol			0.00E+00	20	250	1	70	365	25,550
3,3'-Dichlorobenzidine			8.93E-09	20	250	1	70	365	25,550
3-Nitroaniline			2.16E-08	20	250	1	70	365	25,550
4-Nitroaniline			2.16E-08	20	250	1	70	365	25,550
Acenaphthene			0.00E+00	20	250	1	70	365	25,550
Acenaphthylene			0.00E+00	20	250	1	70	365	25,550
Anthracene			8.25E-09	20	250	1	70	365	25,550
Benzo(a)anthracene			9.30E-09	20	250	1	70	365	25,550
Benzo(a)pyrene			9.07E-09	20	250	1	70	365	25,550
Benzo(b)fluoranthene			8.64E-09	20	250	1	70	365	25,550
Benzo(g,h,i)perylene			8.49E-09	20	250	1	70	365	25,550
Benzo(k)fluoranthene			9.49E-09	20	250	1	70	365	25,550
Butylbenzylphthalate			8.16E-09	20	250	1	70	365	25,550
Carbazole			8.93E-09	20	250	1	70	365	25,550
Chrysene			7.33E-09	20	250	1	70	365	25,550
Di-n-butylphthalate			1.12E-08	20	250	1	70	365	25,550
Dibenz(a,h)anthracene			8.02E-09	20	250	1	70	365	25,550
Dibenzofuran			0.00E+00	20	250	1	70	365	25,550
Fluoranthene			7.11E-09	20	250	1	70	365	25,550
Fluorene			0.00E+00	20	250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene			8.51E-09	20	250	1	70	365	25,550
N-Nitrosodiphenylamine (1)			8.16E-09	20	250	1	70	365	25,550
Naphthalene			8.04E-09	20	250	1	70	365	25,550
Pentachlorophenol			2.36E-08	20	250	1	70	365	25,550
Phenanthrene			8.82E-09	20	250	1	70	365	25,550
Pyrene			5.96E-09	20	250	1	70	365	25,550
bis(2-Chloroisopropyl) ether	1.68E-09		8.60E-09	20	250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate			1.45E-08	20	250	1	70	365	25,550
PESTICIDES/PCB									
4,4'-DDD			9.33E-11	20	250	1	70	365	25,550
4,4'-DDE			2.34E-10	20	250	1	70	365	25,550
4,4'-DDT		3.40E-13	1.22E-10	20	250	1	70	365	25,550
Aldrin	8.00E-12	1.14E-13	4.09E-11	20	250	1	70	365	25,550
Aroclor-1260			7.89E-10	20	250	1	70	365	25,550
Dieldrin		6.07E-13	2.17E-10	20	250	1	70	365	25,550
Endosulfan I			4.14E-11	20	250	1	70	365	25,550
Endosulfan sulfate			0.00E+00	20	250	1	70	365	25,550
Endrin			7.75E-11	20	250	1	70	365	25,550
Endrin ketone			0.00E+00	20	250	1	70	365	25,550
Heptachlor epoxide		1.12E-13	3.99E-11	20	250	1	70	365	25,550
alpha-Chlordane			0.00E+00	20	250	1	70	365	25,550
beta-BHC		0.00E+00	0.00E+00	20	250	1	70	365	25,550
delta-BHC			0.00E+00	20	250	1	70	365	25,550

TABLE 7-12

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m^3)	Inhalation Rate (m^3/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
METALS									
Arsenic		7.00E-10	2.50E-07	20	250	1	70	365	25,550
Barium	1.26E-06		6.46E-06	20	250	1	70	365	25,550
Cadmium		8.50E-10	3.04E-07	20	250	1	70	365	25,550
Copper			8.77E-06	20	250	1	70	365	25,550
Lead			1.06E-04	20	250	1	70	365	25,550
Mercury	8.92E-10		4.56E-09	20	250	1	70	365	25,550
Selenium			2.95E-08	20	250	1	70	365	25,550
Silver			7.55E-08	20	250	1	70	365	25,550
Thallium			1.93E-08	20	250	1	70	365	25,550
Zinc			1.42E-05	20	250	1	70	365	25,550
HERBICIDES									
MCPA			2.58E-04	20	250	1	70	365	25,550

EQUATION: Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:	**Assumptions:**
CA = Chemical Concentration in Air (mg/m^3)	Calculated EPC Air Data - RME
IR = Inhalation Rate (m^3/day)	20 (all receptors)
EF = Exposure Frequency (days/yr)	250 (RME Construction Workers)
ED = Exposure Duration (years)	1 (Upper bound period of Construction Worker)
BW = Bodyweight (kg)	70 (Adult Male)
AT = Averaging Time (days)	1 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-55

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			NA	NA		
Benzene		6.79E-13	NA	2.91E-02		1.98E-14
Methylene Chloride	4.67E-11	6.67E-13	8.57E-01	1.65E-03	5.44E-11	1.10E-15
Toluene	4.96E-11		1.14E-01	NA	4.34E-10	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Butylbenzylphthalate			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Chloroisopropyl) ether	1.68E-09		1.00E-03	NA	1.68E-06	
bis(2-Ethylhexyl)phthalate			NA	NA		
PESTICIDES/PCB						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		3.40E-13	NA	3.40E-01		1.15E-13
Aldrin	8.00E-12	1.14E-13	1.70E+01	1.72E+01	4.70E-13	1.96E-12
Aroclor-1260			NA	NA		
Dieldrin		6.07E-13	NA	1.61E+01		9.77E-12
Endosulfan I			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide		1.12E-13	NA	9.10E+00		1.02E-12
alpha-Chlordane			NA	NA		
beta-BHC		0.00E+00	NA	1.86E+00		0.00E+00
delta-BHC			NA	NA		

TABLE 7-55

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic		7.00E-10	NA	1.51E+01		1.05E-08
Barium	1.26E-06		1.43E-04	NA	8.84E-03	
Cadmium		8.50E-10	NA	6.30E+00		5.35E-09
Copper			NA	NA		
Lead			NA	NA		
Mercury	8.92E-10		8.57E-05	NA	1.04E-05	
Selenium			NA	NA		
Silver			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
HERBICIDES						
MCPA			NA	NA		
Total HQ & CR					**8.86E-03**	**1.59E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-10

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
VOLATILE ORGANICS									
Acetone			2.91E-10	20	250	25	70	9,125	25,550
Benzene		1.70E-11	2.43E-10	20	250	25	70	9,125	25,550
Methylene Chloride	4.67E-11	1.67E-11	2.38E-10	20	250	25	70	9,125	25,550
Toluene	4.96E-11		2.53E-10	20	250	25	70	9,125	25,550
SEMIVOLATILE ORGANICS									
2,4-Dinitrotoluene			1.02E-08	20	250	25	70	9,125	25,550
2,6-Dinitrotoluene			7.77E-09	20	250	25	70	9,125	25,550
2-Methylnaphthalene			7.68E-09	20	250	25	70	9,125	25,550
2-Methylphenol			0.00E+00	20	250	25	70	9,125	25,550
3,3'-Dichlorobenzidine			8.93E-09	20	250	25	70	9,125	25,550
3-Nitroaniline			2.16E-08	20	250	25	70	9,125	25,550
4-Nitroaniline			2.16E-08	20	250	25	70	9,125	25,550
Acenaphthene			0.00E+00	20	250	25	70	9,125	25,550
Acenaphthylene			0.00E+00	20	250	25	70	9,125	25,550
Anthracene			8.25E-09	20	250	25	70	9,125	25,550
Benzo(a)anthracene			9.30E-09	20	250	25	70	9,125	25,550
Benzo(a)pyrene			9.07E-09	20	250	25	70	9,125	25,550
Benzo(b)fluoranthene			8.64E-09	20	250	25	70	9,125	25,550
Benzo(g,h,i)perylene			8.49E-09	20	250	25	70	9,125	25,550
Benzo(k)fluoranthene			9.49E-09	20	250	25	70	9,125	25,550
Butylbenzylphthalate			8.16E-09	20	250	25	70	9,125	25,550
Carbazole			8.93E-09	20	250	25	70	9,125	25,550
Chrysene			7.33E-09	20	250	25	70	9,125	25,550
Di-n-butylphthalate			1.12E-08	20	250	25	70	9,125	25,550
Dibenz(a,h)anthracene			8.02E-09	20	250	25	70	9,125	25,550
Dibenzofuran			0.00E+00	20	250	25	70	9,125	25,550
Fluoranthene			7.11E-09	20	250	25	70	9,125	25,550
Fluorene			0.00E+00	20	250	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			8.51E-09	20	250	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			8.16E-09	20	250	25	70	9,125	25,550
Naphthalene			8.04E-09	20	250	25	70	9,125	25,550
Pentachlorophenol			2.36E-08	20	250	25	70	9,125	25,550
Phenanthrene			8.82E-09	20	250	25	70	9,125	25,550
Pyrene			5.96E-09	20	250	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether	1.68E-09		8.60E-09	20	250	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			1.45E-08	20	250	25	70	9,125	25,550
PESTICIDES/PCB									
4,4'-DDD			9.33E-11	20	250	25	70	9,125	25,550
4,4'-DDE			2.34E-10	20	250	25	70	9,125	25,550
4,4'-DDT		8.50E-12	1.22E-10	20	250	25	70	9,125	25,550
Aldrin	8.00E-12	2.86E-12	4.09E-11	20	250	25	70	9,125	25,550
Aroclor-1260			7.89E-10	20	250	25	70	9,125	25,550
Dieldrin		1.52E-11	2.17E-10	20	250	25	70	9,125	25,550
Endosulfan I			4.14E-11	20	250	25	70	9,125	25,550
Endosulfan sulfate			0.00E+00	20	250	25	70	9,125	25,550
Endrin			7.75E-11	20	250	25	70	9,125	25,550
Endrin ketone			0.00E+00	20	250	25	70	9,125	25,550
Heptachlor epoxide		2.79E-12	3.99E-11	20	250	25	70	9,125	25,550
alpha-Chlordane			0.00E+00	20	250	25	70	9,125	25,550
beta-BHC		0.00E+00	0.00E+00	20	250	25	70	9,125	25,550
delta-BHC			0.00E+00	20	250	25	70	9,125	25,550

TABLE 7-10

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m^3)	Inhalation Rate (m^3/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
METALS									
Arsenic		1.75E-08	2.50E-07	20	250	25	70	9,125	25,550
Barium	1.26E-06		6.46E-06	20	250	25	70	9,125	25,550
Cadmium		2.12E-08	3.04E-07	20	250	25	70	9,125	25,550
Copper			8.77E-06	20	250	25	70	9,125	25,550
Lead			1.06E-04	20	250	25	70	9,125	25,550
Mercury	8.92E-10		4.56E-09	20	250	25	70	9,125	25,550
Selenium			2.95E-08	20	250	25	70	9,125	25,550
Silver			7.55E-08	20	250	25	70	9,125	25,550
Thallium			1.93E-08	20	250	25	70	9,125	25,550
Zinc			1.42E-05	20	250	25	70	9,125	25,550
HERBICIDES									
MCPA			2.58E-04	20	250	25	70	9,125	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CA \times IR \times EF \times ED}{BW \times AT}$$

Variables:	Assumptions:
CA = Chemical Concentration in Air (mg/m^3)	Calculated EPC Air Data - RME
IR = Inhalation Rate (m^3/day)	20 (all receptors)
EF = Exposure Frequency (days/yr)	250 (RME Industrial Workers)
ED = Exposure Duration (years)	5
BW = Bodyweight (kg)	70 (Adult Male)
AT = Averaging Time (days)	5 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-49

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			NA	NA		
Benzene		1.70E-11	NA	2.91E-02		4.94E-13
Methylene Chloride	4.67E-11	1.67E-11	8.57E-01	1.65E-03	5.44E-11	2.75E-14
Toluene	4.96E-11		1.14E-01	NA	4.34E-10	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Butylbenzylphthalate			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Chloroisopropyl) ether	1.68E-09		1.00E-03	NA	1.68E-06	
bis(2-Ethylhexyl)phthalate			NA	NA		
PESTICIDES/PCB						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		8.50E-12	NA	3.40E-01		2.89E-12
Aldrin	8.00E-12	2.86E-12	1.70E+01	1.72E+01	4.70E-13	4.90E-11
Aroclor-1260			NA	NA		
Dieldrin		1.52E-11	NA	1.61E+01		2.44E-10
Endosulfan I			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide		2.79E-12	NA	9.10E+00		2.54E-11
alpha-Chlordane			NA	NA		
beta-BHC		0.00E+00	NA	1.86E+00		0.00E+00
delta-BHC			NA	NA		

TABLE 7-49

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic		1.75E-08	NA	1.51E+01		2.63E-07
Barium	1.26E-06		1.43E-04	NA	8.84E-03	
Cadmium		2.12E-08	NA	6.30E+00		1.34E-07
Copper			NA	NA		
Lead			NA	NA		
Mercury	8.92E-10		8.57E-05	NA	1.04E-05	
Selenium			NA	NA		
Silver			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
HERBICIDES						
MCPA			NA	NA		
Total HQ & CR					**8.86E-03**	**3.98E-07**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-14

CALCULATION OF INTAKE (ONSITE)
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
VOLATILE ORGANICS									
Acetone			2.91E-10	2	50	5	25	1,825	25,550
Benzene		1.90E-13	2.43E-10	2	50	5	25	1,825	25,550
Methylene Chloride	2.61E-12	1.87E-13	2.38E-10	2	50	5	25	1,825	25,550
Toluene	2.78E-12		2.53E-10	2	50	5	25	1,825	25,550
SEMIVOLATILE ORGANICS									
2,4-Dinitrotoluene			1.02E-08	2	50	5	25	1,825	25,550
2,6-Dinitrotoluene			7.77E-09	2	50	5	25	1,825	25,550
2-Methylnaphthalene			7.68E-09	2	50	5	25	1,825	25,550
2-Methylphenol			0.00E+00	2	50	5	25	1,825	25,550
3,3'-Dichlorobenzidine			8.93E-09	2	50	5	25	1,825	25,550
3-Nitroaniline			2.16E-08	2	50	5	25	1,825	25,550
4-Nitroaniline			2.16E-08	2	50	5	25	1,825	25,550
Acenaphthene			0.00E+00	2	50	5	25	1,825	25,550
Acenaphthylene			0.00E+00	2	50	5	25	1,825	25,550
Anthracene			8.25E-09	2	50	5	25	1,825	25,550
Benzo(a)anthracene			9.30E-09	2	50	5	25	1,825	25,550
Benzo(a)pyrene			9.07E-09	2	50	5	25	1,825	25,550
Benzo(b)fluoranthene			8.64E-09	2	50	5	25	1,825	25,550
Benzo(g,h,i)perylene			8.49E-09	2	50	5	25	1,825	25,550
Benzo(k)fluoranthene			9.49E-09	2	50	5	25	1,825	25,550
Butylbenzylphthalate			8.16E-09	2	50	5	25	1,825	25,550
Carbazole			8.93E-09	2	50	5	25	1,825	25,550
Chrysene			7.33E-09	2	50	5	25	1,825	25,550
Di-n-butylphthalate			1.12E-08	2	50	5	25	1,825	25,550
Dibenz(a,h)anthracene			8.02E-09	2	50	5	25	1,825	25,550
Dibenzofuran			0.00E+00	2	50	5	25	1,825	25,550
Fluoranthene			7.11E-09	2	50	5	25	1,825	25,550
Fluorene			0.00E+00	2	50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene			8.51E-09	2	50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			8.16E-09	2	50	5	25	1,825	25,550
Naphthalene			8.04E-09	2	50	5	25	1,825	25,550
Pentachlorophenol			2.36E-08	2	50	5	25	1,825	25,550
Phenanthrene			8.82E-09	2	50	5	25	1,825	25,550
Pyrene			5.96E-09	2	50	5	25	1,825	25,550
bis(2-Chloroisopropyl) ether	9.43E-11		8.60E-09	2	50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			1.45E-08	2	50	5	25	1,825	25,550
PESTICIDES/PCB									
4,4'-DDD			9.33E-11	2	50	5	25	1,825	25,550
4,4'-DDE			2.34E-10	2	50	5	25	1,825	25,550
4,4'-DDT		9.52E-14	1.22E-10	2	50	5	25	1,825	25,550
Aldrin	4.48E-13	3.20E-14	4.09E-11	2	50	5	25	1,825	25,550
Aroclor-1260			7.89E-10	2	50	5	25	1,825	25,550
Dieldrin		1.70E-13	2.17E-10	2	50	5	25	1,825	25,550
Endosulfan I			4.14E-11	2	50	5	25	1,825	25,550
Endosulfan sulfate			0.00E+00	2	50	5	25	1,825	25,550
Endrin			7.75E-11	2	50	5	25	1,825	25,550
Endrin ketone			0.00E+00	2	50	5	25	1,825	25,550
Heptachlor epoxide		3.12E-14	3.99E-11	2	50	5	25	1,825	25,550
alpha-Chlordane			0.00E+00	2	50	5	25	1,825	25,550
beta-BHC		0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
delta-BHC			0.00E+00	2	50	5	25	1,825	25,550

TABLE 7-38

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg sed/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Child(Nc)	Averaging Time (days) Car
Volatile Organics												
Acetone			1.44E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Toluene			8.00E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Semivolatile Organics												
2,4-Dimethylphenol			3.20E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
2,4-Dinitrotoluene			3.14E-01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(a)anthracene			2.50E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(a)pyrene			3.00E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(b)fluoranthene			4.30E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(g,h,i)perylene			3.10E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(k)fluoranthene			3.30E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Chrysene			4.80E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Fluoranthene			7.00E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene			2.40E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Phenanthrene			3.50E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Pyrene			4.70E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			7.70E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Pesticides												
4,4'-DDD			6.46E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
4,4'-DDE			4.82E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
4,4'-DDT			4.90E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Dieldrin			3.26E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Endosulfan I			1.43E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Endosulfan II			3.05E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550

TABLE 7-38

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm^2/event)	Adherence Factor (mg sed/cm^2)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Child(Nc)	Car
Metals												
Aluminum			1.83E+04	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Antimony			5.50E+00	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Arsenic			6.10E+00	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Barium			1.32E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Beryllium			7.64E-01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Cadmium	1.43E-07		2.40E+00	1.0E-06	2,170	1.0	0.01	25	5	25	1,825	25,550
Calcium			1.08E+04	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Chromium			2.47E+01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Cobalt			1.26E+01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Copper			1.33E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Iron			2.94E+04	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Lead			6.83E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Magnesium			5.54E+03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Manganese			5.32E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Mercury			8.11E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Nickel			3.16E+01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Potassium			2.18E+03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Selenium			1.27E+00	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Sodium			4.27E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Thallium			8.24E-01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Vanadium			2.97E+01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Zinc			1.88E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550

EQUATION:

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

Variables:

CS = Chemical Concentration in Sediment (mg sediment/kg)
CF = Conversion Factor (10-6 kg/mg)
SA = Surface Area Contact (cm^2)
AF =Sediment to Skin Adherence Factor (mg/cm^2)
ABS = Absorption Factor (unitless)

Assumptions:

EPC - Sediment Data - RME
10-6
2,170 (RME Child)
1.0 (RME all receptors)
Compound Specific PCBs and Cd, (EPA, 1992b)
(Default Assumption 0% = 0.0)

Variables:

EF = Exposure Frequency (events/year)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

25 (RME)
5 (RME)
25 kg (child)
5 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-73

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Volatile Organics						
Acetone			1.00E-01	NA		
Toluene			1.20E-01	NA		
Semivolatile Organics						
2,4-Dimethylphenol			2.00E-02	NA		
2,4-Dinitrotoluene			2.00E-03	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Chrysene			NA	1.46E-01		
Fluoranthene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Metals						
Aluminum			NA	NA		
Antimony			4.00E-04	NA		
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Beryllium			5.00E-06	4.30E+03		
Cadmium	1.43E-07		3.00E-05	NA	4.76E-03	
Calcium			NA	NA		
Chromium			2.50E-04	NA		
Cobalt			NA	NA		
Copper			2.00E-02	NA		
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese			5.00E-03	NA		
Mercury			4.50E-05	NA		
Nickel			1.00E-03	NA		
Potassium			NA	NA		
Selenium			3.00E-03	NA		
Sodium			NA	NA		
Thallium			7.00E-05	NA		
Vanadium			7.00E-03	NA		
Zinc			1.50E-01	NA		
Totals - HQ & CR					**4.76E-03**	

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-36

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Child Ingestion Rate (mg sed/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Volatile Organics											
Acetone	7.88E-09		1.44E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Toluene	4.38E-09		8.00E-03	200	1.0E-06	1	25	5	25	1,825	25,550
Semivolatile Organics											
2,4-Dimethylphenol	1.75E-08		3.20E-02	200	1.0E-06	1	25	5	25	1,825	25,550
2,4-Dinitrotoluene	1.72E-07		3.14E-01	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(a)anthracene		9.78E-10	2.50E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(a)pyrene		1.17E-09	3.00E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(b)fluoranthene		1.68E-09	4.30E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(g,h,i)perylene			3.10E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(k)fluoranthene		1.29E-09	3.30E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Chrysene		1.88E-09	4.80E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Fluoranthene	3.84E-08		7.00E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene		9.39E-10	2.40E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Phenanthrene			3.50E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Pyrene	2.58E-08		4.70E-02	200	1.0E-06	1	25	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate	4.22E-08	3.01E-09	7.70E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Pesticides											
4,4'-DDD	3.54E-09	2.53E-10	6.46E-03	200	1.0E-06	1	25	5	25	1,825	25,550
4,4'-DDE			4.82E-02	200	1.0E-06	1	25	5	25	1,825	25,550
4,4'-DDT	2.68E-09	1.92E-10	4.90E-03	200	1.0E-06	1	25	5	25	1,825	25,550
Dieldrin	1.78E-09	1.27E-10	3.26E-03	200	1.0E-06	1	25	5	25	1,825	25,550
Endosulfan I	7.82E-10		1.43E-03	200	1.0E-06	1	25	5	25	1,825	25,550
Endosulfan II			3.05E-03	200	1.0E-06	1	25	5	25	1,825	25,550

TABLE 7-36

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Child Ingestion Rate (mg sed/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Metals											
Aluminum			1.83E+04	200	1.0E-06	1	25	5	25	1,825	25,550
Antimony	3.01E-06		5.50E+00	200	1.0E-06	1	25	5	25	1,825	25,550
Arsenic	3.34E-06	2.39E-07	6.10E+00	200	1.0E-06	1	25	5	25	1,825	25,550
Barium	7.21E-05		1.32E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Beryllium	4.19E-07	2.99E-08	7.64E-01	200	1.0E-06	1	25	5	25	1,825	25,550
Cadmium	1.32E-06		2.40E+00	200	1.0E-06	1	25	5	25	1,825	25,550
Calcium			1.08E+04	200	1.0E-06	1	25	5	25	1,825	25,550
Chromium	1.35E-05		2.47E+01	200	1.0E-06	1	25	5	25	1,825	25,550
Cobalt			1.26E+01	200	1.0E-06	1	25	5	25	1,825	25,550
Copper	7.31E-05		1.33E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Iron			2.94E+04	200	1.0E-06	1	25	5	25	1,825	25,550
Lead			6.83E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Magnesium			5.54E+03	200	1.0E-06	1	25	5	25	1,825	25,550
Manganese	2.92E-04		5.32E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Mercury	4.44E-08		8.11E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Nickel	1.73E-05		3.16E+01	200	1.0E-06	1	25	5	25	1,825	25,550
Potassium			2.18E+03	200	1.0E-06	1	25	5	25	1,825	25,550
Selenium	6.94E-07		1.27E+00	200	1.0E-06	1	25	5	25	1,825	25,550
Sodium			4.27E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Thallium	4.51E-07		8.24E-01	200	1.0E-06	1	25	5	25	1,825	25,550
Vanadium	1.63E-05		2.97E+01	200	1.0E-06	1	25	5	25	1,825	25,550
Zinc	1.03E-04		1.88E+02	200	1.0E-06	1	25	5	25	1,825	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Sediment (mg sediment/kg)
IR = Ingestion Rate (mg sediment/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC - Sediment Data - RME
200 (RME Child)
10-6
1
25 (RME)
5 (RME)
25 (Child)
5 x 365 (Nc), 70 x 365 (C)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-71

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Volatile Organics						
Acetone	7.88E-09		1.00E-01	NA	7.88E-08	
Toluene	4.38E-09		2.00E-01	NA	2.19E-08	
Semivolatile Organics						
2,4-Dimethylphenol	1.75E-08		2.00E-02	NA	8.77E-07	
2,4-Dinitrotoluene	1.72E-07		2.00E-03	NA	8.61E-05	
Benzo(a)anthracene		9.78E-10	NA	7.30E-01		7.14E-10
Benzo(a)pyrene		1.17E-09	NA	7.30E+00		8.57E-09
Benzo(b)fluoranthene		1.68E-09	NA	7.30E-01		1.23E-09
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		1.29E-09	NA	7.30E-01		9.43E-10
Chrysene		1.88E-09	NA	7.30E-02		1.37E-10
Fluoranthene	3.84E-08		4.00E-02	NA	9.59E-07	
Indeno(1,2,3-cd)pyrene		9.39E-10	NA	7.30E-01		6.86E-10
Phenanthrene			NA	NA		
Pyrene	2.58E-08		3.00E-02	NA	8.58E-07	
bis(2-Ethylhexyl)phthalate	4.22E-08	3.01E-09	2.00E-02	1.40E-02	2.11E-06	4.22E-11
Pesticides						
4,4'-DDD	3.54E-09	2.53E-10	5.00E-04	2.40E-01	7.08E-06	6.07E-11
4,4'-DDE			NA	NA		
4,4'-DDT	2.68E-09	1.92E-10	5.00E-04	3.40E-01	5.37E-06	6.52E-11
Dieldrin	1.78E-09	1.27E-10	5.00E-05	1.60E+01	3.57E-05	2.04E-09
Endosulfan I	7.82E-10		6.00E-03	NA	1.30E-07	
Endosulfan II			NA	NA		
Metals						
Aluminum			NA	NA		
Antimony	3.01E-06		4.00E-04	NA	7.53E-03	
Arsenic	3.34E-06	2.39E-07	3.00E-04	1.75E+00	1.11E-02	4.17E-07
Barium	7.21E-05		7.00E-02	NA	1.03E-03	
Beryllium	4.19E-07	2.99E-08	5.00E-03	4.30E+00	8.37E-05	1.29E-07
Cadmium	1.32E-06		5.00E-04	NA	2.63E-03	
Calcium			NA	NA		
Chromium	1.35E-05		5.00E-03	NA	2.70E-03	
Cobalt			NA	NA		
Copper	7.31E-05		4.00E-02	NA	1.83E-03	
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese	2.92E-04		5.00E-03	NA	5.83E-02	
Mercury	4.44E-08		3.00E-04	NA	1.48E-04	
Nickel	1.73E-05		2.00E-02	NA	8.66E-04	
Potassium			NA	NA		
Selenium	6.94E-07		5.00E-03	NA	1.39E-04	
Sodium			NA	NA		
Thallium	4.51E-07		7.00E-05	NA	6.45E-03	
Vanadium	1.63E-05		7.00E-03	NA	2.33E-03	
Zinc	1.03E-04		3.00E-01	NA	3.44E-04	
Totals - HQ & CR					**9.57E-02**	**5.61E-07**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-22

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
VOLATILE ORGANICS											
Acetone	8.40E-09		7.67E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Benzene		5.00E-10	6.39E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Methylene Chloride	6.88E-09	4.91E-10	6.27E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Toluene	7.31E-09		6.67E-03	200	1.0E-06	1	50	5	25	1,825	25,550
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene	2.95E-07		2.69E-01	200	1.0E-06	1	50	5	25	1,825	25,550
2,6-Dinitrotoluene	2.24E-07		2.04E-01	200	1.0E-06	1	50	5	25	1,825	25,550
2-Methylnaphthalene			2.02E-01	200	1.0E-06	1	50	5	25	1,825	25,550
2-Methylphenol				200	1.0E-06	1	50	5	25	1,825	25,550
3,3'-Dichlorobenzidine		1.84E-08	2.35E-01	200	1.0E-06	1	50	5	25	1,825	25,550
3-Nitroaniline			5.68E-01	200	1.0E-06	1	50	5	25	1,825	25,550
4-Nitroaniline			5.68E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Acenaphthene				200	1.0E-06	1	50	5	25	1,825	25,550
Acenaphthylene				200	1.0E-06	1	50	5	25	1,825	25,550
Anthracene	2.38E-07		2.17E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(a)anthracene		1.91E-08	2.45E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(a)pyrene		1.87E-08	2.39E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(b)fluoranthene		1.78E-08	2.27E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(g,h,i)perylene			2.23E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(k)fluoranthene		1.96E-08	2.50E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Butylbenzylphthalate	2.35E-07		2.15E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Carbazole		1.84E-08	2.35E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Chrysene		1.51E-08	1.93E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Di-n-butylphthalate	3.22E-07		2.94E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Dibenz(a,h)anthracene		1.65E-08	2.11E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Dibenzofuran				200	1.0E-06	1	50	5	25	1,825	25,550
Fluoranthene	2.05E-07		1.87E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Fluorene				200	1.0E-06	1	50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene		1.75E-08	2.24E-01	200	1.0E-06	1	50	5	25	1,825	25,550

TABLE 7-22

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
N-Nitrosodiphenylamine (1)		1.68E-08	2.15E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Naphthalene			2.12E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Pentachlorophenol	6.80E-07	4.86E-08	6.21E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Phenanthrene			2.32E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Pyrene	1.72E-07		1.57E-01	200	1.0E-06	1	50	5	25	1,825	25,550
bis(2-Chloroisopropyl) ether	2.48E-07		2.26E-01	200	1.0E-06	1	50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate	4.18E-07	2.98E-08	3.81E-01	200	1.0E-06	1	50	5	25	1,825	25,550
PESTICIDES/PCB											
4,4'-DDD	2.69E-09	1.92E-10	2.45E-03	200	1.0E-06	1	50	5	25	1,825	25,550
4,4'-DDE			6.17E-03	200	1.0E-06	1	50	5	25	1,825	25,550
4,4'-DDT	3.51E-09	2.51E-10	3.20E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Aldrin	1.18E-09	8.42E-11	1.08E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Aroclor-1260		1.62E-09	2.08E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Dieldrin	6.26E-09	4.47E-10	5.71E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Endosulfan I	1.19E-09		1.09E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Endosulfan sulfate				200	1.0E-06	1	50	5	25	1,825	25,550
Endrin	2.24E-09		2.04E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Endrin ketone				200	1.0E-06	1	50	5	25	1,825	25,550
Heptachlor epoxide	1.15E-09	8.22E-11	1.05E-03	200	1.0E-06	1	50	5	25	1,825	25,550
alpha-Chlordane				200	1.0E-06	1	50	5	25	1,825	25,550
beta-BHC				200	1.0E-06	1	50	5	25	1,825	25,550
delta-BHC				200	1.0E-06	1	50	5	25	1,825	25,550

TABLE 7-22

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
METALS											
Arsenic	7.22E-06	5.16E-07	6.59E+00	200	1.0E-06	1	50	5	25	1,825	25,550
Barium	1.86E-04		1.70E+02	200	1.0E-06	1	50	5	25	1,825	25,550
Cadmium	8.76E-06		8.00E+00	200	1.0E-06	1	50	5	25	1,825	25,550
Copper	2.53E-04		2.31E+02	200	1.0E-06	1	50	5	25	1,825	25,550
Lead			2.78E+03	200	1.0E-06	1	50	5	25	1,825	25,550
Mercury	1.31E-07		1.20E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Selenium	8.50E-07		7.75E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Silver	2.18E-06		1.99E+00	200	1.0E-06	1	50	5	25	1,825	25,550
Thallium	5.55E-07		5.07E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Zinc	4.10E-04		3.74E+02	200	1.0E-06	1	50	5	25	1,825	25,550
HERBICIDES											
MCPA	7.44E-06		6.78E+00	200	1.0E-06	1	50	5	25	1,825	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC Soil Data - RME
IR = Ingestion Rate (mg soil/day)	200 (RME Child)
CF = Conversion Factor (10-6 kg/mg)	10-6
FI = Fraction Ingested (unitless)	1
EF = Exposure Frequency (days/years)	50 (RME)
ED = Exposure Duration (years)	5 (RME)
BW = Bodyweight (kg)	25 (Child)
AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-63

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone	8.40E-09		1.00E-01	NA	8.40E-08	
Benzene		5.00E-10	NA	2.90E-02		1.45E-11
Methylene Chloride	6.88E-09	4.91E-10	6.00E-02	7.50E-03	1.15E-07	3.68E-12
Toluene	7.31E-09		2.00E-01	NA	3.65E-08	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene	2.95E-07		2.00E-03	NA	1.48E-04	
2,6-Dinitrotoluene	2.24E-07		1.00E-03	NA	2.24E-04	
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine		1.84E-08	NA	4.50E-01		8.28E-09
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene	2.38E-07		3.00E-01	NA	7.93E-07	
Benzo(a)anthracene		1.91E-08	NA	7.30E-01		1.40E-08
Benzo(a)pyrene		1.87E-08	NA	7.30E+00		1.36E-07
Benzo(b)fluoranthene		1.78E-08	NA	7.30E-01		1.30E-08
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		1.96E-08	NA	7.30E-01		1.43E-08
Butylbenzylphthalate	2.35E-07		2.00E+00	NA	1.18E-07	
Carbazole		1.84E-08	NA	2.00E-02		3.68E-10
Chrysene		1.51E-08	NA	7.30E-02		1.10E-09
Di-n-butylphthalate	3.22E-07		1.00E-01	NA	3.22E-06	
Dibenz(a,h)anthracene		1.65E-08	NA	7.30E+00		1.21E-07
Dibenzofuran			NA	NA		
Fluoranthene	2.05E-07		4.00E-02	NA	5.13E-06	
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene		1.75E-08	NA	7.30E-01		1.28E-08
N-Nitrosodiphenylamine (1)		1.68E-08	NA	4.90E-03		8.24E-11
Naphthalene			NA	NA		
Pentachlorophenol	6.80E-07	4.86E-08	3.00E-02	1.20E-01	2.27E-05	5.83E-09
Phenanthrene			NA	NA		
Pyrene	1.72E-07		3.00E-02	NA	5.73E-06	
bis(2-Chloroisopropyl) ether	2.48E-07		1.00E-03	NA	2.48E-04	
bis(2-Ethylhexyl)phthalate	4.18E-07	2.98E-08	2.00E-02	1.40E-02	2.09E-05	4.18E-10
PESTICIDES/PCB						
4,4'-DDD	2.69E-09	1.92E-10	5.00E-04	2.40E-01	5.38E-06	4.61E-11
4,4'-DDE			NA	NA		
4,4'-DDT	3.51E-09	2.51E-10	5.00E-04	3.40E-01	7.02E-06	8.52E-11
Aldrin	1.18E-09	8.42E-11	3.00E-05	1.70E+01	3.93E-05	1.43E-09
Aroclor-1260		1.62E-09	NA	7.70E+00		1.25E-08
Dieldrin	6.26E-09	4.47E-10	5.00E-05	1.60E+01	1.25E-04	7.15E-09
Endosulfan I	1.19E-09		6.00E-03	NA	1.99E-07	
Endosulfan sulfate			5.00E-05	NA		
Endrin	2.24E-09		3.00E-04	NA	7.45E-06	
Endrin ketone			NA	NA		
Heptachlor epoxide	1.15E-09	8.22E-11	1.30E-05	9.10E+00	8.85E-05	7.48E-10
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		
METALS						
Arsenic	7.22E-06	5.16E-07	3.00E-04	1.75E+00	2.41E-02	9.03E-07
Barium	1.86E-04		7.00E-02	NA	2.66E-03	
Cadmium	8.76E-06		5.00E-04	NA	1.75E-02	
Copper	2.53E-04		4.00E-02	NA	6.32E-03	
Lead			NA	NA		
Mercury	1.31E-07		3.00E-04	NA	4.38E-04	
Selenium	8.50E-07		5.00E-03	NA	1.70E-04	
Silver	2.18E-06		5.00E-03	NA	4.36E-04	
Thallium	5.55E-07		7.00E-05	NA	7.93E-03	
Zinc	4.10E-04		3.00E-01	NA	1.37E-03	
HERBICIDES						
MCPA	7.44E-06		5.00E-04	NA	1.49E-02	
Totals - HQ & CR					**7.67E-02**	**1.25E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-30

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm^2/event)	Adherence Factor (mg soil/cm^2)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
											Nc	Car
VOLATILE ORGANICS												
Acetone			7.67E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzene			6.39E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Methylene Chloride			6.27E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Toluene			6.67E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			2.69E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2,6-Dinitrotoluene			2.04E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2-Methylnaphthalene			2.02E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2-Methylphenol				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
3,3'-Dichlorobenzidine			2.35E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
3-Nitroaniline			5.68E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4-Nitroaniline			5.68E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acenaphthene				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acenaphthylene				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Anthracene			2.17E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(a)anthracene			2.45E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(a)pyrene			2.39E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(b)fluoranthene			2.27E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(g,h,i)perylene			2.23E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(k)fluoranthene			2.50E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Butylbenzylphthalate			2.15E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Carbazole			2.35E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Chrysene			1.93E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Di-n-butylphthalate			2.94E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Dibenz(a,h)anthracene			2.11E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Dibenzofuran				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Fluoranthene			1.87E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Fluorene				1.00E-06	2,300	1.0		50	5	25	1,825	25,550

TABLE 7-30

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
											Nc	Car
Indeno(1,2,3-cd)pyrene			2.24E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			2.15E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Naphthalene			2.12E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pentachlorophenol			6.21E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Phenanthrene			2.32E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pyrene			1.57E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
bis(2-Chloroisopropyl) ether			2.26E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			3.81E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
PESTICIDES/PCB												
4,4'-DDD			2.45E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4,4'-DDE			6.17E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4,4'-DDT			3.20E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Aldrin			1.08E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Aroclor-1260		1.121E-09	2.08E-02	1.00E-06	2,300	1.0	0.06	50	5	25	1,825	25,550
Dieldrin			5.71E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan I			1.09E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan sulfate				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin			2.04E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin ketone				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Heptachlor epoxide			1.05E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
alpha-Chlordane				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
beta-BHC				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
delta-BHC				1.00E-06	2,300	1.0		50	5	25	1,825	25,550

TABLE 7-30

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm^2/event)	Adherence Factor (mg soil/cm^2)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
											Nc	Car
METALS												
Arsenic			6.59E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Barium			1.70E+02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Cadmium	1.01E-06		8.00E+00	1.00E-06	2,300	1.0	0.01	50	5	25	1,825	25,550
Copper			2.31E+02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Lead			2.78E+03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Mercury			1.20E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Selenium			7.75E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Silver			1.99E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Thallium			5.07E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Zinc			3.74E+02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
HERBICIDES												
MCPA			6.78E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550

EQUATION:

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

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC Soil Data - RME	EF = Exposure Frequency (events/year)	50 (RME)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	5 (RME)
SA = Surface Area Contact (cm^2)	2,300 (RME Child)	BW = Bodyweight (kg)	25 kg (child)
AF =Soil to Skin Adherence Factor (mg/cm^2)	1.0 (RME all receptors)	AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (Car)
ABS = Absorption Factor (unitless)	Compound Specific PCBs and Cd (EPA, 1992b)		
	(Default Assumption 0% = 0.0)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-65

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Chloroisopropyl) ether			1.00E-03	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
PESTICIDES/PCB						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1260		1.12E-09	NA	8.11E+00		9.09E-09
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		

TABLE 7-65

**CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)**

**SEAD-17 Remedial Investigation
Seneca Army Depot Activity**

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
METALS						
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Cadmium	1.01E-06		3.00E-05	NA	3.36E-02	
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			2.00E-02	NA		
HERBICIDES						
MCPA			5.00E-04	NA		
Totals - HQ & CR					**3.36E-02**	**9.09E-09**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
VOLATILE ORGANICS											
Acetone	6.00E-10		7.67E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Benzene		1.79E-10	6.39E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Methylene Chloride	4.91E-10	1.75E-10	6.27E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Toluene	5.22E-10		6.67E-03	100	1.00E-06	1	20	25	70	9,125	25,550
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene	2.11E-08		2.69E-01	100	1.00E-06	1	20	25	70	9,125	25,550
2,6-Dinitrotoluene	1.60E-08		2.04E-01	100	1.00E-06	1	20	25	70	9,125	25,550
2-Methylnaphthalene			2.02E-01	100	1.00E-06	1	20	25	70	9,125	25,550
2-Methylphenol	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine		6.57E-09	2.35E-01	100	1.00E-06	1	20	25	70	9,125	25,550
3-Nitroaniline			5.68E-01	100	1.00E-06	1	20	25	70	9,125	25,550
4-Nitroaniline			5.68E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthene	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthylene			0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Anthracene	1.70E-08		2.17E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)anthracene		6.84E-09	2.45E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)pyrene		6.67E-09	2.39E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(b)fluoranthene		6.36E-09	2.27E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			2.23E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(k)fluoranthene		6.98E-09	2.50E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Butylbenzylphthalate	1.68E-08		2.15E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Carbazole		6.57E-09	2.35E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Chrysene		5.39E-09	1.93E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Di-n-butylphthalate	2.30E-08		2.94E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenz(a,h)anthracene		5.90E-09	2.11E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenzofuran			0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Fluoranthene	1.46E-08		1.87E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Fluorene	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550

TABLE 7-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Indeno(1,2,3-cd)pyrene		6.26E-09	2.24E-01	100	1.00E-06	1	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)		6.01E-09	2.15E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Naphthalene			2.12E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Pentachlorophenol	4.86E-08	1.74E-08	6.21E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Phenanthrene			2.32E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Pyrene	1.23E-08		1.57E-01	100	1.00E-06	1	20	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether	1.77E-08		2.26E-01	100	1.00E-06	1	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate	2.98E-08	1.07E-08	3.81E-01	100	1.00E-06	1	20	25	70	9,125	25,550
PESTICIDES/PCB											
4,4'-DDD	1.92E-10	6.86E-11	2.45E-03	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDE			6.17E-03	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDT	2.51E-10	8.95E-11	3.20E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Aldrin	8.42E-11	3.01E-11	1.08E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1260		5.80E-10	2.08E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Dieldrin	4.47E-10	1.60E-10	5.71E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan I	8.52E-11		1.09E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan sulfate	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin	1.60E-10		2.04E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin ketone			0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor epoxide	8.22E-11	2.94E-11	1.05E-03	100	1.00E-06	1	20	25	70	9,125	25,550
alpha-Chlordane	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
beta-BHC		0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
delta-BHC			0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550

TABLE 7-47

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Chloroisopropyl) ether			1.00E-03	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
PESTICIDES/PCB						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1260		2.02E-09	NA	8.11E+00		1.64E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		

TABLE 7-47

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Cadmium	3.63E-07		3.00E-05	NA	1.21E-02	
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			2.00E-02	NA		
HERBICIDES						
MCPA			5.00E-04	NA		
Totals - HQ & CR					**1.21E-02**	**1.64E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

STACK/FUGITIVE EMISSIONS PARAMETERS AND VENT/EXHAUST DATA:

COMPANY NAME AlliedSignal, Chesterfield Facility	DATE 12-15-97	REGISTRATION NO. 50233

UNIT REFERENCE NUMBER	FUGITIVE EMISSIONS? (Yes/No)	VENT/STACK INFORMATION				EXIT GAS PARAMETERS		
		Stack Reference Number	Configuration (Code H)	Height (ft.)	Diameter (ft.)	Velocity (ft./min.)	Volume (acfm)	Temp. (° F.)
31-A-1	No	31-6	3	30	0.2	113	3	122
31-A-2 31-B-2	No	31-12	1	113	1.33	3240	4500	115
25-B-1	No	25-20	1	86	1.33	400	562	100
5-C-1 5-E-1	No	5-4	1	119	0.83	1025	562	100
5-D-1	No	5-8	1	121	0.5	1200	235	100
75-D-1	No	75-1	1	160	0.833	2933	1600	90
75-D-2	No	75-2	1	160	0.167	2292	50	112
5-E-2 5-CR-2 5-CR-4 5-CR-6 5-CR-8	No	5-40	1	65	1.33	2100	3000	100
5-CR-1 5-CR-3 5-CR-5 5-CR-7	No	5-10	1	50	3.5' x 2.5'	2286	20,000	70
12-CR-1	No	12-27	3	16.8	1	860	3000	90

STACK/FUGITIVE EMISSIONS PARAMETERS AND VENT/EXHAUST DATA:

COMPANY NAME AlliedSignal, Chesterfield Facility	DATE 12-15-97	REGISTRATION NO. 50233

UNIT REFERENCE NUMBER	FUGITIVE EMISSIONS? (Yes/No)	VENT/STACK INFORMATION				EXIT GAS PARAMETERS		
		Stack Reference Number	Configuration (Code H)	Height (ft.)	Diameter (ft.)	Velocity (ft./min.)	Volume (acfm)	Temp. (° F.)
12-CR-2	No	12-1	1	30	1	3846	3000	115
12-CR-3	No	12-26	3	15	0.92' x 1.08'	4025	4000	70
12-CR-3	No	12-22	3	18	0.92' x 1.08'	4025	4000	200
12-CR-3	No	12-23	3	15	0.92' x 1.08'	7754	7700	200
6-SP-1	No	6-3	1	74.8	1	4076	3200	100
6-SP-2	No	6-5	1	68	3.5' x 3.5'	1021	12200	100
6-SP-3	No	6-1	99 (note 1)	68	3.5' x 3.5'	1021	12200	100
26-SP-1 26-SP-9	No	31-10	1	113	1.67	2800	6000	140
26-SP-2	No	26-1	1	50	4	3300	41500	100
26-SP-3 26-SP-5 26-SP-7	No	31-11	1	113	1.67	2150	4640	124

NOTE: 1). Enclosed with downward louvers.

STACK/FUGITIVE EMISSIONS PARAMETERS AND VENT/EXHAUST DATA:

COMPANY NAME AlliedSignal,Chesterfield Facility	DATE 12-15-97	REGISTRATION NO. 50233

UNIT REFERENCE NUMBER	FUGITIVE EMISSIONS? (Yes/No)	VENT/STACK INFORMATION				EXIT GAS PARAMETERS		
		Stack Reference Number	Configuration (CodeH)	Height (ft.)	Diameter (ft.)	Velocity (ft./min.)	Volume (acfm)	Temp. (°F.)
26-SP-4	No	26-9	1	57.9	3.5' x 3.5'	3385	41500	100
26-SP-6	No	26-13	3	22	1.5	3112	5500	100
26-SP-8	No	26-12	1	83.9	2	1719	5400	100
26-SP-10	N	26-3	1	50	4	3300	41500	100
26-SPD	No	26-5	1	68.9	1	2406	3200	100
6-DTC-13	No	6-33	1	34.1	2' x 2.5'	1511	7814	115
6-DTC-14	No	6-34	1	34.1	2' x 2.5'	1511	7814	115
6-DTC-15	No	6-35	1	29	2' x 2.5'	1511	7814	115
6-DTC-16	No	6-36	1	42.3	2' x 2.5'	1511	7814	115
26-ANSO-1	No	26-22	1	28	1' x 1.5'	1500	2000	80
14-NRR-1	No	14-3	?	?	?	?	?	?
F-DHT	Yes	NA	NA	NA	NA	NA	NA	NA

STACK/FUGITIVE EMISSIONS PARAMETERS AND VENT/EXHAUST DATA:

COMPANYNAME AlliedSignal,Chesterfield Facility	DATE 12-15-97	REGISTRATIONNO. 50233

UNIT REFERENCE NUMBER	FUGITIVE EMISSIONS? (Yes/No)	VENT/STACK INFORMATION				EXIT GAS PARAMETERS		
		Stack Reference Number	Configuration (CodeH)	Height (ft.)	Diameter (ft.)	Velocity (ft./min.)	Volume (acfm)	Temp. (°F.)
6-OV-1	No	6-2	1	65.6	1.3	716	1000	563
26-OV-2	No	26-7	1	65.6	1.3	716	1000	563
4-SG-1 4-SG-2	No	4-6 (note 1)	1	20	5	2245	43682	977
4-SG-1	No	4-7	1	20	5	2245	43682	977
4-SG-2	No	4-8	1	20	5	2245	43682	977
4-SG-3 4-SG-4	No	4-4 (note 2)	1	20	5	2040	40055	932
4-SG-3 4-SG-4	No	4-5	1	20	5	2040	40055	932
4-HE-260	No	4-1	1	45	1.5	482	2360	932
4-HE-66	No	4-2	1	25	3.5	210	2022	1274
5-HE-1	No	5-2	1	25	2	5729	6364	830
5-HE-259	No	5-3	1	45	2	1254	3940	932
14-HE-42	No	14-2	1	53	3	147	1040	572
14-HE-36	No	14-1	1	34	1.5	230	406	752

NOTE:
1) Stack 4-6 is designated for start-up use for SG-1 and SG-2.
2) Stack 4-4 is designated for start-up use for SG-3 and SG-4.

TABLE 7-63

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone	8.40E-09		1.00E-01	NA	8.40E-08	
Benzene		5.00E-10	NA	2.90E-02		1.45E-11
Methylene Chloride	6.88E-09	4.91E-10	6.00E-02	7.50E-03	1.15E-07	3.68E-12
Toluene	7.31E-09		2.00E-01	NA	3.65E-08	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene	2.95E-07		2.00E-03	NA	1.48E-04	
2,6-Dinitrotoluene	2.24E-07		1.00E-03	NA	2.24E-04	
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine		1.84E-08	NA	4.50E-01		8.28E-09
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene	2.38E-07		3.00E-01	NA	7.93E-07	
Benzo(a)anthracene		1.91E-08	NA	7.30E-01		1.40E-08
Benzo(a)pyrene		1.87E-08	NA	7.30E+00		1.36E-07
Benzo(b)fluoranthene		1.78E-08	NA	7.30E-01		1.30E-08
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		1.96E-08	NA	7.30E-01		1.43E-08
Butylbenzylphthalate	2.35E-07		2.00E+00	NA	1.18E-07	
Carbazole		1.84E-08	NA	2.00E-02		3.68E-10
Chrysene		1.51E-08	NA	7.30E-02		1.10E-09
Di-n-butylphthalate	3.22E-07		1.00E-01	NA	3.22E-06	
Dibenz(a,h)anthracene		1.65E-08	NA	7.30E+00		1.21E-07
Dibenzofuran			NA	NA		
Fluoranthene	2.05E-07		4.00E-02	NA	5.13E-06	
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene		1.75E-08	NA	7.30E-01		1.28E-08
N-Nitrosodiphenylamine (1)		1.68E-08	NA	4.90E-03		8.24E-11
Naphthalene			NA	NA		
Pentachlorophenol	6.80E-07	4.86E-08	3.00E-02	1.20E-01	2.27E-05	5.83E-09
Phenanthrene			NA	NA		
Pyrene	1.72E-07		3.00E-02	NA	5.73E-06	
bis(2-Chloroisopropyl) ether	2.48E-07		1.00E-03	NA	2.48E-04	
bis(2-Ethylhexyl)phthalate	4.18E-07	2.98E-08	2.00E-02	1.40E-02	2.09E-05	4.18E-10
PESTICIDES/PCB						
4,4'-DDD	2.69E-09	1.92E-10	5.00E-04	2.40E-01	5.38E-06	4.61E-11
4,4'-DDE			NA	NA		
4,4'-DDT	3.51E-09	2.51E-10	5.00E-04	3.40E-01	7.02E-06	8.52E-11
Aldrin	1.18E-09	8.42E-11	3.00E-05	1.70E+01	3.93E-05	1.43E-09
Aroclor-1260		1.62E-09	NA	7.70E+00		1.25E-08
Dieldrin	6.26E-09	4.47E-10	5.00E-05	1.60E+01	1.25E-04	7.15E-09
Endosulfan I	1.19E-09		6.00E-03	NA	1.99E-07	
Endosulfan sulfate			5.00E-05	NA		
Endrin	2.24E-09		3.00E-04	NA	7.45E-06	
Endrin ketone			NA	NA		
Heptachlor epoxide	1.15E-09	8.22E-11	1.30E-05	9.10E+00	8.85E-05	7.48E-10
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		
METALS						
Arsenic	7.22E-06	5.16E-07	3.00E-04	1.75E+00	2.41E-02	9.03E-07
Barium	1.86E-04		7.00E-02	NA	2.66E-03	
Cadmium	8.76E-06		5.00E-04	NA	1.75E-02	
Copper	2.53E-04		4.00E-02	NA	6.32E-03	
Lead			NA	NA		
Mercury	1.31E-07		3.00E-04	NA	4.38E-04	
Selenium	8.50E-07		5.00E-03	NA	1.70E-04	
Silver	2.18E-06		5.00E-03	NA	4.36E-04	
Thallium	5.55E-07		7.00E-05	NA	7.93E-03	
Zinc	4.10E-04		3.00E-01	NA	1.37E-03	
HERBICIDES						
MCPA	7.44E-06		5.00E-04	NA	1.49E-02	
Totals - HQ & CR					**7.67E-02**	**1.25E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-22

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
VOLATILE ORGANICS											
Acetone	8.40E-09		7.67E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Benzene		5.00E-10	6.39E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Methylene Chloride	6.88E-09	4.91E-10	6.27E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Toluene	7.31E-09		6.67E-03	200	1.0E-06	1	50	5	25	1,825	25,550
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene	2.95E-07		2.69E-01	200	1.0E-06	1	50	5	25	1,825	25,550
2,6-Dinitrotoluene	2.24E-07		2.04E-01	200	1.0E-06	1	50	5	25	1,825	25,550
2-Methylnaphthalene			2.02E-01	200	1.0E-06	1	50	5	25	1,825	25,550
2-Methylphenol				200	1.0E-06	1	50	5	25	1,825	25,550
3,3'-Dichlorobenzidine		1.84E-08	2.35E-01	200	1.0E-06	1	50	5	25	1,825	25,550
3-Nitroaniline			5.68E-01	200	1.0E-06	1	50	5	25	1,825	25,550
4-Nitroaniline			5.68E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Acenaphthene				200	1.0E-06	1	50	5	25	1,825	25,550
Acenaphthylene				200	1.0E-06	1	50	5	25	1,825	25,550
Anthracene	2.38E-07		2.17E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(a)anthracene		1.91E-08	2.45E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(a)pyrene		1.87E-08	2.39E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(b)fluoranthene		1.78E-08	2.27E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(g,h,i)perylene			2.23E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(k)fluoranthene		1.96E-08	2.50E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Butylbenzylphthalate	2.35E-07		2.15E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Carbazole		1.84E-08	2.35E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Chrysene		1.51E-08	1.93E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Di-n-butylphthalate	3.22E-07		2.94E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Dibenz(a,h)anthracene		1.65E-08	2.11E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Dibenzofuran				200	1.0E-06	1	50	5	25	1,825	25,550
Fluoranthene	2.05E-07		1.87E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Fluorene				200	1.0E-06	1	50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene		1.75E-08	2.24E-01	200	1.0E-06	1	50	5	25	1,825	25,550

TABLE 7-22

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
N-Nitrosodiphenylamine (1)		1.68E-08	2.15E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Naphthalene			2.12E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Pentachlorophenol	6.80E-07	4.86E-08	6.21E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Phenanthrene			2.32E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Pyrene	1.72E-07		1.57E-01	200	1.0E-06	1	50	5	25	1,825	25,550
bis(2-Chloroisopropyl) ether	2.48E-07		2.26E-01	200	1.0E-06	1	50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate	4.18E-07	2.98E-08	3.81E-01	200	1.0E-06	1	50	5	25	1,825	25,550
PESTICIDES/PCB											
4,4'-DDD	2.69E-09	1.92E-10	2.45E-03	200	1.0E-06	1	50	5	25	1,825	25,550
4,4'-DDE			6.17E-03	200	1.0E-06	1	50	5	25	1,825	25,550
4,4'-DDT	3.51E-09	2.51E-10	3.20E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Aldrin	1.18E-09	8.42E-11	1.08E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Aroclor-1260		1.62E-09	2.08E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Dieldrin	6.26E-09	4.47E-10	5.71E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Endosulfan I	1.19E-09		1.09E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Endosulfan sulfate				200	1.0E-06	1	50	5	25	1,825	25,550
Endrin	2.24E-09		2.04E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Endrin ketone				200	1.0E-06	1	50	5	25	1,825	25,550
Heptachlor epoxide	1.15E-09	8.22E-11	1.05E-03	200	1.0E-06	1	50	5	25	1,825	25,550
alpha-Chlordane				200	1.0E-06	1	50	5	25	1,825	25,550
beta-BHC				200	1.0E-06	1	50	5	25	1,825	25,550
delta-BHC				200	1.0E-06	1	50	5	25	1,825	25,550

TABLE 7-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
METALS											
Arsenic	5.16E-07	1.84E-07	6.59E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Barium	1.33E-05		1.70E+02	100	1.00E-06	1	20	25	70	9,125	25,550
Cadmium	6.26E-07		8.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Copper	1.81E-05		2.31E+02	100	1.00E-06	1	20	25	70	9,125	25,550
Lead			2.78E+03	100	1.00E-06	1	20	25	70	9,125	25,550
Mercury	9.39E-09		1.20E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Selenium	6.07E-08		7.75E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Silver	1.56E-07		1.99E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Thallium	3.97E-08		5.07E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Zinc	2.93E-05		3.74E+02	100	1.00E-06	1	20	25	70	9,125	25,550
HERBICIDES											
MCPA	5.31E-07		6.78E+00	100	1.00E-06	1	20	25	70	9,125	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC Soil Data - RME
100 (RME Site Worker)
10-6
1 (All Receptors)
20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-45

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone	6.00E-10		1.00E-01	NA	6.00E-09	
Benzene		1.79E-10	NA	2.90E-02		5.18E-12
Methylene Chloride	4.91E-10	1.75E-10	6.00E-02	7.50E-03	8.19E-09	1.32E-12
Toluene	5.22E-10		2.00E-01	NA	2.61E-09	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene	2.11E-08		2.00E-03	NA	1.05E-05	
2,6-Dinitrotoluene	1.60E-08		1.00E-03	NA	1.60E-05	
2-Methylnaphthalene			NA	NA		
2-Methylphenol	0.00E+00		5.00E-02	NA	0.00E+00	
3,3'-Dichlorobenzidine		6.57E-09	NA	4.50E-01		2.96E-09
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene	0.00E+00		6.00E-02	NA	0.00E+00	
Acenaphthylene			NA	NA		
Anthracene	1.70E-08		3.00E-01	NA	5.66E-08	
Benzo(a)anthracene		6.84E-09	NA	7.30E-01		4.99E-09
Benzo(a)pyrene		6.67E-09	NA	7.30E+00		4.87E-08
Benzo(b)fluoranthene		6.36E-09	NA	7.30E-01		4.64E-09
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		6.98E-09	NA	7.30E-01		5.10E-09
Butylbenzylphthalate	1.68E-08		2.00E+00	NA	8.41E-09	
Carbazole		6.57E-09	NA	2.00E-02		1.31E-10
Chrysene		5.39E-09	NA	7.30E-02		3.94E-10
Di-n-butylphthalate	2.30E-08		1.00E-01	NA	2.30E-07	
Dibenz(a,h)anthracene		5.90E-09	NA	7.30E+00		4.31E-08
Dibenzofuran			NA	NA		
Fluoranthene	1.46E-08		4.00E-02	NA	3.66E-07	
Fluorene	0.00E+00		4.00E-02	NA	0.00E+00	
Indeno(1,2,3-cd)pyrene		6.26E-09	NA	7.30E-01		4.57E-09
N-Nitrosodiphenylamine (1)		6.01E-09	NA	4.90E-03		2.94E-11
Naphthalene			NA	NA		
Pentachlorophenol	4.86E-08	1.74E-08	3.00E-02	1.20E-01	1.62E-06	2.08E-09
Phenanthrene			NA	NA		
Pyrene	1.23E-08		3.00E-02	NA	4.09E-07	
bis(2-Chloroisopropyl) ether	1.77E-08		1.00E-03	NA	1.77E-05	
bis(2-Ethylhexyl)phthalate	2.98E-08	1.07E-08	2.00E-02	1.40E-02	1.49E-06	1.49E-10
PESTICIDES/PCB						
4,4'-DDD	1.92E-10	6.86E-11	5.00E-04	2.40E-01	3.84E-07	1.65E-11
4,4'-DDE			NA	NA		
4,4'-DDT	2.51E-10	8.95E-11	5.00E-04	3.40E-01	5.01E-07	3.04E-11
Aldrin	8.42E-11	3.01E-11	3.00E-05	1.70E+01	2.81E-06	5.11E-10
Aroclor-1260		5.80E-10	NA	7.70E+00		4.47E-09
Dieldrin	4.47E-10	1.60E-10	5.00E-05	1.60E+01	8.94E-06	2.55E-09
Endosulfan I	8.52E-11		6.00E-03	NA	1.42E-08	
Endosulfan sulfate	0.00E+00		5.00E-05	NA	0.00E+00	
Endrin	1.60E-10		3.00E-04	NA	5.32E-07	
Endrin ketone			NA	NA		
Heptachlor epoxide	8.22E-11	2.94E-11	1.30E-05	9.10E+00	6.32E-06	2.67E-10
alpha-Chlordane	0.00E+00	0.00E+00	6.00E-05	1.30E+00	0.00E+00	0.00E+00
beta-BHC		0.00E+00	NA	1.80E+00		0.00E+00
delta-BHC			NA	NA		

TABLE 7-45

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic	5.16E-07	1.84E-07	3.00E-04	1.75E+00	1.72E-03	3.22E-07
Barium	1.33E-05		7.00E-02	NA	1.90E-04	
Cadmium	6.26E-07		5.00E-04	NA	1.25E-03	
Copper	1.81E-05		4.00E-02	NA	4.52E-04	
Lead			NA	NA		
Mercury	9.39E-09		3.00E-04	NA	3.13E-05	
Selenium	6.07E-08		5.00E-03	NA	1.21E-05	
Silver	1.56E-07		5.00E-03	NA	3.11E-05	
Thallium	3.97E-08		7.00E-05	NA	5.67E-04	
Zinc	2.93E-05		3.00E-01	NA	9.75E-05	
HERBICIDES						
MCPA	5.31E-07		5.00E-04	NA	1.06E-03	
Totals - HQ & CR					**5.48E-03**	**4.47E-07**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-24

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
VOLATILE ORGANICS												
Acetone			7.67E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzene			6.39E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Methylene Chloride			6.27E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toluene			6.67E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			2.69E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2,6-Dinitrotoluene			2.04E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2-Methylnaphthalene			2.02E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2-Methylphenol				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3,3'-Dichlorobenzidine			2.35E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3-Nitroaniline			5.68E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4-Nitroaniline			5.68E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthene				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthylene				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Anthracene			2.17E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)anthracene			2.45E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)pyrene			2.39E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(b)fluoranthene			2.27E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(g,h,i)perylene			2.23E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(k)fluoranthene			2.50E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Butylbenzylphthalate			2.15E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbazole			2.35E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chrysene			1.93E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Di-n-butylphthalate			2.94E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenz(a,h)anthracene			2.11E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenzofuran				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluoranthene			1.87E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluorene				1.00E-06	5,800	1.0		20	25	70	9,125	25,550

TABLE 7-24

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
Indeno(1,2,3-cd)pyrene			2.24E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			2.15E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Naphthalene			2.12E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pentachlorophenol			6.21E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Phenanthrene			2.32E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pyrene			1.57E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether			2.26E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			3.81E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
PESTICIDES/PCB												
4,4'-DDD			2.45E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDE			6.17E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDT			3.20E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aldrin			1.08E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aroclor-1260		2.02E-09	2.08E-02	1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Dieldrin			5.71E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan I			1.09E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan sulfate				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin			2.04E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin ketone				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor epoxide			1.05E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
alpha-Chlordane				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
beta-BHC				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
delta-BHC				1.00E-06	5,800	1.0		20	25	70	9,125	25,550

TABLE 7-24

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm^2/event)	Adherence Factor (mg soil/cm^2)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
METALS												
Arsenic			6.59E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Barium			1.70E+02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Cadmium	3.63E-07		8.00E+00	1.00E-06	5,800	1.0	0.01	20	25	70	9,125	25,550
Copper			2.31E+02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Lead			2.78E+03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Mercury			1.20E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Selenium			7.75E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Silver			1.99E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Thallium			5.07E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Zinc			3.74E+02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
HERBICIDES												
MCPA			6.78E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550

EQUATION: Absorbed dose (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
CF = Conversion Factor (10-6 kg/mg)
SA = Surface Area Contact (cm^2)
AF =Soil to Skin Adherence Factor (mg/cm^2)
ABS = Absorption Factor (unitless)

Assumptions:

EPC Soil Data - RME
10-6
5,800 cm^2 (RME Site Worker)
1.0 (RME all receptors)
Compound Specific for PCBs and Cd
EPA, 1992b (Default Assumption 0% = 0.0)

Variables:

EF = Exposure Frequency (events/year)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult Male)
25 x 365 (Nc) 70 x 365 Adult (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-47

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Chloroisopropyl) ether			1.00E-03	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
PESTICIDES/PCB						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1260		2.02E-09	NA	8.11E+00		1.64E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		

TABLE 7-47

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Cadmium	3.63E-07		3.00E-05	NA	1.21E-02	
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			2.00E-02	NA		
HERBICIDES						
MCPA			5.00E-04	NA		
Totals - HQ & CR					**1.21E-02**	**1.64E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-18

CALCULATION OF INTAKE FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
VOLATILE ORGANICS											
Acetone	2.40E-09		7.67E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Benzene		7.15E-10	6.39E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Methylene Chloride	1.96E-09	7.02E-10	6.27E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Toluene	2.09E-09		6.67E-03	100	1.00E-06	1	80	25	70	9,125	25,550
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene	8.43E-08		2.69E-01	100	1.00E-06	1	80	25	70	9,125	25,550
2,6-Dinitrotoluene	6.40E-08		2.04E-01	100	1.00E-06	1	80	25	70	9,125	25,550
2-Methylnaphthalene			2.02E-01	100	1.00E-06	1	80	25	70	9,125	25,550
2-Methylphenol	0.00E+00		0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
3,3'-Dichlorobenzidine		2.63E-08	2.35E-01	100	1.00E-06	1	80	25	70	9,125	25,550
3-Nitroaniline			5.68E-01	100	1.00E-06	1	80	25	70	9,125	25,550
4-Nitroaniline			5.68E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Acenaphthene	0.00E+00		0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Acenaphthylene			0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Anthracene	6.80E-08		2.17E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(a)anthracene		2.74E-08	2.45E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(a)pyrene		2.67E-08	2.39E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(b)fluoranthene		2.54E-08	2.27E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(g,h,i)perylene			2.23E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(k)fluoranthene		2.79E-08	2.50E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Butylbenzylphthalate	6.72E-08		2.15E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Carbazole		2.63E-08	2.35E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Chrysene		2.16E-08	1.93E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Di-n-butylphthalate	9.19E-08		2.94E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Dibenz(a,h)anthracene		2.36E-08	2.11E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Dibenzofuran			0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Fluoranthene	5.86E-08		1.87E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Fluorene	0.00E+00		0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550

TABLE 7-18

CALCULATION OF INTAKE FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Indeno(1,2,3-cd)pyrene		2.50E-08	2.24E-01	100	1.00E-06	1	80	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)		2.40E-08	2.15E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Naphthalene			2.12E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Pentachlorophenol	1.94E-07	6.94E-08	6.21E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Phenanthrene			2.32E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Pyrene	4.91E-08		1.57E-01	100	1.00E-06	1	80	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether	7.09E-08		2.26E-01	100	1.00E-06	1	80	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate	1.19E-07	4.26E-08	3.81E-01	100	1.00E-06	1	80	25	70	9,125	25,550
PESTICIDES/PCB											
4,4'-DDD	7.69E-10	2.75E-10	2.45E-03	100	1.00E-06	1	80	25	70	9,125	25,550
4,4'-DDE			6.17E-03	100	1.00E-06	1	80	25	70	9,125	25,550
4,4'-DDT	1.00E-09	3.58E-10	3.20E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Aldrin	3.37E-10	1.20E-10	1.08E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Aroclor-1260		2.32E-09	2.08E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Dieldrin	1.79E-09	6.39E-10	5.71E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Endosulfan I	3.41E-10		1.09E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Endosulfan sulfate	0.00E+00		0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Endrin	6.39E-10		2.04E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Endrin ketone			0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Heptachlor epoxide	3.29E-10	1.17E-10	1.05E-03	100	1.00E-06	1	80	25	70	9,125	25,550
alpha-Chlordane	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
beta-BHC		0.00E+00	0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
delta-BHC			0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550

TABLE 7-18

CALCULATION OF INTAKE FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
METALS											
Arsenic	2.06E-06	7.37E-07	6.59E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Barium	5.32E-05		1.70E+02	100	1.00E-06	1	80	25	70	9,125	25,550
Cadmium	2.50E-06		8.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Copper	7.23E-05		2.31E+02	100	1.00E-06	1	80	25	70	9,125	25,550
Lead			2.78E+03	100	1.00E-06	1	80	25	70	9,125	25,550
Mercury	3.76E-08		1.20E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Selenium	2.43E-07		7.75E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Silver	6.22E-07		1.99E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Thallium	1.59E-07		5.07E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Zinc	1.17E-04		3.74E+02	100	1.00E-06	1	80	25	70	9,125	25,550
HERBICIDES											
MCPA	2.12E-06		6.78E+00	100	1.00E-06	1	80	25	70	9,125	25,550

EQUATION: Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC - Soil Data (RME)
100 (RME Adult Worker)
10-6
1 (All Receptors)
80 (RME Adult Industrial Worker)
25 (Upper bound limit)
70 (Adult male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-51

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone	2.40E-09		1.00E-01	NA	2.40E-08	
Benzene		7.15E-10	NA	2.90E-02		2.07E-11
Methylene Chloride	1.96E-09	7.02E-10	6.00E-02	7.50E-03	3.27E-08	5.26E-12
Toluene	2.09E-09		2.00E-01	NA	1.04E-08	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene	8.43E-08		2.00E-03	NA	4.22E-05	
2,6-Dinitrotoluene	6.40E-08		1.00E-03	NA	6.40E-05	
2-Methylnaphthalene			NA	NA		
2-Methylphenol	0.00E+00		5.00E-02	NA	0.00E+00	
3,3'-Dichlorobenzidine		2.63E-08	NA	4.50E-01		1.18E-08
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene	0.00E+00		6.00E-02	NA	0.00E+00	
Acenaphthylene			NA	NA		
Anthracene	6.80E-08		3.00E-01	NA	2.27E-07	
Benzo(a)anthracene		2.74E-08	NA	7.30E-01		2.00E-08
Benzo(a)pyrene		2.67E-08	NA	7.30E+00		1.95E-07
Benzo(b)fluoranthene		2.54E-08	NA	7.30E-01		1.86E-08
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		2.79E-08	NA	7.30E-01		2.04E-08
Butylbenzylphthalate	6.72E-08		2.00E+00	NA	3.36E-08	
Carbazole		2.63E-08	NA	2.00E-02		5.26E-10
Chrysene		2.16E-08	NA	7.30E-02		1.57E-09
Di-n-butylphthalate	9.19E-08		1.00E-01	NA	9.19E-07	
Dibenz(a,h)anthracene		2.36E-08	NA	7.30E+00		1.72E-07
Dibenzofuran			NA	NA		
Fluoranthene	5.86E-08		4.00E-02	NA	1.46E-06	
Fluorene	0.00E+00		4.00E-02	NA	0.00E+00	
Indeno(1,2,3-cd)pyrene		2.50E-08	NA	7.30E-01		1.83E-08
N-Nitrosodiphenylamine (1)		2.40E-08	NA	4.90E-03		1.18E-10
Naphthalene			NA	NA		
Pentachlorophenol	1.94E-07	6.94E-08	3.00E-02	1.20E-01	6.48E-06	8.33E-09
Phenanthrene			NA	NA		
Pyrene	4.91E-08		3.00E-02	NA	1.64E-06	
bis(2-Chloroisopropyl) ether	7.09E-08		1.00E-03	NA	7.09E-05	
bis(2-Ethylhexyl)phthalate	1.19E-07	4.26E-08	2.00E-02	1.40E-02	5.97E-06	5.97E-10
PESTICIDES/PCB						
4,4'-DDD	7.69E-10	2.75E-10	5.00E-04	2.40E-01	1.54E-06	6.59E-11
4,4'-DDE			NA	NA		
4,4'-DDT	1.00E-09	3.58E-10	5.00E-04	3.40E-01	2.00E-06	1.22E-10
Aldrin	3.37E-10	1.20E-10	3.00E-05	1.70E+01	1.12E-05	2.04E-09
Aroclor-1260		2.32E-09	NA	7.70E+00		1.79E-08
Dieldrin	1.79E-09	6.39E-10	5.00E-05	1.60E+01	3.58E-05	1.02E-08
Endosulfan I	3.41E-10		6.00E-03	NA	5.68E-08	
Endosulfan sulfate	0.00E+00		5.00E-05	NA	0.00E+00	
Endrin	6.39E-10		3.00E-04	NA	2.13E-06	
Endrin ketone			NA	NA		
Heptachlor epoxide	3.29E-10	1.17E-10	1.30E-05	9.10E+00	2.53E-05	1.07E-09
alpha-Chlordane	0.00E+00	0.00E+00	6.00E-05	1.30E+00	0.00E+00	0.00E+00
beta-BHC		0.00E+00	NA	1.80E+00		0.00E+00
delta-BHC			NA	NA		

TABLE 7-51

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic	2.06E-06	7.37E-07	3.00E-04	1.75E+00	6.88E-03	1.29E-06
Barium	5.32E-05		7.00E-02	NA	7.60E-04	
Cadmium	2.50E-06		5.00E-04	NA	5.01E-03	
Copper	7.23E-05		4.00E-02	NA	1.81E-03	
Lead			NA	NA		
Mercury	3.76E-08		3.00E-04	NA	1.25E-04	
Selenium	2.43E-07		5.00E-03	NA	4.86E-05	
Silver	6.22E-07		5.00E-03	NA	1.24E-04	
Thallium	1.59E-07		7.00E-05	NA	2.27E-03	
Zinc	1.17E-04		3.00E-01	NA	3.90E-04	
HERBICIDES						
MCPA	2.12E-06		5.00E-04	NA	4.25E-03	
Totals - HQ & CR					**2.19E-02**	**1.79E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
VOLATILE ORGANICS												
Acetone			7.67E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzene			6.39E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Methylene Chloride			6.27E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Toluene			6.67E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			2.69E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
2,6-Dinitrotoluene			2.04E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
2-Methylnaphthalene			2.02E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
2-Methylphenol				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
3,3'-Dichlorobenzidine			2.35E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
3-Nitroaniline			5.68E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
4-Nitroaniline			5.68E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Acenaphthene				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Acenaphthylene				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Anthracene			2.17E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(a)anthracene			2.45E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(a)pyrene			2.39E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(b)fluoranthene			2.27E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(g,h,i)perylene			2.23E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(k)fluoranthene			2.50E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Butylbenzylphthalate			2.15E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Carbazole			2.35E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Chrysene			1.93E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Di-n-butylphthalate			2.94E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Dibenz(a,h)anthracene			2.11E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Dibenzofuran				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Fluoranthene			1.87E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Fluorene				1.00E-06	5,800	1.0		80	25	70	9,125	25,550

TABLE 7-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
Indeno(1,2,3-cd)pyrene			2.24E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			2.15E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Naphthalene			2.12E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Pentachlorophenol			6.21E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Phenanthrene			2.32E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Pyrene			1.57E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether			2.26E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			3.81E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
PESTICIDES/PCB												
4,4'-DDD			2.45E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
4,4'-DDE			6.17E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
4,4'-DDT			3.20E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Aldrin			1.08E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Aroclor-1260		8.08E-09	2.08E-02	1.00E-06	5,800	1.0	0.06	80	25	70	9,125	25,550
Dieldrin			5.71E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Endosulfan I			1.09E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Endosulfan sulfate				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Endrin			2.04E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Endrin ketone				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Heptachlor epoxide			1.05E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
alpha-Chlordane				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
beta-BHC				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
delta-BHC				1.00E-06	5,800	1.0		80	25	70	9,125	25,550

TABLE 7-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
METALS												
Arsenic			6.59E+00	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Barium			1.70E+02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Cadmium	1.452E-06		8.00E+00	1.00E-06	5,800	1.0	0.01	80	25	70	9,125	25,550
Copper			2.31E+02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Lead			2.78E+03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Mercury			1.20E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Selenium			7.75E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Silver			1.99E+00	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Thallium			5.07E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Zinc			3.74E+02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
HERBICIDES												
MCPA			6.78E+00	1.00E-06	5,800	1.0		80	25	70	9,125	25,550

EQUATION:

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

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC - Soil Data (RME)	EF = Exposure Frequency (days/year)	80 (RME Industrial Worker)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	25 (RME Industrial Worker)
SA = Surface Area Contact (cm²)	5,800 (RME Adult Worker)	BW = Bodyweight (kg)	70 (Adult Male)
AF =Soil to Skin Adherence Factor (mg/cm²)	1.0 (RME - All Receptors)	AT = Averaging Time (days)	25 x 365 (Nc), 70 x 365 (Car)
ABS = Absorption Factor (unitless)	Applicable for PCBs and Cadmium (EPA, 1992b)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-53

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Chloroisopropyl) ether			1.00E-03	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
PESTICIDES/PCB						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1260		8.08E-09	NA	8.11E+00		6.55E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		

TABLE 7-53

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Cadmium	1.45E-06		3.00E-05	NA	4.84E-02	
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			2.00E-02	NA		
HERBICIDES						
MCPA			5.00E-04	NA		
Totals - HQ & CR					**4.84E-02**	**6.55E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-67

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS FROM THE INGESTION OF ONSITE SURFACE WATER FUTURE TRESSPASSER (Child) REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
SEMIVOLATILE ORGANICS						
bis(2-Ethylhexyl)phthalate	2.74E-07	1.96E-08	2.00E-02	1.40E-02	1.37E-05	2.74E-10
METALS						
Antimony	3.03E-06		4.00E-04	NA	7.57E-03	
Arsenic	5.84E-07	4.17E-08	3.00E-04	1.75E+00	1.95E-03	7.30E-08
Barium	9.89E-06		7.00E-02	NA	1.41E-04	
Cadmium	1.07E-07		5.00E-04	NA	2.14E-04	
Calcium			NA	NA		
Chromium	8.64E-08		5.00E-03	NA	1.73E-05	
Copper	2.64E-06		4.00E-02	NA	6.59E-05	
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese	1.64E-06		5.00E-03	NA	3.28E-04	
Nickel	1.42E-07		2.00E-02	NA	7.08E-06	
Potassium			NA	NA		
Selenium	4.42E-07		5.00E-03	NA	8.84E-05	
Sodium			NA	NA		
Vanadium	1.23E-07		7.00E-03	NA	1.76E-05	
Zinc	4.97E-06		3.00E-01	NA	1.66E-05	
Totals - HQ & CR					**1.04E-02**	**7.33E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-34

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE WATER (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	Absorbed Dose/Event (mg-cm²-event)	EPC Surface W. (mg/L)	Child Skin Surface Area Contact (cm²)	Kp Permeability Coefficient (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Volumetric Conv. Factor (1 liter/1000 cm³)	B (unitless)	Tau (hours)	Child Body Weight (kg)	Averaging Time (days)	
														Child (Nc)	Car
SEMIVOLATILE ORGANICS															
bis(2-Ethylhexyl)phthalate	1.64E-07	1.17E-08	8.36E-04	2.00E-03	2,170	3.3E-02	1	25	5	1.0E-03	1.30E+01	2.10E+01	25	1,825	25,550
METALS															
Antimony	1.31E-10		2.21E-05	2.21E-02	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Arsenic	2.54E-11	1.81E-12	4.26E-06	4.26E-03	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Barium	4.29E-10		7.22E-05	7.22E-02	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Cadmium	4.65E-12		7.82E-07	7.82E-04	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Calcium			6.32E-02	6.32E+01	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Chromium	1.50E-11		1.26E-06	6.31E-04	2,170	2.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Copper				1.93E-02	2,170	NA	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Iron			1.93E-04	1.93E-01	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Lead			1.48E-07	3.71E-02	2,170	4.0E-06	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Magnesium			8.90E-03	8.90E+00	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Manganese	7.12E-11		1.20E-05	1.20E-02	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Nickel	6.14E-14		1.03E-07	1.03E-03	2,170	1.0E-04	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Potassium			3.52E-03	3.52E+00	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Selenium	1.92E-11		3.23E-06	3.23E-03	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Sodium			7.03E-03	7.03E+00	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Vanadium	5.35E-12		9.00E-07	9.00E-04	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Zinc	7.76E-11		2.18E-05	3.63E-02	2,170	6.0E-04	1	25	5	1.0E-03	NA	NA	25	1,825	25,550

EQUATION:

$$\text{Absorbed Dose (mg/kg-day)} = \frac{DA \times SA \times Kp \times ET \times EF \times ED \times CF}{BW \times AT}$$

Variables:	Assumptions:	Variables:	Assumptions:
DA = Absorbed Dose per Event (mg-cm²/event)	Calculated from EPA, 1992	EF = Exposure Frequency (days/year)	25
SA = Surface Area Contact (cm²)	2,170 (RME Child)	ED = Exposure Duration (years)	5 (RME)
Kp = Permeability Coefficient (cm/hour)	Compound Specific, EPA, 1992	CF = Vol. Conv. Factor (1 L/1000 cm³)	0.001
ET = Exposure Time (hours/day)	1 (RME)	BW = Bodyweight (kg)	25 (Child)
Tao = Lag time (hours)	Compound Specific, EPA, 1992	B = Bunge Model Value	Compound Specific, EPA, 1992

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-69

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS FROM DERMAL CONTACT TO SURFACE WATER (while Wading) FUTURE TRESSPASSER (Child) REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg)	Child CDI (Car) (mg/kg)	Dermal RfD (mg/kg/day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
SEMIVOLATILE ORGANICS						
bis(2-Ethylhexyl)phthalate	1.64E-07	1.17E-08	2.00E-02	1.40E-02	8.20E-06	2.30E-09
METALS						
Antimony	1.31E-10		4.00E-04	NA	3.28E-07	
Arsenic	2.54E-11	1.81E-12	2.94E-04	1.79E+00	8.62E-08	4.54E-11
Barium	4.29E-10		7.00E-03	NA	6.13E-08	
Cadmium	4.65E-12		3.00E-05	NA	1.55E-07	
Calcium			NA	NA		
Chromium	1.50E-11		2.50E-04	NA	6.00E-08	
Copper			2.00E-02	NA		
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese	7.12E-11		5.00E-03	NA	1.42E-08	
Nickel	6.14E-14		1.00E-03	NA	6.14E-11	
Potassium			NA	NA		
Selenium	1.92E-11		3.00E-03	NA	6.40E-09	
Sodium			NA	NA		
Vanadium	5.35E-12		7.00E-03	NA	7.64E-10	
Zinc	7.76E-11		1.50E-01	NA	5.17E-10	
Totals - HQ & CR					**8.91E-06**	**2.34E-09**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-32

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SURFACE WATER (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Surface W. (mg/L)	Contact Rate (L/hr)	Exposure Time (hr/day)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
									Child(Nc)	Car
SEMIVOLATILE ORGANICS										
bis(2-Ethylhexyl)phthalate	2.74E-07	1.96E-08	2.00E-03	0.05	1	25	5	25	1,825	25,550
METALS										
Antimony	3.03E-06		2.21E-02	0.05	1	25	5	25	1,825	25,550
Arsenic	5.84E-07	4.17E-08	4.26E-03	0.05	1	25	5	25	1,825	25,550
Barium	9.89E-06		7.22E-02	0.05	1	25	5	25	1,825	25,550
Cadmium	1.07E-07		7.82E-04	0.05	1	25	5	25	1,825	25,550
Calcium			6.32E+01	0.05	1	25	5	25	1,825	25,550
Chromium	8.64E-08		6.31E-04	0.05	1	25	5	25	1,825	25,550
Copper	2.64E-06		1.93E-02	0.05	1	25	5	25	1,825	25,550
Iron			1.93E-01	0.05	1	25	5	25	1,825	25,550
Lead			3.71E-02	0.05	1	25	5	25	1,825	25,550
Magnesium			8.90E+00	0.05	1	25	5	25	1,825	25,550
Manganese	1.64E-06		1.20E-02	0.05	1	25	5	25	1,825	25,550
Nickel	1.42E-07		1.03E-03	0.05	1	25	5	25	1,825	25,550
Potassium			3.52E+00	0.05	1	25	5	25	1,825	25,550
Selenium	4.42E-07		3.23E-03	0.05	1	25	5	25	1,825	25,550
Sodium			7.03E+00	0.05	1	25	5	25	1,825	25,550
Vanadium	1.23E-07		9.00E-04	0.05	1	25	5	25	1,825	25,550
Zinc	4.97E-06		3.63E-02	0.05	1	25	5	25	1,825	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times CR \times ET \times EF \times ED}{BW \times AT}$$

Variables:	Assumptions:
CS = Chemical Concentration in Surface Water (mg/L)	EPC - Surface Water Data - RME
CR = Contact Rate (Liters/hour)	0.05 (all recreators)
ET = Exposure Time (hours/day)	1 (RME - all recreators)
EF = Exposure Frequency (days/year)	25
ED = Exposure Duration (years)	5 (RME)
BW = Bodyweight (kg)	25 (Child)
AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-67

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SURFACE WATER
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
SEMIVOLATILE ORGANICS						
bis(2-Ethylhexyl)phthalate	2.74E-07	1.96E-08	2.00E-02	1.40E-02	1.37E-05	2.74E-10
METALS						
Antimony	3.03E-06		4.00E-04	NA	7.57E-03	
Arsenic	5.84E-07	4.17E-08	3.00E-04	1.75E+00	1.95E-03	7.30E-08
Barium	9.89E-06		7.00E-02	NA	1.41E-04	
Cadmium	1.07E-07		5.00E-04	NA	2.14E-04	
Calcium			NA	NA		
Chromium	8.64E-08		5.00E-03	NA	1.73E-05	
Copper	2.64E-06		4.00E-02	NA	6.59E-05	
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese	1.64E-06		5.00E-03	NA	3.28E-04	
Nickel	1.42E-07		2.00E-02	NA	7.08E-06	
Potassium			NA	NA		
Selenium	4.42E-07		5.00E-03	NA	8.84E-05	
Sodium			NA	NA		
Vanadium	1.23E-07		7.00E-03	NA	1.76E-05	
Zinc	4.97E-06		3.00E-01	NA	1.66E-05	
Totals - HQ & CR					**1.04E-02**	**7.33E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-20

CALCULATION OF INTAKE FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
VOLATILE ORGANICS											
Acetone	3.42E-08		7.28E-03	480	1.00E-06	1	250	1	70	365	25,550
Benzene		1.34E-10	2.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Methylene Chloride		2.68E-10	4.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Toluene	3.04E-08	4.34E-10	6.47E-03	480	1.00E-06	1	250	1	70	365	25,550
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene	1.28E-06		2.73E-01	480	1.00E-06	1	250	1	70	365	25,550
2,6-Dinitrotoluene	3.29E-07		7.00E-02	480	1.00E-06	1	250	1	70	365	25,550
2-Methylnaphthalene			1.30E-01	480	1.00E-06	1	250	1	70	365	25,550
2-Methylphenol	0.00E+00		0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
3,3'-Dichlorobenzidine		1.52E-08	2.26E-01	480	1.00E-06	1	250	1	70	365	25,550
3-Nitroaniline			5.46E-01	480	1.00E-06	1	250	1	70	365	25,550
4-Nitroaniline			5.46E-01	480	1.00E-06	1	250	1	70	365	25,550
Acenaphthene	1.55E-07		3.30E-02	480	1.00E-06	1	250	1	70	365	25,550
Acenaphthylene			9.60E-02	480	1.00E-06	1	250	1	70	365	25,550
Anthracene	6.11E-07		1.30E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(a)anthracene		1.85E-08	2.76E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(a)pyrene		1.88E-08	2.81E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(b)fluoranthene		1.93E-08	2.87E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(g,h,i)perylene			2.54E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(k)fluoranthene		1.74E-08	2.59E-01	480	1.00E-06	1	250	1	70	365	25,550
Butylbenzylphthalate	2.16E-07		4.60E-02	480	1.00E-06	1	250	1	70	365	25,550
Carbazole		1.54E-08	2.30E-01	480	1.00E-06	1	250	1	70	365	25,550
Chrysene		1.60E-08	2.38E-01	480	1.00E-06	1	250	1	70	365	25,550
Di-n-butylphthalate	1.25E-06		2.67E-01	480	1.00E-06	1	250	1	70	365	25,550

TABLE 7-20

**CALCULATION OF INTAKE FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)**

**SEAD-17 Remedial Investigation
Seneca Army Depot Activity**

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Dibenz(a,h)anthracene		1.63E-08	2.42E-01	480	1.00E-06	1	250	1	70	365	25,550
Dibenzofuran			3.60E-02	480	1.00E-06	1	250	1	70	365	25,550
Fluoranthene	1.05E-06		2.23E-01	480	1.00E-06	1	250	1	70	365	25,550
Fluorene	1.78E-07		3.80E-02	480	1.00E-06	1	250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene		1.77E-08	2.63E-01	480	1.00E-06	1	250	1	70	365	25,550
N-Nitrosodiphenylamine (1)		6.37E-09	9.50E-02	480	1.00E-06	1	250	1	70	365	25,550
Naphthalene			3.70E-02	480	1.00E-06	1	250	1	70	365	25,550
Pentachlorophenol	2.75E-06	3.93E-08	5.85E-01	480	1.00E-06	1	250	1	70	365	25,550
Phenanthrene			2.52E-01	480	1.00E-06	1	250	1	70	365	25,550
Pyrene	1.02E-06		2.18E-01	480	1.00E-06	1	250	1	70	365	25,550
bis(2-Chloroisopropyl) ether	1.00E-06		2.13E-01	480	1.00E-06	1	250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate	1.63E-06	2.33E-08	3.48E-01	480	1.00E-06	1	250	1	70	365	25,550
PESTICIDES/PCB											
4,4'-DDD	1.23E-08	1.76E-10	2.62E-03	480	1.00E-06	1	250	1	70	365	25,550
4,4'-DDE			7.05E-03	480	1.00E-06	1	250	1	70	365	25,550
4,4'-DDT	1.68E-08	2.40E-10	3.58E-03	480	1.00E-06	1	250	1	70	365	25,550
Aldrin	5.68E-09	8.11E-11	1.21E-03	480	1.00E-06	1	250	1	70	365	25,550
Aroclor-1254	1.13E-07	1.61E-09	2.40E-02	480	1.00E-06	1	250	1	70	365	25,550
Aroclor-1260		1.57E-09	2.34E-02	480	1.00E-06	1	250	1	70	365	25,550
Dieldrin	2.40E-08	3.42E-10	5.10E-03	480	1.00E-06	1	250	1	70	365	25,550
Endosulfan I	1.09E-08		2.33E-03	480	1.00E-06	1	250	1	70	365	25,550
Endosulfan sulfate	1.09E-08		2.33E-03	480	1.00E-06	1	250	1	70	365	25,550
Endrin	1.23E-08		2.62E-03	480	1.00E-06	1	250	1	70	365	25,550
Endrin ketone			2.75E-03	480	1.00E-06	1	250	1	70	365	25,550
Heptachlor epoxide	4.85E-09	6.92E-11	1.03E-03	480	1.00E-06	1	250	1	70	365	25,550
alpha-Chlordane	4.86E-09	6.94E-11	1.03E-03	480	1.00E-06	1	250	1	70	365	25,550
beta-BHC		8.62E-11	1.28E-03	480	1.00E-06	1	250	1	70	365	25,550
delta-BHC			1.21E-03	480	1.00E-06	1	250	1	70	365	25,550

TABLE 7-20

**CALCULATION OF INTAKE FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)**

**SEAD-17 Remedial Investigation
Seneca Army Depot Activity**

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
METALS											
Antimony	4.47E-05		9.52E+00	480	1.00E-06	1	250	1	70	365	25,550
Arsenic	2.93E-05	4.19E-07	6.24E+00	480	1.00E-06	1	250	1	70	365	25,550
Barium	7.24E-04		1.54E+02	480	1.00E-06	1	250	1	70	365	25,550
Cadmium	9.97E-05		2.12E+01	480	1.00E-06	1	250	1	70	365	25,550
Copper	8.42E-04		1.79E+02	480	1.00E-06	1	250	1	70	365	25,550
Lead			2.50E+03	480	1.00E-06	1	250	1	70	365	25,550
Mercury	5.45E-07		1.16E-01	480	1.00E-06	1	250	1	70	365	25,550
Selenium	3.21E-06		6.84E-01	480	1.00E-06	1	250	1	70	365	25,550
Silver	5.45E-07		1.16E-01	480	1.00E-06	1	250	1	70	365	25,550
Zinc	1.44E-03		3.06E+02	480	1.00E-06	1	250	1	70	365	25,550
HERBICIDES											
MCPA	2.94E-05		6.26E+00	480	1.00E-06	1	250	1	70	365	25,550

EQUATION: **Intake (mg/kg-day) =** $\dfrac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC - Soil Data (RME)
480 (RME Construction Worker)
10-6
1 (All Receptors)
250 (RME Construction Worker)
1 (Upper bound limit for Construction Worker)
70 (Adult male)
1 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-57

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone	3.42E-08		1.00E-01	NA	3.42E-07	
Benzene		1.34E-10	NA	2.90E-02		3.89E-12
Methylene Chloride		2.68E-10	NA	2.90E-02		7.78E-12
Toluene	3.04E-08	4.34E-10	6.00E-02	7.50E-03	5.06E-07	3.26E-12
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene	1.28E-06		2.00E-03	NA	6.42E-04	
2,6-Dinitrotoluene	3.29E-07		1.00E-03	NA	3.29E-04	
2-Methylnaphthalene			NA	NA		
2-Methylphenol	0.00E+00		5.00E-02	NA	0.00E+00	
3,3'-Dichlorobenzidine		1.52E-08	NA	4.50E-01		6.82E-09
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene	1.55E-07		6.00E-02	NA	2.58E-06	
Acenaphthylene			NA	NA		
Anthracene	6.11E-07		3.00E-01	NA	2.04E-06	
Benzo(a)anthracene		1.85E-08	NA	7.30E-01		1.35E-08
Benzo(a)pyrene		1.88E-08	NA	7.30E+00		1.38E-07
Benzo(b)fluoranthene		1.93E-08	NA	7.30E-01		1.41E-08
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		1.74E-08	NA	7.30E-01		1.27E-08
Butylbenzylphthalate	2.16E-07		2.00E+00	NA	1.08E-07	
Carbazole		1.54E-08	NA	2.00E-02		3.08E-10
Chrysene		1.60E-08	NA	7.30E-02		1.17E-09
Di-n-butylphthalate	1.25E-06		1.00E-01	NA	1.25E-05	
Dibenz(a,h)anthracene		1.63E-08	NA	7.30E+00		1.19E-07
Dibenzofuran			NA	NA		
Fluoranthene	1.05E-06		4.00E-02	NA	2.62E-05	
Fluorene	1.78E-07		4.00E-02	NA	4.46E-06	
Indeno(1,2,3-cd)pyrene		1.77E-08	NA	7.30E-01		1.29E-08
N-Nitrosodiphenylamine (1)		6.37E-09	NA	4.90E-03		3.12E-11
Naphthalene			NA	NA		
Pentachlorophenol	2.75E-06	3.93E-08	3.00E-02	1.20E-01	9.16E-05	4.71E-09
Phenanthrene			NA	NA		
Pyrene	1.02E-06		3.00E-02	NA	3.41E-05	
bis(2-Chloroisopropyl) ether	1.00E-06		1.00E-03	NA	1.00E-03	
bis(2-Ethylhexyl)phthalate	1.63E-06	2.33E-08	2.00E-02	1.40E-02	8.16E-05	3.26E-10

TABLE 7-57

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS FROM INGESTION OF SURFACE & SUBSURFACE SOIL CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE) REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
PESTICIDES/PCB						
4,4'-DDD	1.23E-08	1.76E-10	5.00E-04	2.40E-01	2.46E-05	4.22E-11
4,4'-DDE			NA	NA		
4,4'-DDT	1.68E-08	2.40E-10	5.00E-04	3.40E-01	3.37E-05	8.17E-11
Aldrin	5.68E-09	8.11E-11	3.00E-05	1.70E+01	1.89E-04	1.38E-09
Aroclor-1254	1.13E-07	1.61E-09	2.00E-05	2.00E+00	5.63E-03	3.22E-09
Aroclor-1260		1.57E-09	NA	7.70E+00		1.21E-08
Dieldrin	2.40E-08	3.42E-10	5.00E-05	1.60E+01	4.79E-04	5.48E-09
Endosulfan I	1.09E-08		6.00E-03	NA	1.82E-06	
Endosulfan sulfate	1.09E-08		5.00E-05	NA	2.19E-04	
Endrin	1.23E-08		3.00E-04	NA	4.09E-05	
Endrin ketone			NA	NA		
Heptachlor epoxide	4.85E-09	6.92E-11	1.30E-05	9.10E+00	3.73E-04	6.30E-10
alpha-Chlordane	4.86E-09	6.94E-11	6.00E-05	1.30E+00	8.10E-05	9.03E-11
beta-BHC		8.62E-11	NA	1.80E+00		1.55E-10
delta-BHC			NA	NA		
METALS						
Antimony	4.47E-05		4.00E-04	NA	1.12E-01	
Arsenic	2.93E-05	4.19E-07	3.00E-04	1.75E+00	9.77E-02	7.33E-07
Barium	7.24E-04		7.00E-02	NA	1.03E-02	
Cadmium	9.97E-05		5.00E-04	NA	1.99E-01	
Copper	8.42E-04		4.00E-02	NA	2.10E-02	
Lead			NA	NA		
Mercury	5.45E-07		3.00E-04	NA	1.82E-03	
Selenium	3.21E-06		5.00E-03	NA	6.43E-04	
Silver	5.45E-07		5.00E-03	NA	1.09E-04	
Zinc	1.44E-03		3.00E-01	NA	4.79E-03	
HERBICIDES						
MCPA	2.94E-05		5.00E-04	NA	5.88E-02	
Totals - HQ & CR					**5.16E-01**	**1.08E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-28

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
VOLATILE ORGANICS												
Acetone			7.28E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzene			2.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Methylene Chloride			4.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Toluene			6.47E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			2.73E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
2,6-Dinitrotoluene			7.00E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
2-Methylnaphthalene			1.30E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
2-Methylphenol				1.00E-06	5,800	1.0		250	1	70	365	25,550
3,3'-Dichlorobenzidine			2.26E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
3-Nitroaniline			5.46E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
4-Nitroaniline			5.46E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Acenaphthene			3.30E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Acenaphthylene			9.60E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Anthracene			1.30E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(a)anthracene			2.76E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(a)pyrene			2.81E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(b)fluoranthene			2.87E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(g,h,i)perylene			2.54E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(k)fluoranthene			2.59E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Butylbenzylphthalate			4.60E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Carbazole			2.30E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Chrysene			2.38E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Di-n-butylphthalate			2.67E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550

TABLE 7-28

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Dibenz(a,h)anthracene			2.42E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Dibenzofuran			3.60E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Fluoranthene			2.23E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Fluorene			3.80E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene			2.63E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
N-Nitrosodiphenylamine (1)			9.50E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Naphthalene			3.70E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pentachlorophenol			5.85E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Phenanthrene			2.52E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pyrene			2.18E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
bis(2-Chloroisopropyl) ether			2.13E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate			3.48E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
PESTICIDES/PCB												
4,4'-DDD			2.62E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
4,4'-DDE			7.05E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
4,4'-DDT			3.58E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Aldrin			1.21E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Aroclor-1254	8.165E-08	1.166E-09	2.40E-02	1.00E-06	5,800	1.0	0.06	250	1	70	365	25,550
Aroclor-1260	7.966E-08	1.138E-09	2.34E-02	1.00E-06	5,800	1.0	0.06	250	1	70	365	25,550
Dieldrin			5.10E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan I			2.33E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan sulfate			2.33E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin			2.62E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin ketone			2.75E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Heptachlor epoxide			1.03E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
alpha-Chlordane			1.03E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
beta-BHC			1.28E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
delta-BHC			1.21E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550

TABLE 7-28

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm^2)	Adherence Factor (mg soil/cm^2)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
METALS												
Antimony			9.52E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Arsenic			6.24E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Barium			1.54E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Cadmium			2.12E+01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Copper			1.79E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Lead			2.50E+03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Mercury			1.16E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Selenium			6.84E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Silver			1.16E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Zinc			3.06E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
HERBICIDES												
MCPA			6.26E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550

EQUATION:

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

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC - Soil Data (RME)	EF = Exposure Frequency (days/year)	250 (RME Construction Worker)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	1 (Upper bound limit for CW)
SA = Surface Area Contact (cm^2)	5,800 (RME Adult Worker)	BW = Bodyweight (kg)	70 (Adult Male)
AF =Soil to Skin Adherence Factor (mg/cm^2)	1.0 (RME - All Receptors)	AT = Averaging Time (days)	1 x 365 (Nc) 70 x 365 (Car)
ABS = Absorption Factor (unitless)	Applicable for PCBs and Cadmium (EPA, 1992b)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-59

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Chloroisopropyl) ether			1.00E-03	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 7-59

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
PESTICIDES/PCB						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254	8.16E-08	1.17E-09	1.90E-05	2.11E+00	4.30E-03	2.46E-09
Aroclor-1260	7.97E-08	1.14E-09	NA	8.11E+00		9.23E-09
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		
METALS						
Antimony			4.00E-04	NA		
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Cadmium			3.00E-05	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Zinc			1.50E-01	NA		
HERBICIDES						
MCPA			5.00E-04	NA		
Totals - HQ & CR					**4.30E-03**	**1.17E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	Acetone	UG/KG	33	1	1	3.0%	6.553	2.577	8.000	FALSE	FALSE	6.976	6.976
VOLATILE ORGANICS	Benzene	UG/KG	34	0	2	5.9%	5.963	1.145	2.000	FALSE	FALSE	6.578	2.000
VOLATILE ORGANICS	Toluene	UG/KG	34	0	3	8.8%	6.066	1.100	8.000	FALSE	FALSE	6.591	6.591
SEMIVOLATILE ORGANICS	2,4-Dinitrotoluene	UG/KG	34	0	3	8.8%	248.412	202.253	880.000	FALSE	FALSE	278.937	278.937
SEMIVOLATILE ORGANICS	2,6-Dinitrotoluene	UG/KG	33	1	0	0.0%	196.212	14.845	0.000	TRUE	TRUE	200.587	0.000
SEMIVOLATILE ORGANICS	2-Methylnaphthalene	UG/KG	33	1	2	6.1%	190.545	34.248	130.000	FALSE	FALSE	218.793	130.000
SEMIVOLATILE ORGANICS	3,3`-Dichlorobenzidine	UG/KG	34	0	1	2.9%	230.294	167.232	410.000	FALSE	FALSE	247.172	247.172
SEMIVOLATILE ORGANICS	3-Nitroaniline	UG/KG	34	0	1	2.9%	556.985	399.030	990.000	FALSE	FALSE	597.864	597.864
SEMIVOLATILE ORGANICS	4-Nitroaniline	UG/KG	34	0	1	2.9%	556.985	399.030	990.000	FALSE	FALSE	597.864	597.864
SEMIVOLATILE ORGANICS	Acenaphthene	UG/KG	33	1	2	6.1%	186.697	44.007	33.000	FALSE	FALSE	236.221	33.000
SEMIVOLATILE ORGANICS	Acenaphthylene	UG/KG	33	1	2	6.1%	189.727	35.601	96.000	FALSE	FALSE	214.874	96.000
SEMIVOLATILE ORGANICS	Anthracene	UG/KG	33	1	2	6.1%	193.030	23.316	130.000	FALSE	FALSE	201.727	130.000
SEMIVOLATILE ORGANICS	Benzo[a]anthracene	UG/KG	34	0	10	29.4%	211.853	210.778	720.000	FALSE	FALSE	343.755	343.755
SEMIVOLATILE ORGANICS	Benzo[a]pyrene	UG/KG	34	0	12	35.3%	213.471	240.759	940.000	FALSE	FALSE	380.185	380.185
SEMIVOLATILE ORGANICS	Benzo[b]fluoranthene	UG/KG	34	0	10	29.4%	261.618	393.512	2200.000	FALSE	FALSE	372.032	372.032
SEMIVOLATILE ORGANICS	Benzo[ghi]perylene	UG/KG	34	0	8	23.5%	226.824	204.920	710.000	FALSE	FALSE	306.396	306.396
SEMIVOLATILE ORGANICS	Benzo[k]fluoranthene	UG/KG	34	0	8	23.5%	204.676	189.464	530.000	FALSE	FALSE	294.589	294.589
SEMIVOLATILE ORGANICS	Bis(2-Chloroisopropyl)ether	UG/KG	17	0	1	5.9%	203.235	54.571	410.000	FALSE	FALSE	221.331	221.331
SEMIVOLATILE ORGANICS	Bis(2-Ethylhexyl)phthalate	UG/KG	34	0	9	26.5%	261.353	259.112	1300.000	FALSE	FALSE	327.750	327.750
SEMIVOLATILE ORGANICS	Butylbenzylphthalate	UG/KG	33	1	1	3.0%	192.303	29.928	46.000	FALSE	FALSE	211.222	46.000
SEMIVOLATILE ORGANICS	Carbazole	UG/KG	34	0	3	8.8%	223.824	171.632	410.000	FALSE	FALSE	255.751	255.751
SEMIVOLATILE ORGANICS	Chrysene	UG/KG	34	0	18	52.9%	173.235	223.256	670.000	FALSE	FALSE	324.585	324.585
SEMIVOLATILE ORGANICS	Cresols (-o)	UG/KG	33	1	1	3.0%	193.636	19.814	120.000	FALSE	FALSE	200.523	120.000
SEMIVOLATILE ORGANICS	Di-n-butylphthalate	UG/KG	34	0	9	26.5%	238.529	215.671	1200.000	FALSE	FALSE	294.284	294.284
SEMIVOLATILE ORGANICS	Dibenz[a,h]anthracene	UG/KG	34	0	5	14.7%	220.324	178.157	470.000	FALSE	FALSE	284.260	284.260
SEMIVOLATILE ORGANICS	Dibenzofuran	UG/KG	33	1	1	3.0%	192.000	31.466	36.000	FALSE	FALSE	215.124	36.000
SEMIVOLATILE ORGANICS	Fluoranthene	UG/KG	34	0	19	55.9%	192.912	263.225	1000.000	FALSE	FALSE	325.407	325.407
SEMIVOLATILE ORGANICS	Fluorene	UG/KG	33	1	1	3.0%	192.061	31.157	38.000	FALSE	FALSE	214.211	38.000
SEMIVOLATILE ORGANICS	Indeno[1,2,3-cd]pyrene	UG/KG	34	0	8	23.5%	226.676	211.650	790.000	FALSE	FALSE	328.688	328.688
SEMIVOLATILE ORGANICS	N-Nitrosodiphenylamine	UG/KG	33	1	2	6.1%	190.061	34.083	95.000	FALSE	FALSE	210.480	95.000
SEMIVOLATILE ORGANICS	Naphthalene	UG/KG	33	1	3	9.1%	183.091	51.639	37.000	FALSE	FALSE	246.019	37.000
SEMIVOLATILE ORGANICS	Pentachlorophenol	UG/KG	34	0	2	5.9%	544.721	408.400	990.000	FALSE	FALSE	659.896	659.896
SEMIVOLATILE ORGANICS	Phenanthrene	UG/KG	34	0	10	29.4%	197.647	187.380	360.000	FALSE	FALSE	318.510	318.510
SEMIVOLATILE ORGANICS	Pyrene	UG/KG	34	0	19	55.9%	194.412	273.925	1200.000	FALSE	FALSE	301.259	301.259
PESTICIDES/PCB	4,4`-DDD	UG/KG	34	0	2	5.9%	2.810	3.427	15.000	FALSE	FALSE	3.005	3.005
PESTICIDES/PCB	4,4`-DDE	UG/KG	34	0	7	20.6%	7.407	24.205	140.000	FALSE	FALSE	5.784	5.784
PESTICIDES/PCB	4,4`-DDT	UG/KG	34	0	3	8.8%	3.132	3.474	13.000	FALSE	FALSE	3.494	3.494
PESTICIDES/PCB	Aldrin	UG/KG	34	0	1	2.9%	1.286	1.373	1.900	FALSE	FALSE	1.359	1.359
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	33	1	1	3.0%	1.027	0.076	1.100	FALSE	FALSE	1.060	1.060
PESTICIDES/PCB	Aroclor-1260	UG/KG	34	0	2	5.9%	24.544	26.661	28.000	FALSE	FALSE	25.831	25.831
PESTICIDES/PCB	Beta-BHC	UG/KG	34	0	1	2.9%	1.580	3.256	20.000	FALSE	FALSE	1.512	1.512

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
PESTICIDES/PCB	Delta-BHC	UG/KG	34	0	1	2.9%	1.293	1.379	2.200	FALSE	FALSE	1.371	1.371
PESTICIDES/PCB	Dieldrin	UG/KG	34	0	3	8.8%	4.416	10.424	62.000	FALSE	FALSE	4.284	4.284
PESTICIDES/PCB	Endosulfan I	UG/KG	34	0	3	8.8%	13.985	73.532	430.000	FALSE	FALSE	4.022	4.022
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	34	0	1	2.9%	2.509	3.094	20.000	FALSE	FALSE	2.611	2.611
PESTICIDES/PCB	Endrin	UG/KG	34	0	2	5.9%	3.300	7.043	43.000	FALSE	FALSE	3.159	3.159
PESTICIDES/PCB	Endrin ketone	UG/KG	34	0	2	5.9%	4.100	11.832	71.000	FALSE	FALSE	3.449	3.449
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	34	0	34	100.0%	0.335	0.415	2.400	FALSE	TRUE	0.478	0.478
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	34	0	1	2.9%	70.294	45.957	330.000	FALSE	FALSE	74.685	74.685
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	34	0	1	2.9%	87.206	143.639	900.000	FALSE	FALSE	87.405	87.405
METALS	Aluminum	MG/KG	34	0	34	100.0%	13438.235	2922.173	19300.000	FALSE	FALSE	14793.610	14793.610
METALS	Antimony	MG/KG	34	0	17	50.0%	4.735	8.647	52.000	FALSE	TRUE	7.818	7.818
METALS	Arsenic	MG/KG	34	0	34	100.0%	5.229	1.068	8.900	FALSE	TRUE	5.540	5.540
METALS	Barium	MG/KG	34	0	28	82.4%	106.394	59.652	357.000	FALSE	TRUE	125.247	125.247
METALS	Beryllium	MG/KG	34	0	34	100.0%	0.580	0.171	0.990	TRUE	FALSE	0.629	0.629
METALS	Cadmium	MG/KG	34	0	24	70.6%	1.244	1.956	3.500	FALSE	TRUE	2.060	2.060
METALS	Calcium	MG/KG	34	0	34	100.0%	28600.588	52136.981	#########	FALSE	FALSE	50697.394	50697.394
METALS	Chromium	MG/KG	34	0	34	100.0%	19.894	3.933	27.900	TRUE	FALSE	21.035	21.035
METALS	Cobalt	MG/KG	34	0	34	100.0%	10.265	3.719	21.900	FALSE	TRUE	11.360	11.360
METALS	Copper	MG/KG	34	0	34	100.0%	55.347	89.252	546.000	FALSE	FALSE	62.403	62.403
METALS	Cyanide	MG/KG	34	0	1	2.9%	0.315	0.220	1.500	FALSE	FALSE	0.377	0.377
METALS	Iron	MG/KG	34	0	34	100.0%	23757.647	5597.783	38700.000	TRUE	FALSE	25381.795	25381.795
METALS	Lead	MG/KG	34	0	33	97.1%	279.938	542.982	686.000	FALSE	TRUE	619.014	619.014
METALS	Magnesium	MG/KG	34	0	34	100.0%	5178.088	2028.900	9830.000	FALSE	TRUE	5854.933	5854.933
METALS	Manganese	MG/KG	34	0	34	100.0%	539.426	220.701	1080.000	TRUE	TRUE	603.461	603.461
METALS	Mercury	MG/KG	34	0	30	88.2%	0.099	0.182	1.000	FALSE	FALSE	0.111	0.111
METALS	Nickel	MG/KG	34	0	34	100.0%	27.003	9.145	50.800	FALSE	TRUE	29.987	29.987
METALS	Potassium	MG/KG	34	0	34	100.0%	1351.500	287.221	1960.000	TRUE	TRUE	1434.835	1434.835
METALS	Selenium	MG/KG	34	0	20	58.8%	0.638	0.521	1.600	FALSE	FALSE	1.158	1.158
METALS	Silver	MG/KG	34	0	4	11.8%	0.546	0.765	4.600	FALSE	FALSE	0.750	0.750
METALS	Sodium	MG/KG	34	0	23	67.6%	75.865	72.860	383.000	FALSE	FALSE	93.909	93.909
METALS	Thallium	MG/KG	34	0	7	20.6%	0.417	0.385	1.500	FALSE	FALSE	0.610	0.610
METALS	Vanadium	MG/KG	34	0	34	100.0%	23.104	4.422	30.700	TRUE	TRUE	24.387	24.387
METALS	Zinc	MG/KG	34	0	34	100.0%	132.596	107.961	620.000	FALSE	FALSE	153.822	153.822
HERBICIDES	MCPA	UG/KG	17	0	1	5.9%	4773.529	7020.486	32000.000	FALSE	FALSE	5626.631	5626.631

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
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VOLATILE ORGANICS	Benzene	UG/KG	34	0	2	5.9%	5.963	1.145	2.000	FALSE	FALSE	6.578	2.000
VOLATILE ORGANICS	Toluene	UG/KG	34	0	3	8.8%	6.066	1.100	8.000	FALSE	FALSE	6.591	6.591
SEMIVOLATILE ORGANICS	2,4-Dinitrotoluene	UG/KG	34	0	3	8.8%	248.412	202.253	880.000	FALSE	FALSE	278.937	278.937
SEMIVOLATILE ORGANICS	2,6-Dinitrotoluene	UG/KG	33	1	0	0.0%	196.212	14.845	0.000	TRUE	TRUE	200.587	0.000
SEMIVOLATILE ORGANICS	2-Methylnaphthalene	UG/KG	33	1	2	6.1%	190.545	34.248	130.000	FALSE	FALSE	218.793	130.000
SEMIVOLATILE ORGANICS	3,3`-Dichlorobenzidine	UG/KG	34	0	1	2.9%	230.294	167.232	410.000	FALSE	FALSE	247.172	247.172
SEMIVOLATILE ORGANICS	3-Nitroaniline	UG/KG	34	0	1	2.9%	556.985	399.030	990.000	FALSE	FALSE	597.864	597.864
SEMIVOLATILE ORGANICS	4-Nitroaniline	UG/KG	34	0	1	2.9%	556.985	399.030	990.000	FALSE	FALSE	597.864	597.864
SEMIVOLATILE ORGANICS	Acenaphthene	UG/KG	33	1	2	6.1%	186.697	44.007	33.000	FALSE	FALSE	236.221	33.000
SEMIVOLATILE ORGANICS	Acenaphthylene	UG/KG	33	1	2	6.1%	189.727	35.601	96.000	FALSE	FALSE	214.874	96.000
SEMIVOLATILE ORGANICS	Anthracene	UG/KG	33	1	2	6.1%	193.030	23.316	130.000	FALSE	FALSE	201.727	130.000
SEMIVOLATILE ORGANICS	Benzo[a]anthracene	UG/KG	34	0	10	29.4%	211.853	210.778	720.000	FALSE	FALSE	343.755	343.755
SEMIVOLATILE ORGANICS	Benzo[a]pyrene	UG/KG	34	0	12	35.3%	213.471	240.759	940.000	FALSE	FALSE	380.185	380.185
SEMIVOLATILE ORGANICS	Benzo[b]fluoranthene	UG/KG	34	0	10	29.4%	261.618	393.512	2200.000	FALSE	FALSE	372.032	372.032
SEMIVOLATILE ORGANICS	Benzo[ghi]perylene	UG/KG	34	0	8	23.5%	226.824	204.920	710.000	FALSE	FALSE	306.396	306.396
SEMIVOLATILE ORGANICS	Benzo[k]fluoranthene	UG/KG	34	0	8	23.5%	204.676	189.464	530.000	FALSE	FALSE	294.589	294.589
SEMIVOLATILE ORGANICS	Bis(2-Chloroisopropyl)ether	UG/KG	17	0	1	5.9%	203.235	54.571	410.000	FALSE	FALSE	221.331	221.331
SEMIVOLATILE ORGANICS	Bis(2-Ethylhexyl)phthalate	UG/KG	34	0	9	26.5%	261.353	259.112	1300.000	FALSE	FALSE	327.750	327.750
SEMIVOLATILE ORGANICS	Butylbenzylphthalate	UG/KG	33	1	1	3.0%	192.303	29.928	46.000	FALSE	FALSE	211.222	46.000
SEMIVOLATILE ORGANICS	Carbazole	UG/KG	34	0	3	8.8%	223.824	171.632	410.000	FALSE	FALSE	255.751	255.751
SEMIVOLATILE ORGANICS	Chrysene	UG/KG	34	0	18	52.9%	173.235	223.256	670.000	FALSE	FALSE	324.585	324.585
SEMIVOLATILE ORGANICS	Cresols (-o)	UG/KG	33	1	1	3.0%	193.636	19.814	120.000	FALSE	FALSE	200.523	120.000
SEMIVOLATILE ORGANICS	Di-n-butylphthalate	UG/KG	34	0	9	26.5%	238.529	215.671	1200.000	FALSE	FALSE	294.284	294.284
SEMIVOLATILE ORGANICS	Dibenz[a,h]anthracene	UG/KG	34	0	5	14.7%	220.324	178.157	470.000	FALSE	FALSE	284.260	284.260
SEMIVOLATILE ORGANICS	Dibenzofuran	UG/KG	33	1	1	3.0%	192.000	31.466	36.000	FALSE	FALSE	215.124	36.000
SEMIVOLATILE ORGANICS	Fluoranthene	UG/KG	34	0	19	55.9%	192.912	263.225	1000.000	FALSE	FALSE	325.407	325.407
SEMIVOLATILE ORGANICS	Fluorene	UG/KG	33	1	1	3.0%	192.061	31.157	38.000	FALSE	FALSE	214.211	38.000
SEMIVOLATILE ORGANICS	Indeno[1,2,3-cd]pyrene	UG/KG	34	0	8	23.5%	226.676	211.650	790.000	FALSE	FALSE	328.688	328.688
SEMIVOLATILE ORGANICS	N-Nitrosodiphenylamine	UG/KG	33	1	2	6.1%	190.061	34.083	95.000	FALSE	FALSE	210.480	95.000
SEMIVOLATILE ORGANICS	Naphthalene	UG/KG	33	1	3	9.1%	183.091	51.639	37.000	FALSE	FALSE	246.019	37.000
SEMIVOLATILE ORGANICS	Pentachlorophenol	UG/KG	34	0	2	5.9%	544.721	408.400	990.000	FALSE	FALSE	659.896	659.896
SEMIVOLATILE ORGANICS	Phenanthrene	UG/KG	34	0	10	29.4%	197.647	187.380	360.000	FALSE	FALSE	318.510	318.510
SEMIVOLATILE ORGANICS	Pyrene	UG/KG	34	0	19	55.9%	194.412	273.925	1200.000	FALSE	FALSE	301.259	301.259
PESTICIDES/PCB	4,4`-DDD	UG/KG	34	0	2	5.9%	2.810	3.427	15.000	FALSE	FALSE	3.005	3.005
PESTICIDES/PCB	4,4`-DDE	UG/KG	34	0	7	20.6%	7.407	24.205	140.000	FALSE	FALSE	5.784	5.784
PESTICIDES/PCB	4,4`-DDT	UG/KG	34	0	3	8.8%	3.132	3.474	13.000	FALSE	FALSE	3.494	3.494
PESTICIDES/PCB	Aldrin	UG/KG	34	0	1	2.9%	1.286	1.373	1.900	FALSE	FALSE	1.359	1.359
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	33	1	1	3.0%	1.027	0.076	1.100	FALSE	FALSE	1.060	1.060
PESTICIDES/PCB	Aroclor-1260	UG/KG	34	0	2	5.9%	24.544	26.661	28.000	FALSE	FALSE	25.831	25.831
PESTICIDES/PCB	Beta-BHC	UG/KG	34	0	1	2.9%	1.580	3.256	20.000	FALSE	FALSE	1.512	1.512

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
PESTICIDES/PCB	Delta-BHC	UG/KG	34	0	1	2.9%	1.293	1.379	2.200	FALSE	FALSE	1.371	1.371
PESTICIDES/PCB	Dieldrin	UG/KG	34	0	3	8.8%	4.416	10.424	62.000	FALSE	FALSE	4.284	4.284
PESTICIDES/PCB	Endosulfan I	UG/KG	34	0	3	8.8%	13.985	73.532	430.000	FALSE	FALSE	4.022	4.022
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	34	0	1	2.9%	2.509	3.094	20.000	FALSE	FALSE	2.611	2.611
PESTICIDES/PCB	Endrin	UG/KG	34	0	2	5.9%	3.300	7.043	43.000	FALSE	FALSE	3.159	3.159
PESTICIDES/PCB	Endrin ketone	UG/KG	34	0	2	5.9%	4.100	11.832	71.000	FALSE	FALSE	3.449	3.449
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	34	0	34	100.0%	0.335	0.415	2.400	FALSE	TRUE	0.478	0.478
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	34	0	1	2.9%	70.294	45.957	330.000	FALSE	FALSE	74.685	74.685
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	34	0	1	2.9%	87.206	143.639	900.000	FALSE	FALSE	87.405	87.405
METALS	Aluminum	MG/KG	34	0	34	100.0%	13438.235	2922.173	19300.000	FALSE	FALSE	14793.610	14793.610
METALS	Antimony	MG/KG	34	0	17	50.0%	4.735	8.647	52.000	FALSE	TRUE	7.818	7.818
METALS	Arsenic	MG/KG	34	0	34	100.0%	5.229	1.068	8.900	FALSE	TRUE	5.540	5.540
METALS	Barium	MG/KG	34	0	28	82.4%	106.394	59.652	357.000	FALSE	TRUE	125.247	125.247
METALS	Beryllium	MG/KG	34	0	34	100.0%	0.580	0.171	0.990	TRUE	FALSE	0.629	0.629
METALS	Cadmium	MG/KG	34	0	24	70.6%	1.244	1.956	3.500	FALSE	TRUE	2.060	2.060
METALS	Calcium	MG/KG	34	0	34	100.0%	28600.588	52136.981	#########	FALSE	FALSE	50697.394	50697.394
METALS	Chromium	MG/KG	34	0	34	100.0%	19.894	3.933	27.900	TRUE	FALSE	21.035	21.035
METALS	Cobalt	MG/KG	34	0	34	100.0%	10.265	3.719	21.900	FALSE	TRUE	11.360	11.360
METALS	Copper	MG/KG	34	0	34	100.0%	55.347	89.252	546.000	FALSE	FALSE	62.403	62.403
METALS	Cyanide	MG/KG	34	0	1	2.9%	0.315	0.220	1.500	FALSE	FALSE	0.377	0.377
METALS	Iron	MG/KG	34	0	34	100.0%	23757.647	5597.783	38700.000	TRUE	FALSE	25381.795	25381.795
METALS	Lead	MG/KG	34	0	33	97.1%	279.938	542.982	686.000	FALSE	TRUE	619.014	619.014
METALS	Magnesium	MG/KG	34	0	34	100.0%	5178.088	2028.900	9830.000	FALSE	TRUE	5854.933	5854.933
METALS	Manganese	MG/KG	34	0	34	100.0%	539.426	220.701	1080.000	TRUE	TRUE	603.461	603.461
METALS	Mercury	MG/KG	34	0	30	88.2%	0.099	0.182	1.000	FALSE	FALSE	0.111	0.111
METALS	Nickel	MG/KG	34	0	34	100.0%	27.003	9.145	50.800	FALSE	TRUE	29.987	29.987
METALS	Potassium	MG/KG	34	0	34	100.0%	1351.500	287.221	1960.000	TRUE	TRUE	1434.835	1434.835
METALS	Selenium	MG/KG	34	0	20	58.8%	0.638	0.521	1.600	FALSE	FALSE	1.158	1.158
METALS	Silver	MG/KG	34	0	4	11.8%	0.546	0.765	4.600	FALSE	FALSE	0.750	0.750
METALS	Sodium	MG/KG	34	0	23	67.6%	75.865	72.860	383.000	FALSE	FALSE	93.909	93.909
METALS	Thallium	MG/KG	34	0	7	20.6%	0.417	0.385	1.500	FALSE	FALSE	0.610	0.610
METALS	Vanadium	MG/KG	34	0	34	100.0%	23.104	4.422	30.700	TRUE	TRUE	24.387	24.387
METALS	Zinc	MG/KG	34	0	34	100.0%	132.596	107.961	620.000	FALSE	FALSE	153.822	153.822
HERBICIDES	MCPA	UG/KG	17	0	1	5.9%	4773.529	7020.486	32000.000	FALSE	FALSE	5626.631	5626.631

TABLE 7-14

CALCULATION OF INTAKE (ONSITE)
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
VOLATILE ORGANICS									
Acetone			2.65E-10	2	50	5	25	1,825	25,550
Benzene		5.95E-14	7.60E-11	2	50	5	25	1,825	25,550
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
Toluene	2.74E-12		2.50E-10	2	50	5	25	1,825	25,550
SEMIVOLATILE ORGANICS									
2,4-Dinitrotoluene			1.06E-08	2	50	5	25	1,825	25,550
2,6-Dinitrotoluene			0.00E+00	2	50	5	25	1,825	25,550
2-Methylnaphthalene			4.94E-09	2	50	5	25	1,825	25,550
2-Methylphenol			0.00E+00	2	50	5	25	1,825	25,550
3,3'-Dichlorobenzidine			9.39E-09	2	50	5	25	1,825	25,550
3-Nitroaniline			2.27E-08	2	50	5	25	1,825	25,550
4-Nitroaniline			2.27E-08	2	50	5	25	1,825	25,550
Acenaphthene			1.25E-09	2	50	5	25	1,825	25,550
Acenaphthylene			3.65E-09	2	50	5	25	1,825	25,550
Anthracene			4.94E-09	2	50	5	25	1,825	25,550
Benzo(a)anthracene			1.31E-08	2	50	5	25	1,825	25,550
Benzo(a)pyrene			1.44E-08	2	50	5	25	1,825	25,550
Benzo(b)fluoranthene			1.41E-08	2	50	5	25	1,825	25,550
Benzo(g,h,i)perylene			1.16E-08	2	50	5	25	1,825	25,550
Benzo(k)fluoranthene			1.12E-08	2	50	5	25	1,825	25,550
Butylbenzylphthalate			1.75E-09	2	50	5	25	1,825	25,550
Carbazole			9.72E-09	2	50	5	25	1,825	25,550
Chrysene			1.23E-08	2	50	5	25	1,825	25,550
Di-n-butylphthalate			1.12E-08	2	50	5	25	1,825	25,550
Dibenz(a,h)anthracene			1.08E-08	2	50	5	25	1,825	25,550
Dibenzofuran			1.37E-09	2	50	5	25	1,825	25,550
Fluoranthene			1.24E-08	2	50	5	25	1,825	25,550
Fluorene			1.44E-09	2	50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene			1.25E-08	2	50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			3.61E-09	2	50	5	25	1,825	25,550
Naphthalene			1.41E-09	2	50	5	25	1,825	25,550
Pentachlorophenol			2.51E-08	2	50	5	25	1,825	25,550
Phenanthrene			1.21E-08	2	50	5	25	1,825	25,550
Pyrene			1.14E-08	2	50	5	25	1,825	25,550
bis(2-Chloroisopropyl) ether	9.22E-11		8.41E-09	2	50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			1.25E-08	2	50	5	25	1,825	25,550
PESTICIDES/PCB									
4,4'-DDD			1.14E-10	2	50	5	25	1,825	25,550
4,4'-DDE			2.20E-10	2	50	5	25	1,825	25,550
4,4'-DDT		1.04E-13	1.33E-10	2	50	5	25	1,825	25,550
Aldrin	5.66E-13	4.04E-14	5.17E-11	2	50	5	25	1,825	25,550
Aroclor-1260			9.82E-10	2	50	5	25	1,825	25,550
Dieldrin		1.27E-13	1.63E-10	2	50	5	25	1,825	25,550
Endosulfan I			1.53E-10	2	50	5	25	1,825	25,550
Endosulfan sulfate			9.92E-11	2	50	5	25	1,825	25,550
Endrin			1.20E-10	2	50	5	25	1,825	25,550
Endrin ketone			1.31E-10	2	50	5	25	1,825	25,550
Heptachlor epoxide		0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
alpha-Chlordane			4.03E-11	2	50	5	25	1,825	25,550
beta-BHC		4.50E-14	5.74E-11	2	50	5	25	1,825	25,550
delta-BHC			5.21E-11	2	50	5	25	1,825	25,550

TABLE 7-14

CALCULATION OF INTAKE (ONSITE)
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
METALS									
Arsenic		1.65E-10	2.11E-07	2	50	5	25	1,825	25,550
Barium	5.22E-08		4.76E-06	2	50	5	25	1,825	25,550
Cadmium		6.13E-11	7.83E-08	2	50	5	25	1,825	25,550
Copper			2.37E-06	2	50	5	25	1,825	25,550
Lead			2.35E-05	2	50	5	25	1,825	25,550
Mercury	4.62E-11		4.22E-09	2	50	5	25	1,825	25,550
Selenium			4.40E-08	2	50	5	25	1,825	25,550
Silver			2.85E-08	2	50	5	25	1,825	25,550
Thallium			2.32E-08	2	50	5	25	1,825	25,550
Zinc			5.85E-06	2	50	5	25	1,825	25,550
HERBICIDES									
MCPA			2.14E-07	2	50	5	25	1,825	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:

CA = Chemical Concentration in Air (mg/m³)
IR = Inhalation Rate (m³/day)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

Calculated EPC Air Data - RME
2 (RME Child)
50
5
25 (Child)
5 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-61

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			NA	NA		
Benzene		5.95E-14	NA	2.91E-02		1.73E-15
Methylene Chloride	0.00E+00	0.00E+00	8.57E-01	1.65E-03	0.00E+00	0.00E+00
Toluene	2.74E-12		1.14E-01	NA	2.40E-11	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Butylbenzylphthalate			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Chloroisopropyl) ether	9.22E-11		1.00E-03	NA	9.22E-08	
bis(2-Ethylhexyl)phthalate			NA	NA		
PESTICIDES/PCB						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		1.04E-13	NA	3.40E-01		3.53E-14
Aldrin	5.66E-13	4.04E-14	1.70E+01	1.72E+01	3.33E-14	6.93E-13
Aroclor-1260			NA	NA		
Dieldrin		1.27E-13	NA	1.61E+01		2.05E-12
Endosulfan I			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide		0.00E+00	NA	9.10E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		4.50E-14	NA	1.86E+00		8.36E-14
delta-BHC			NA	NA		

TABLE 7-61

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic		1.65E-10	NA	1.51E+01		2.48E-09
Barium	5.22E-08		1.43E-04	NA	3.65E-04	
Cadmium		6.13E-11	NA	6.30E+00		3.86E-10
Copper			NA	NA		
Lead			NA	NA		
Mercury	4.62E-11		8.57E-05	NA	5.39E-07	
Selenium			NA	NA		
Silver			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
HERBICIDES						
MCPA			NA	NA		
Total HQ & CR					**3.66E-04**	**2.87E-09**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-7A

AMBIENT AIR EXPOSURE POINT CONCENTRATIONS
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

COMPOUND	SURFACE SOIL EPC Data mg/kg	AVERAGE TSP (ug/m³)	CONVERSION FACTOR (kg/ug)	AIR CALCULATED EPC (mg/m³)
VOLATILE ORGANICS				
Acetone	6.98E-03	3.80E+01	1.00E-09	2.65E-10
Benzene	2.00E-03	3.80E+01	1.00E-09	7.60E-11
Methylene Chloride	0.00E+00	3.80E+01	1.00E-09	0.00E+00
Toluene	6.59E-03	3.80E+01	1.00E-09	2.50E-10
SEMIVOLATILE ORGANICS				
2,4-Dinitrotoluene	2.79E-01	3.80E+01	1.00E-09	1.06E-08
2,6-Dinitrotoluene	0.00E+00	3.80E+01	1.00E-09	0.00E+00
2-Methylnaphthalene	1.30E-01	3.80E+01	1.00E-09	4.94E-09
2-Methylphenol	0.00E+00	3.80E+01	1.00E-09	0.00E+00
3,3'-Dichlorobenzidine	2.47E-01	3.80E+01	1.00E-09	9.39E-09
3-Nitroaniline	5.98E-01	3.80E+01	1.00E-09	2.27E-08
4-Nitroaniline	5.98E-01	3.80E+01	1.00E-09	2.27E-08
Acenaphthene	3.30E-02	3.80E+01	1.00E-09	1.25E-09
Acenaphthylene	9.60E-02	3.80E+01	1.00E-09	3.65E-09
Anthracene	1.30E-01	3.80E+01	1.00E-09	4.94E-09
Benzo(a)anthracene	3.44E-01	3.80E+01	1.00E-09	1.31E-08
Benzo(a)pyrene	3.80E-01	3.80E+01	1.00E-09	1.44E-08
Benzo(b)fluoranthene	3.72E-01	3.80E+01	1.00E-09	1.41E-08
Benzo(g,h,i)perylene	3.06E-01	3.80E+01	1.00E-09	1.16E-08
Benzo(k)fluoranthene	2.95E-01	3.80E+01	1.00E-09	1.12E-08
Butylbenzylphthalate	4.60E-02	3.80E+01	1.00E-09	1.75E-09
Carbazole	2.56E-01	3.80E+01	1.00E-09	9.72E-09
Chrysene	3.25E-01	3.80E+01	1.00E-09	1.23E-08
Di-n-butylphthalate	2.94E-01	3.80E+01	1.00E-09	1.12E-08
Dibenz(a,h)anthracene	2.84E-01	3.80E+01	1.00E-09	1.08E-08
Dibenzofuran	3.60E-02	3.80E+01	1.00E-09	1.37E-09
Fluoranthene	3.25E-01	3.80E+01	1.00E-09	1.24E-08
Fluorene	3.80E-02	3.80E+01	1.00E-09	1.44E-09
Indeno(1,2,3-cd)pyrene	3.29E-01	3.80E+01	1.00E-09	1.25E-08
N-Nitrosodiphenylamine (1)	9.50E-02	3.80E+01	1.00E-09	3.61E-09
Naphthalene	3.70E-02	3.80E+01	1.00E-09	1.41E-09
Pentachlorophenol	6.60E-01	3.80E+01	1.00E-09	2.51E-08
Phenanthrene	3.19E-01	3.80E+01	1.00E-09	1.21E-08
Pyrene	3.01E-01	3.80E+01	1.00E-09	1.14E-08
bis(2-Chloroisopropyl) ether	2.21E-01	3.80E+01	1.00E-09	8.41E-09
bis(2-Ethylhexyl)phthalate	3.28E-01	3.80E+01	1.00E-09	1.25E-08
PESTICIDES/PCB				
4,4'-DDD	3.00E-03	3.80E+01	1.00E-09	1.14E-10
4,4'-DDE	5.78E-03	3.80E+01	1.00E-09	2.20E-10
4,4'-DDT	3.49E-03	3.80E+01	1.00E-09	1.33E-10
Aldrin	1.36E-03	3.80E+01	1.00E-09	5.17E-11
Aroclor-1260	2.58E-02	3.80E+01	1.00E-09	9.82E-10
Dieldrin	4.28E-03	3.80E+01	1.00E-09	1.63E-10
Endosulfan I	4.02E-03	3.80E+01	1.00E-09	1.53E-10
Endosulfan sulfate	2.61E-03	3.80E+01	1.00E-09	9.92E-11
Endrin	3.16E-03	3.80E+01	1.00E-09	1.20E-10
Endrin ketone	3.45E-03	3.80E+01	1.00E-09	1.31E-10
Heptachlor epoxide	0.00E+00	3.80E+01	1.00E-09	0.00E+00
alpha-Chlordane	1.06E-03	3.80E+01	1.00E-09	4.03E-11
beta-BHC	1.51E-03	3.80E+01	1.00E-09	5.74E-11
delta-BHC	1.37E-03	3.80E+01	1.00E-09	5.21E-11

TABLE 7-7A

AMBIENT AIR EXPOSURE POINT CONCENTRATIONS
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

COMPOUND	SURFACE SOIL EPC Data mg/kg	AVERAGE TSP (ug/m^3)	CONVERSION FACTOR (kg/ug)	AIR CALCULATED EPC (mg/m^3)
METALS				
Arsenic	5.54E+00	3.80E+01	1.00E-09	2.11E-07
Barium	1.25E+02	3.80E+01	1.00E-09	4.76E-06
Cadmium	2.06E+00	3.80E+01	1.00E-09	7.83E-08
Copper	6.24E+01	3.80E+01	1.00E-09	2.37E-06
Lead	6.19E+02	3.80E+01	1.00E-09	2.35E-05
Mercury	1.11E-01	3.80E+01	1.00E-09	4.22E-09
Selenium	1.16E+00	3.80E+01	1.00E-09	4.40E-08
Silver	7.50E-01	3.80E+01	1.00E-09	2.85E-08
Thallium	6.10E-01	3.80E+01	1.00E-09	2.32E-08
Zinc	1.54E+02	3.80E+01	1.00E-09	5.85E-06
HERBICIDES				
MCPA	5.63E+00	3.80E+01	1.00E-09	2.14E-07

EQUATION: **Calculated Air EPC (mg/m3) = Soil EPC x TSP x CF**

Variables:	**Assumptions:**
TSP = Total Suspended Particulates	**Average value - 38 ug/m3**
CF = Conversion Factor	**10-9 kg/ug**

TABLE 7-8

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
VOLATILE ORGANICS									
Acetone			2.65E-10	20	20	25	70	9,125	25,550
Benzene		4.25E-13	7.60E-11	20	20	25	70	9,125	25,550
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
Toluene	3.92E-12		2.50E-10	20	20	25	70	9,125	25,550
SEMIVOLATILE ORGANICS									
2,4-Dinitrotoluene			1.06E-08	20	20	25	70	9,125	25,550
2,6-Dinitrotoluene			0.00E+00	20	20	25	70	9,125	25,550
2-Methylnaphthalene			4.94E-09	20	20	25	70	9,125	25,550
2-Methylphenol			0.00E+00	20	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine			9.39E-09	20	20	25	70	9,125	25,550
3-Nitroaniline			2.27E-08	20	20	25	70	9,125	25,550
4-Nitroaniline			2.27E-08	20	20	25	70	9,125	25,550
Acenaphthene			1.25E-09	20	20	25	70	9,125	25,550
Acenaphthylene			3.65E-09	20	20	25	70	9,125	25,550
Anthracene			4.94E-09	20	20	25	70	9,125	25,550
Benzo(a)anthracene			1.31E-08	20	20	25	70	9,125	25,550
Benzo(a)pyrene			1.44E-08	20	20	25	70	9,125	25,550
Benzo(b)fluoranthene			1.41E-08	20	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			1.16E-08	20	20	25	70	9,125	25,550
Benzo(k)fluoranthene			1.12E-08	20	20	25	70	9,125	25,550
Butylbenzylphthalate			1.75E-09	20	20	25	70	9,125	25,550
Carbazole			9.72E-09	20	20	25	70	9,125	25,550
Chrysene			1.23E-08	20	20	25	70	9,125	25,550
Di-n-butylphthalate			1.12E-08	20	20	25	70	9,125	25,550
Dibenz(a,h)anthracene			1.08E-08	20	20	25	70	9,125	25,550
Dibenzofuran			1.37E-09	20	20	25	70	9,125	25,550
Fluoranthene			1.24E-08	20	20	25	70	9,125	25,550
Fluorene			1.44E-09	20	20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			1.25E-08	20	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			3.61E-09	20	20	25	70	9,125	25,550
Naphthalene			1.41E-09	20	20	25	70	9,125	25,550
Pentachlorophenol			2.51E-08	20	20	25	70	9,125	25,550
Phenanthrene			1.21E-08	20	20	25	70	9,125	25,550
Pyrene			1.14E-08	20	20	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether	1.32E-10		8.41E-09	20	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			1.25E-08	20	20	25	70	9,125	25,550
PESTICIDES/PCB									
4,4'-DDD			1.14E-10	20	20	25	70	9,125	25,550
4,4'-DDE			2.20E-10	20	20	25	70	9,125	25,550
4,4'-DDT		7.42E-13	1.33E-10	20	20	25	70	9,125	25,550
Aldrin	8.09E-13	2.89E-13	5.17E-11	20	20	25	70	9,125	25,550
Aroclor-1260			9.82E-10	20	20	25	70	9,125	25,550
Dieldrin		9.10E-13	1.63E-10	20	20	25	70	9,125	25,550
Endosulfan I			1.53E-10	20	20	25	70	9,125	25,550
Endosulfan sulfate			9.92E-11	20	20	25	70	9,125	25,550
Endrin			1.20E-10	20	20	25	70	9,125	25,550
Endrin ketone			1.31E-10	20	20	25	70	9,125	25,550
Heptachlor epoxide		0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
alpha-Chlordane			4.03E-11	20	20	25	70	9,125	25,550
beta-BHC		3.21E-13	5.74E-11	20	20	25	70	9,125	25,550
delta-BHC			5.21E-11	20	20	25	70	9,125	25,550

TABLE 7-8

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m^3)	Inhalation Rate (m^3/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
METALS									
Arsenic		1.18E-09	2.11E-07	20	20	25	70	9,125	25,550
Barium	7.45E-08		4.76E-06	20	20	25	70	9,125	25,550
Cadmium		4.38E-10	7.83E-08	20	20	25	70	9,125	25,550
Copper			2.37E-06	20	20	25	70	9,125	25,550
Lead			2.35E-05	20	20	25	70	9,125	25,550
Mercury	6.60E-11		4.22E-09	20	20	25	70	9,125	25,550
Selenium			4.40E-08	20	20	25	70	9,125	25,550
Silver			2.85E-08	20	20	25	70	9,125	25,550
Thallium			2.32E-08	20	20	25	70	9,125	25,550
Zinc			5.85E-06	20	20	25	70	9,125	25,550
HERBICIDES									
MCPA			2.14E-07	20	20	25	70	9,125	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:

CA = Chemical Concentration in Air (mg/m^3)
IR = Inhalation Rate (m^3/day)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

Calculated EPC Air Data - RME
20 (RME All Receptors)
20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult Male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-43

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			NA	NA		
Benzene		4.25E-13	NA	2.91E-02		1.24E-14
Methylene Chloride	0.00E+00	0.00E+00	8.57E-01	1.65E-03	0.00E+00	0.00E+00
Toluene	3.92E-12		1.14E-01	NA	3.43E-11	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Butylbenzylphthalate			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Chloroisopropyl) ether	1.32E-10		1.00E-03	NA	1.32E-07	
bis(2-Ethylhexyl)phthalate			NA	NA		
PESTICIDES/PCB						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		7.42E-13	NA	3.40E-01		2.52E-13
Aldrin	8.09E-13	2.89E-13	1.70E+01	1.72E+01	4.76E-14	4.95E-12
Aroclor-1260			NA	NA		
Dieldrin		9.10E-13	NA	1.61E+01		1.47E-11
Endosulfan I			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide		0.00E+00	NA	9.10E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		3.21E-13	NA	1.86E+00		5.97E-13
delta-BHC			NA	NA		

TABLE 7-43

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic		1.18E-09	NA	1.51E+01		1.77E-08
Barium	7.45E-08		1.43E-04	NA	5.22E-04	
Cadmium		4.38E-10	NA	6.30E+00		2.76E-09
Copper			NA	NA		
Lead			NA	NA		
Mercury	6.60E-11		8.57E-05	NA	7.70E-07	
Selenium			NA	NA		
Silver			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
HERBICIDES						
MCPA			NA	NA		
Total HQ & CR					**5.22E-04**	**2.05E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-12

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
VOLATILE ORGANICS									
Acetone			2.65E-10	20	250	1	70	365	25,550
Benzene		2.12E-13	7.60E-11	20	250	1	70	365	25,550
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	20	250	1	70	365	25,550
Toluene	4.90E-11		2.50E-10	20	250	1	70	365	25,550
SEMIVOLATILE ORGANICS									
2,4-Dinitrotoluene			1.06E-08	20	250	1	70	365	25,550
2,6-Dinitrotoluene			0.00E+00	20	250	1	70	365	25,550
2-Methylnaphthalene			4.94E-09	20	250	1	70	365	25,550
2-Methylphenol			0.00E+00	20	250	1	70	365	25,550
3,3'-Dichlorobenzidine			9.39E-09	20	250	1	70	365	25,550
3-Nitroaniline			2.27E-08	20	250	1	70	365	25,550
4-Nitroaniline			2.27E-08	20	250	1	70	365	25,550
Acenaphthene			1.25E-09	20	250	1	70	365	25,550
Acenaphthylene			3.65E-09	20	250	1	70	365	25,550
Anthracene			4.94E-09	20	250	1	70	365	25,550
Benzo(a)anthracene			1.31E-08	20	250	1	70	365	25,550
Benzo(a)pyrene			1.44E-08	20	250	1	70	365	25,550
Benzo(b)fluoranthene			1.41E-08	20	250	1	70	365	25,550
Benzo(g,h,i)perylene			1.16E-08	20	250	1	70	365	25,550
Benzo(k)fluoranthene			1.12E-08	20	250	1	70	365	25,550
Butylbenzylphthalate			1.75E-09	20	250	1	70	365	25,550
Carbazole			9.72E-09	20	250	1	70	365	25,550
Chrysene			1.23E-08	20	250	1	70	365	25,550
Di-n-butylphthalate			1.12E-08	20	250	1	70	365	25,550
Dibenz(a,h)anthracene			1.08E-08	20	250	1	70	365	25,550
Dibenzofuran			1.37E-09	20	250	1	70	365	25,550
Fluoranthene			1.24E-08	20	250	1	70	365	25,550
Fluorene			1.44E-09	20	250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene			1.25E-08	20	250	1	70	365	25,550
N-Nitrosodiphenylamine (1)			3.61E-09	20	250	1	70	365	25,550
Naphthalene			1.41E-09	20	250	1	70	365	25,550
Pentachlorophenol			2.51E-08	20	250	1	70	365	25,550
Phenanthrene			1.21E-08	20	250	1	70	365	25,550
Pyrene			1.14E-08	20	250	1	70	365	25,550
bis(2-Chloroisopropyl) ether	1.65E-09		8.41E-09	20	250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate			1.25E-08	20	250	1	70	365	25,550
PESTICIDES/PCB									
4,4'-DDD			1.14E-10	20	250	1	70	365	25,550
4,4'-DDE			2.20E-10	20	250	1	70	365	25,550
4,4'-DDT		3.71E-13	1.33E-10	20	250	1	70	365	25,550
Aldrin	1.01E-11	1.44E-13	5.17E-11	20	250	1	70	365	25,550
Aroclor-1260			9.82E-10	20	250	1	70	365	25,550
Dieldrin		4.55E-13	1.63E-10	20	250	1	70	365	25,550
Endosulfan I			1.53E-10	20	250	1	70	365	25,550
Endosulfan sulfate			9.92E-11	20	250	1	70	365	25,550
Endrin			1.20E-10	20	250	1	70	365	25,550
Endrin ketone			1.31E-10	20	250	1	70	365	25,550
Heptachlor epoxide		0.00E+00	0.00E+00	20	250	1	70	365	25,550
alpha-Chlordane			4.03E-11	20	250	1	70	365	25,550
beta-BHC		1.61E-13	5.74E-11	20	250	1	70	365	25,550
delta-BHC			5.21E-11	20	250	1	70	365	25,550

TABLE 7-12

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
METALS									
Arsenic		5.89E-10	2.11E-07	20	250	1	70	365	25,550
Barium	9.31E-07		4.76E-06	20	250	1	70	365	25,550
Cadmium		2.19E-10	7.83E-08	20	250	1	70	365	25,550
Copper			2.37E-06	20	250	1	70	365	25,550
Lead			2.35E-05	20	250	1	70	365	25,550
Mercury	8.25E-10		4.22E-09	20	250	1	70	365	25,550
Selenium			4.40E-08	20	250	1	70	365	25,550
Silver			2.85E-08	20	250	1	70	365	25,550
Thallium			2.32E-08	20	250	1	70	365	25,550
Zinc			5.85E-06	20	250	1	70	365	25,550
HERBICIDES									
MCPA			2.14E-07	20	250	1	70	365	25,550

EQUATION: **Intake (mg/kg-day) =** $$\frac{CA \times IR \times EF \times ED}{BW \times AT}$$

Variables:

CA = Chemical Concentration in Air (mg/m³)
IR = Inhalation Rate (m³/day)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

Calculated EPC Air Data - RME
20 (all receptors)
250 (RME Construction Workers)
1 (Upper bound period of Construction Worker)
70 (Adult Male)
1 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-55

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			NA	NA		
Benzene		2.12E-13	NA	2.91E-02		6.18E-15
Methylene Chloride	0.00E+00	0.00E+00	8.57E-01	1.65E-03	0.00E+00	0.00E+00
Toluene	4.90E-11		1.14E-01	NA	4.29E-10	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Butylbenzylphthalate			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Chloroisopropyl) ether	1.65E-09		1.00E-03	NA	1.65E-06	
bis(2-Ethylhexyl)phthalate			NA	NA		
PESTICIDES/PCB						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		3.71E-13	NA	3.40E-01		1.26E-13
Aldrin	1.01E-11	1.44E-13	1.70E+01	1.72E+01	5.95E-13	2.48E-12
Aroclor-1260			NA	NA		
Dieldrin		4.55E-13	NA	1.61E+01		7.33E-12
Endosulfan I			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide		0.00E+00	NA	9.10E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		1.61E-13	NA	1.86E+00		2.99E-13
delta-BHC			NA	NA		

TABLE 7-55

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic		5.89E-10	NA	1.51E+01		8.86E-09
Barium	9.31E-07		1.43E-04	NA	6.52E-03	
Cadmium		2.19E-10	NA	6.30E+00		1.38E-09
Copper			NA	NA		
Lead			NA	NA		
Mercury	8.25E-10		8.57E-05	NA	9.63E-06	
Selenium			NA	NA		
Silver			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
HERBICIDES						
MCPA			NA	NA		
Total HQ & CR					**6.53E-03**	**1.02E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-10

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m^3)	Inhalation Rate (m^3/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
VOLATILE ORGANICS									
Acetone			2.65E-10	20	250	25	70	9,125	25,550
Benzene		5.31E-12	7.60E-11	20	250	25	70	9,125	25,550
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	20	250	25	70	9,125	25,550
Toluene	4.90E-11		2.50E-10	20	250	25	70	9,125	25,550
SEMIVOLATILE ORGANICS									
2,4-Dinitrotoluene			1.06E-08	20	250	25	70	9,125	25,550
2,6-Dinitrotoluene			0.00E+00	20	250	25	70	9,125	25,550
2-Methylnaphthalene			4.94E-09	20	250	25	70	9,125	25,550
2-Methylphenol			0.00E+00	20	250	25	70	9,125	25,550
3,3'-Dichlorobenzidine			9.39E-09	20	250	25	70	9,125	25,550
3-Nitroaniline			2.27E-08	20	250	25	70	9,125	25,550
4-Nitroaniline			2.27E-08	20	250	25	70	9,125	25,550
Acenaphthene			1.25E-09	20	250	25	70	9,125	25,550
Acenaphthylene			3.65E-09	20	250	25	70	9,125	25,550
Anthracene			4.94E-09	20	250	25	70	9,125	25,550
Benzo(a)anthracene			1.31E-08	20	250	25	70	9,125	25,550
Benzo(a)pyrene			1.44E-08	20	250	25	70	9,125	25,550
Benzo(b)fluoranthene			1.41E-08	20	250	25	70	9,125	25,550
Benzo(g,h,i)perylene			1.16E-08	20	250	25	70	9,125	25,550
Benzo(k)fluoranthene			1.12E-08	20	250	25	70	9,125	25,550
Butylbenzylphthalate			1.75E-09	20	250	25	70	9,125	25,550
Carbazole			9.72E-09	20	250	25	70	9,125	25,550
Chrysene			1.23E-08	20	250	25	70	9,125	25,550
Di-n-butylphthalate			1.12E-08	20	250	25	70	9,125	25,550
Dibenz(a,h)anthracene			1.08E-08	20	250	25	70	9,125	25,550
Dibenzofuran			1.37E-09	20	250	25	70	9,125	25,550
Fluoranthene			1.24E-08	20	250	25	70	9,125	25,550
Fluorene			1.44E-09	20	250	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			1.25E-08	20	250	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			3.61E-09	20	250	25	70	9,125	25,550
Naphthalene			1.41E-09	20	250	25	70	9,125	25,550
Pentachlorophenol			2.51E-08	20	250	25	70	9,125	25,550
Phenanthrene			1.21E-08	20	250	25	70	9,125	25,550
Pyrene			1.14E-08	20	250	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether	1.65E-09		8.41E-09	20	250	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			1.25E-08	20	250	25	70	9,125	25,550
PESTICIDES/PCB									
4,4'-DDD			1.14E-10	20	250	25	70	9,125	25,550
4,4'-DDE			2.20E-10	20	250	25	70	9,125	25,550
4,4'-DDT		9.28E-12	1.33E-10	20	250	25	70	9,125	25,550
Aldrin	1.01E-11	3.61E-12	5.17E-11	20	250	25	70	9,125	25,550
Aroclor-1260			9.82E-10	20	250	25	70	9,125	25,550
Dieldrin		1.14E-11	1.63E-10	20	250	25	70	9,125	25,550
Endosulfan I			1.53E-10	20	250	25	70	9,125	25,550
Endosulfan sulfate			9.92E-11	20	250	25	70	9,125	25,550
Endrin			1.20E-10	20	250	25	70	9,125	25,550
Endrin ketone			1.31E-10	20	250	25	70	9,125	25,550
Heptachlor epoxide		0.00E+00	0.00E+00	20	250	25	70	9,125	25,550
alpha-Chlordane			4.03E-11	20	250	25	70	9,125	25,550
beta-BHC		4.01E-12	5.74E-11	20	250	25	70	9,125	25,550
delta-BHC			5.21E-11	20	250	25	70	9,125	25,550

TABLE 7-10

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
METALS									
Arsenic		1.47E-08	2.11E-07	20	250	25	70	9,125	25,550
Barium	9.31E-07		4.76E-06	20	250	25	70	9,125	25,550
Cadmium		5.47E-09	7.83E-08	20	250	25	70	9,125	25,550
Copper			2.37E-06	20	250	25	70	9,125	25,550
Lead			2.35E-05	20	250	25	70	9,125	25,550
Mercury	8.25E-10		4.22E-09	20	250	25	70	9,125	25,550
Selenium			4.40E-08	20	250	25	70	9,125	25,550
Silver			2.85E-08	20	250	25	70	9,125	25,550
Thallium			2.32E-08	20	250	25	70	9,125	25,550
Zinc			5.85E-06	20	250	25	70	9,125	25,550
HERBICIDES									
MCPA			2.14E-07	20	250	25	70	9,125	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CA \times IR \times EF \times ED}{BW \times AT}$$

Variables:	**Assumptions:**
CA = Chemical Concentration in Air (mg/m³)	Calculated EPC Air Data - RME
IR = Inhalation Rate (m³/day)	20 (all receptors)
EF = Exposure Frequency (days/yr)	250 (RME Industrial Workers)
ED = Exposure Duration (years)	5
BW = Bodyweight (kg)	70 (Adult Male)
AT = Averaging Time (days)	5 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-49

**CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)**

**SEAD-17 Remedial Investigation
Seneca Army Depot Activity**

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			NA	NA		
Benzene		5.31E-12	NA	2.91E-02		1.55E-13
Methylene Chloride	0.00E+00	0.00E+00	8.57E-01	1.65E-03	0.00E+00	0.00E+00
Toluene	4.90E-11		1.14E-01	NA	4.29E-10	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Butylbenzylphthalate			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Chloroisopropyl) ether	1.65E-09		1.00E-03	NA	1.65E-06	
bis(2-Ethylhexyl)phthalate			NA	NA		
PESTICIDES/PCB						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		9.28E-12	NA	3.40E-01		3.15E-12
Aldrin	1.01E-11	3.61E-12	1.70E+01	1.72E+01	5.95E-13	6.19E-11
Aroclor-1260			NA	NA		
Dieldrin		1.14E-11	NA	1.61E+01		1.83E-10
Endosulfan I			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide		0.00E+00	NA	9.10E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		4.01E-12	NA	1.86E+00		7.47E-12
delta-BHC			NA	NA		

TABLE 7-49

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic		1.47E-08	NA	1.51E+01		2.21E-07
Barium	9.31E-07		1.43E-04	NA	6.52E-03	
Cadmium		5.47E-09	NA	6.30E+00		3.45E-08
Copper			NA	NA		
Lead			NA	NA		
Mercury	8.25E-10		8.57E-05	NA	9.63E-06	
Selenium			NA	NA		
Silver			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
HERBICIDES						
MCPA			NA	NA		
Total HQ & CR					**6.53E-03**	**2.56E-07**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-38

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg sed/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
											Child(Nc)	Car
Volatile Organics												
Acetone			1.44E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Toluene			8.00E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Semivolatile Organics												
2,4-Dimethylphenol			3.20E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
2,4-Dinitrotoluene			3.14E-01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(a)anthracene			2.50E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(a)pyrene			3.00E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(b)fluoranthene			4.30E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(g,h,i)perylene			3.10E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(k)fluoranthene			3.30E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Chrysene			4.80E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Fluoranthene			7.00E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene			2.40E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Phenanthrene			3.50E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Pyrene			4.70E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			7.70E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Pesticides												
4,4'-DDD			6.46E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
4,4'-DDE			4.82E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
4,4'-DDT			4.90E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Dieldrin			3.26E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Endosulfan I			1.43E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Endosulfan II			3.05E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550

TABLE 7-38

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg sed/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Child(Nc)	Averaging Time (days) Car
Metals												
Aluminum			1.83E+04	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Antimony			5.50E+00	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Arsenic			6.10E+00	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Barium			1.32E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Beryllium			7.64E-01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Cadmium	1.43E-07		2.40E+00	1.0E-06	2,170	1.0	0.01	25	5	25	1,825	25,550
Calcium			1.08E+04	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Chromium			2.47E+01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Cobalt			1.26E+01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Copper			1.33E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Iron			2.94E+04	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Lead			6.83E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Magnesium			5.54E+03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Manganese			5.32E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Mercury			8.11E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Nickel			3.16E+01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Potassium			2.18E+03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Selenium			1.27E+00	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Sodium			4.27E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Thallium			8.24E-01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Vanadium			2.97E+01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Zinc			1.88E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550

EQUATION:

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

Variables:

CS = Chemical Concentration in Sediment (mg sediment/kg)
CF = Conversion Factor (10-6 kg/mg)
SA = Surface Area Contact (cm²)
AF =Sediment to Skin Adherence Factor (mg/cm²)
ABS = Absorption Factor (unitless)

Assumptions:

EPC - Sediment Data - RME
10-6
2,170 (RME Child)
1.0 (RME all receptors)
Compound Specific PCBs and Cd, (EPA, 1992b)
(Default Assumption 0% = 0.0)

Variables:

EF = Exposure Frequency (events/year)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

25 (RME)
5 (RME)
25 kg (child)
5 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-73

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Volatile Organics						
Acetone			1.00E-01	NA		
Toluene			1.20E-01	NA		
Semivolatile Organics						
2,4-Dimethylphenol			2.00E-02	NA		
2,4-Dinitrotoluene			2.00E-03	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Chrysene			NA	1.46E-01		
Fluoranthene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Metals						
Aluminum			NA	NA		
Antimony			4.00E-04	NA		
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Beryllium			5.00E-06	4.30E+03		
Cadmium	1.43E-07		3.00E-05	NA	4.76E-03	
Calcium			NA	NA		
Chromium			2.50E-04	NA		
Cobalt			NA	NA		
Copper			2.00E-02	NA		
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese			5.00E-03	NA		
Mercury			4.50E-05	NA		
Nickel			1.00E-03	NA		
Potassium			NA	NA		
Selenium			3.00E-03	NA		
Sodium			NA	NA		
Thallium			7.00E-05	NA		
Vanadium			7.00E-03	NA		
Zinc			1.50E-01	NA		
Totals - HQ & CR					**4.76E-03**	

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-36

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Child Ingestion Rate (mg sed/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Volatile Organics											
Acetone	7.88E-09		1.44E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Toluene	4.38E-09		8.00E-03	200	1.0E-06	1	25	5	25	1,825	25,550
Semivolatile Organics											
2,4-Dimethylphenol	1.75E-08		3.20E-02	200	1.0E-06	1	25	5	25	1,825	25,550
2,4-Dinitrotoluene	1.72E-07		3.14E-01	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(a)anthracene		9.78E-10	2.50E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(a)pyrene		1.17E-09	3.00E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(b)fluoranthene		1.68E-09	4.30E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(g,h,i)perylene			3.10E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(k)fluoranthene		1.29E-09	3.30E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Chrysene		1.88E-09	4.80E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Fluoranthene	3.84E-08		7.00E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene		9.39E-10	2.40E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Phenanthrene			3.50E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Pyrene	2.58E-08		4.70E-02	200	1.0E-06	1	25	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate	4.22E-08	3.01E-09	7.70E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Pesticides											
4,4'-DDD	3.54E-09	2.53E-10	6.46E-03	200	1.0E-06	1	25	5	25	1,825	25,550
4,4'-DDE			4.82E-02	200	1.0E-06	1	25	5	25	1,825	25,550
4,4'-DDT	2.68E-09	1.92E-10	4.90E-03	200	1.0E-06	1	25	5	25	1,825	25,550
Dieldrin	1.78E-09	1.27E-10	3.26E-03	200	1.0E-06	1	25	5	25	1,825	25,550
Endosulfan I	7.82E-10		1.43E-03	200	1.0E-06	1	25	5	25	1,825	25,550
Endosulfan II			3.05E-03	200	1.0E-06	1	25	5	25	1,825	25,550

TABLE 7-36

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Child Ingestion Rate (mg sed/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Metals											
Aluminum			1.83E+04	200	1.0E-06	1	25	5	25	1,825	25,550
Antimony	3.01E-06		5.50E+00	200	1.0E-06	1	25	5	25	1,825	25,550
Arsenic	3.34E-06	2.39E-07	6.10E+00	200	1.0E-06	1	25	5	25	1,825	25,550
Barium	7.21E-05		1.32E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Beryllium	4.19E-07	2.99E-08	7.64E-01	200	1.0E-06	1	25	5	25	1,825	25,550
Cadmium	1.32E-06		2.40E+00	200	1.0E-06	1	25	5	25	1,825	25,550
Calcium			1.08E+04	200	1.0E-06	1	25	5	25	1,825	25,550
Chromium	1.35E-05		2.47E+01	200	1.0E-06	1	25	5	25	1,825	25,550
Cobalt			1.26E+01	200	1.0E-06	1	25	5	25	1,825	25,550
Copper	7.31E-05		1.33E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Iron			2.94E+04	200	1.0E-06	1	25	5	25	1,825	25,550
Lead			6.83E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Magnesium			5.54E+03	200	1.0E-06	1	25	5	25	1,825	25,550
Manganese	2.92E-04		5.32E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Mercury	4.44E-08		8.11E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Nickel	1.73E-05		3.16E+01	200	1.0E-06	1	25	5	25	1,825	25,550
Potassium			2.18E+03	200	1.0E-06	1	25	5	25	1,825	25,550
Selenium	6.94E-07		1.27E+00	200	1.0E-06	1	25	5	25	1,825	25,550
Sodium			4.27E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Thallium	4.51E-07		8.24E-01	200	1.0E-06	1	25	5	25	1,825	25,550
Vanadium	1.63E-05		2.97E+01	200	1.0E-06	1	25	5	25	1,825	25,550
Zinc	1.03E-04		1.88E+02	200	1.0E-06	1	25	5	25	1,825	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:	Assumptions:
CS = Chemical Concentration in Sediment (mg sediment/kg)	EPC - Sediment Data - RME
IR = Ingestion Rate (mg sediment/day)	200 (RME Child)
CF = Conversion Factor (10-6 kg/mg)	10-6
FI = Fraction Ingested (unitless)	1
EF = Exposure Frequency (days/years)	25 (RME)
ED = Exposure Duration (years)	5 (RME)
BW = Bodyweight (kg)	25 (Child)
AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (C)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-71

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Volatile Organics						
Acetone	7.88E-09		1.00E-01	NA	7.88E-08	
Toluene	4.38E-09		2.00E-01	NA	2.19E-08	
Semivolatile Organics						
2,4-Dimethylphenol	1.75E-08		2.00E-02	NA	8.77E-07	
2,4-Dinitrotoluene	1.72E-07		2.00E-03	NA	8.61E-05	
Benzo(a)anthracene		9.78E-10	NA	7.30E-01		7.14E-10
Benzo(a)pyrene		1.17E-09	NA	7.30E+00		8.57E-09
Benzo(b)fluoranthene		1.68E-09	NA	7.30E-01		1.23E-09
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		1.29E-09	NA	7.30E-01		9.43E-10
Chrysene		1.88E-09	NA	7.30E-02		1.37E-10
Fluoranthene	3.84E-08		4.00E-02	NA	9.59E-07	
Indeno(1,2,3-cd)pyrene		9.39E-10	NA	7.30E-01		6.86E-10
Phenanthrene			NA	NA		
Pyrene	2.58E-08		3.00E-02	NA	8.58E-07	
bis(2-Ethylhexyl)phthalate	4.22E-08	3.01E-09	2.00E-02	1.40E-02	2.11E-06	4.22E-11
Pesticides						
4,4'-DDD	3.54E-09	2.53E-10	5.00E-04	2.40E-01	7.08E-06	6.07E-11
4,4'-DDE			NA	NA		
4,4'-DDT	2.68E-09	1.92E-10	5.00E-04	3.40E-01	5.37E-06	6.52E-11
Dieldrin	1.78E-09	1.27E-10	5.00E-05	1.60E+01	3.57E-05	2.04E-09
Endosulfan I	7.82E-10		6.00E-03	NA	1.30E-07	
Endosulfan II			NA	NA		
Metals						
Aluminum			NA	NA		
Antimony	3.01E-06		4.00E-04	NA	7.53E-03	
Arsenic	3.34E-06	2.39E-07	3.00E-04	1.75E+00	1.11E-02	4.17E-07
Barium	7.21E-05		7.00E-02	NA	1.03E-03	
Beryllium	4.19E-07	2.99E-08	5.00E-03	4.30E+00	8.37E-05	1.29E-07
Cadmium	1.32E-06		5.00E-04	NA	2.63E-03	
Calcium			NA	NA		
Chromium	1.35E-05		5.00E-03	NA	2.70E-03	
Cobalt			NA	NA		
Copper	7.31E-05		4.00E-02	NA	1.83E-03	
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese	2.92E-04		5.00E-03	NA	5.83E-02	
Mercury	4.44E-08		3.00E-04	NA	1.48E-04	
Nickel	1.73E-05		2.00E-02	NA	8.66E-04	
Potassium			NA	NA		
Selenium	6.94E-07		5.00E-03	NA	1.39E-04	
Sodium			NA	NA		
Thallium	4.51E-07		7.00E-05	NA	6.45E-03	
Vanadium	1.63E-05		7.00E-03	NA	2.33E-03	
Zinc	1.03E-04		3.00E-01	NA	3.44E-04	
Totals - HQ & CR					**9.57E-02**	**5.61E-07**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-22

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
VOLATILE ORGANICS											
Acetone	7.64E-09		6.98E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Benzene		1.57E-10	2.00E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Methylene Chloride				200	1.0E-06	1	50	5	25	1,825	25,550
Toluene	7.22E-09		6.59E-03	200	1.0E-06	1	50	5	25	1,825	25,550
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene	3.06E-07		2.79E-01	200	1.0E-06	1	50	5	25	1,825	25,550
2,6-Dinitrotoluene				200	1.0E-06	1	50	5	25	1,825	25,550
2-Methylnaphthalene			1.30E-01	200	1.0E-06	1	50	5	25	1,825	25,550
2-Methylphenol				200	1.0E-06	1	50	5	25	1,825	25,550
3,3'-Dichlorobenzidine		1.93E-08	2.47E-01	200	1.0E-06	1	50	5	25	1,825	25,550
3-Nitroaniline			5.98E-01	200	1.0E-06	1	50	5	25	1,825	25,550
4-Nitroaniline			5.98E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Acenaphthene	3.62E-08		3.30E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Acenaphthylene			9.60E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Anthracene	1.42E-07		1.30E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(a)anthracene		2.69E-08	3.44E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(a)pyrene		2.98E-08	3.80E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(b)fluoranthene		2.91E-08	3.72E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(g,h,i)perylene			3.06E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(k)fluoranthene		2.31E-08	2.95E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Butylbenzylphthalate	5.04E-08		4.60E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Carbazole		2.00E-08	2.56E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Chrysene		2.54E-08	3.25E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Di-n-butylphthalate	3.23E-07		2.94E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Dibenz(a,h)anthracene		2.23E-08	2.84E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Dibenzofuran			3.60E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Fluoranthene	3.57E-07		3.25E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Fluorene	4.16E-08		3.80E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene		2.57E-08	3.29E-01	200	1.0E-06	1	50	5	25	1,825	25,550

TABLE 7-22

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
N-Nitrosodiphenylamine (1)		7.44E-09	9.50E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Naphthalene			3.70E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Pentachlorophenol	7.23E-07	5.17E-08	6.60E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Phenanthrene			3.19E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Pyrene	3.30E-07		3.01E-01	200	1.0E-06	1	50	5	25	1,825	25,550
bis(2-Chloroisopropyl) ether	2.43E-07		2.21E-01	200	1.0E-06	1	50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate	3.59E-07	2.57E-08	3.28E-01	200	1.0E-06	1	50	5	25	1,825	25,550
PESTICIDES/PCB											
4,4'-DDD	3.29E-09	2.35E-10	3.00E-03	200	1.0E-06	1	50	5	25	1,825	25,550
4,4'-DDE			5.78E-03	200	1.0E-06	1	50	5	25	1,825	25,550
4,4'-DDT	3.83E-09	2.74E-10	3.49E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Aldrin	1.49E-09	1.06E-10	1.36E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Aroclor-1260		2.02E-09	2.58E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Dieldrin	4.69E-09	3.35E-10	4.28E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Endosulfan I	4.41E-09		4.02E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Endosulfan sulfate	2.86E-09		2.61E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Endrin	3.46E-09		3.16E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Endrin ketone			3.45E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Heptachlor epoxide				200	1.0E-06	1	50	5	25	1,825	25,550
alpha-Chlordane	1.16E-09	8.30E-11	1.06E-03	200	1.0E-06	1	50	5	25	1,825	25,550
beta-BHC		1.18E-10	1.51E-03	200	1.0E-06	1	50	5	25	1,825	25,550
delta-BHC			1.37E-03	200	1.0E-06	1	50	5	25	1,825	25,550

TABLE 7-22

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
METALS											
Arsenic	6.07E-06	4.34E-07	5.54E+00	200	1.0E-06	1	50	5	25	1,825	25,550
Barium	1.37E-04		1.25E+02	200	1.0E-06	1	50	5	25	1,825	25,550
Cadmium	2.26E-06		2.06E+00	200	1.0E-06	1	50	5	25	1,825	25,550
Copper	6.84E-05		6.24E+01	200	1.0E-06	1	50	5	25	1,825	25,550
Lead			6.19E+02	200	1.0E-06	1	50	5	25	1,825	25,550
Mercury	1.22E-07		1.11E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Selenium	1.27E-06		1.16E+00	200	1.0E-06	1	50	5	25	1,825	25,550
Silver	8.22E-07		7.50E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Thallium	6.68E-07		6.10E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Zinc	1.69E-04		1.54E+02	200	1.0E-06	1	50	5	25	1,825	25,550
HERBICIDES											
MCPA	6.17E-06		5.63E+00	200	1.0E-06	1	50	5	25	1,825	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC Soil Data - RME
IR = Ingestion Rate (mg soil/day)	200 (RME Child)
CF = Conversion Factor (10-6 kg/mg)	10-6
FI = Fraction Ingested (unitless)	1
EF = Exposure Frequency (days/years)	50 (RME)
ED = Exposure Duration (years)	5 (RME)
BW = Bodyweight (kg)	25 (Child)
AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-63

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone	7.64E-09		1.00E-01	NA	7.64E-08	
Benzene		1.57E-10	NA	2.90E-02		4.54E-12
Methylene Chloride			6.00E-02	7.50E-03		
Toluene	7.22E-09		2.00E-01	NA	3.61E-08	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene	3.06E-07		2.00E-03	NA	1.53E-04	
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine		1.93E-08	NA	4.50E-01		8.71E-09
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene	3.62E-08		6.00E-02	NA	6.03E-07	
Acenaphthylene			NA	NA		
Anthracene	1.42E-07		3.00E-01	NA	4.75E-07	
Benzo(a)anthracene		2.69E-08	NA	7.30E-01		1.96E-08
Benzo(a)pyrene		2.98E-08	NA	7.30E+00		2.17E-07
Benzo(b)fluoranthene		2.91E-08	NA	7.30E-01		2.13E-08
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		2.31E-08	NA	7.30E-01		1.68E-08
Butylbenzylphthalate	5.04E-08		2.00E+00	NA	2.52E-08	
Carbazole		2.00E-08	NA	2.00E-02		4.00E-10
Chrysene		2.54E-08	NA	7.30E-02		1.85E-09
Di-n-butylphthalate	3.23E-07		1.00E-01	NA	3.23E-06	
Dibenz(a,h)anthracene		2.23E-08	NA	7.30E+00		1.62E-07
Dibenzofuran			NA	NA		
Fluoranthene	3.57E-07		4.00E-02	NA	8.92E-06	
Fluorene	4.16E-08		4.00E-02	NA	1.04E-06	
Indeno(1,2,3-cd)pyrene		2.57E-08	NA	7.30E-01		1.88E-08
N-Nitrosodiphenylamine (1)		7.44E-09	NA	4.90E-03		3.64E-11
Naphthalene			NA	NA		
Pentachlorophenol	7.23E-07	5.17E-08	3.00E-02	1.20E-01	2.41E-05	6.20E-09
Phenanthrene			NA	NA		
Pyrene	3.30E-07		3.00E-02	NA	1.10E-05	
bis(2-Chloroisopropyl) ether	2.43E-07		1.00E-03	NA	2.43E-04	
bis(2-Ethylhexyl)phthalate	3.59E-07	2.57E-08	2.00E-02	1.40E-02	1.80E-05	3.59E-10
PESTICIDES/PCB						
4,4'-DDD	3.29E-09	2.35E-10	5.00E-04	2.40E-01	6.59E-06	5.64E-11
4,4'-DDE			NA	NA		
4,4'-DDT	3.83E-09	2.74E-10	5.00E-04	3.40E-01	7.66E-06	9.30E-11
Aldrin	1.49E-09	1.06E-10	3.00E-05	1.70E+01	4.97E-05	1.81E-09
Aroclor-1260		2.02E-09	NA	7.70E+00		1.56E-08
Dieldrin	4.69E-09	3.35E-10	5.00E-05	1.60E+01	9.39E-05	5.37E-09
Endosulfan I	4.41E-09		6.00E-03	NA	7.35E-07	
Endosulfan sulfate	2.86E-09		5.00E-05	NA	5.72E-05	
Endrin	3.46E-09		3.00E-04	NA	1.15E-05	
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane	1.16E-09	8.30E-11	6.00E-05	1.30E+00	1.94E-05	1.08E-10
beta-BHC		1.18E-10	NA	1.80E+00		2.13E-10
delta-BHC			NA	NA		
METALS						
Arsenic	6.07E-06	4.34E-07	3.00E-04	1.75E+00	2.02E-02	7.59E-07
Barium	1.37E-04		7.00E-02	NA	1.96E-03	
Cadmium	2.26E-06		5.00E-04	NA	4.52E-03	
Copper	6.84E-05		4.00E-02	NA	1.71E-03	
Lead			NA	NA		
Mercury	1.22E-07		3.00E-04	NA	4.05E-04	
Selenium	1.27E-06		5.00E-03	NA	2.54E-04	
Silver	8.22E-07		5.00E-03	NA	1.64E-04	
Thallium	6.68E-07		7.00E-05	NA	9.55E-03	
Zinc	1.69E-04		3.00E-01	NA	5.62E-04	
HERBICIDES						
MCPA	6.17E-06		5.00E-04	NA	1.23E-02	
Totals - HQ & CR					**5.24E-02**	**1.26E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-30

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
VOLATILE ORGANICS												
Acetone			6.98E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzene			2.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Methylene Chloride				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Toluene			6.59E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			2.79E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2,6-Dinitrotoluene				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2-Methylnaphthalene			1.30E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2-Methylphenol				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
3,3'-Dichlorobenzidine			2.47E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
3-Nitroaniline			5.98E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4-Nitroaniline			5.98E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acenaphthene			3.30E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acenaphthylene			9.60E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Anthracene			1.30E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(a)anthracene			3.44E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(a)pyrene			3.80E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(b)fluoranthene			3.72E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(g,h,i)perylene			3.06E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(k)fluoranthene			2.95E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Butylbenzylphthalate			4.60E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Carbazole			2.56E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Chrysene			3.25E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Di-n-butylphthalate			2.94E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Dibenz(a,h)anthracene			2.84E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Dibenzofuran			3.60E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Fluoranthene			3.25E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Fluorene			3.80E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550

TABLE 7-30

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Indeno(1,2,3-cd)pyrene			3.29E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			9.50E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Naphthalene			3.70E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pentachlorophenol			6.60E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Phenanthrene			3.19E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pyrene			3.01E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
bis(2-Chloroisopropyl) ether			2.21E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			3.28E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
PESTICIDES/PCB												
4,4'-DDD			3.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4,4'-DDE			5.78E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4,4'-DDT			3.49E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Aldrin			1.36E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Aroclor-1260		1.395E-09	2.58E-02	1.00E-06	2,300	1.0	0.06	50	5	25	1,825	25,550
Dieldrin			4.28E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan I			4.02E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan sulfate			2.61E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin			3.16E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin ketone			3.45E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Heptachlor epoxide				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
alpha-Chlordane			1.06E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
beta-BHC			1.51E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
delta-BHC			1.37E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550

TABLE 7-30

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
METALS												
Arsenic			5.54E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Barium			1.25E+02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Cadmium	2.60E-07		2.06E+00	1.00E-06	2,300	1.0	0.01	50	5	25	1,825	25,550
Copper			6.24E+01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Lead			6.19E+02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Mercury			1.11E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Selenium			1.16E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Silver			7.50E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Thallium			6.10E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Zinc			1.54E+02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
HERBICIDES												
MCPA			5.63E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550

EQUATION:

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

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC Soil Data - RME	EF = Exposure Frequency (events/year)	50 (RME)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	5 (RME)
SA = Surface Area Contact (cm²)	2,300 (RME Child)	BW = Bodyweight (kg)	25 kg (child)
AF =Soil to Skin Adherence Factor (mg/cm²)	1.0 (RME all receptors)	AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (Car)
ABS = Absorption Factor (unitless)	Compound Specific PCBs and Cd (EPA, 1992b) (Default Assumption 0% = 0.0)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-65

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Chloroisopropyl) ether			1.00E-03	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
PESTICIDES/PCB						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1260		1.40E-09	NA	8.11E+00		1.13E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		

TABLE 7-65

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
METALS						
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Cadmium	2.60E-07		3.00E-05	NA	8.65E-03	
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			2.00E-02	NA		
HERBICIDES						
MCPA			5.00E-04	NA		
Totals - HQ & CR					**8.65E-03**	**1.13E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
VOLATILE ORGANICS											
Acetone	5.46E-10		6.98E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Benzene		5.59E-11	2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Toluene	5.16E-10		6.59E-03	100	1.00E-06	1	20	25	70	9,125	25,550
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene	2.18E-08		2.79E-01	100	1.00E-06	1	20	25	70	9,125	25,550
2,6-Dinitrotoluene	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
2-Methylnaphthalene			1.30E-01	100	1.00E-06	1	20	25	70	9,125	25,550
2-Methylphenol	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine		6.91E-09	2.47E-01	100	1.00E-06	1	20	25	70	9,125	25,550
3-Nitroaniline			5.98E-01	100	1.00E-06	1	20	25	70	9,125	25,550
4-Nitroaniline			5.98E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthene	2.58E-09		3.30E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthylene			9.60E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Anthracene	1.02E-08		1.30E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)anthracene		9.61E-09	3.44E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)pyrene		1.06E-08	3.80E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(b)fluoranthene		1.04E-08	3.72E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			3.06E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(k)fluoranthene		8.24E-09	2.95E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Butylbenzylphthalate	3.60E-09		4.60E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Carbazole		7.15E-09	2.56E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Chrysene		9.07E-09	3.25E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Di-n-butylphthalate	2.30E-08		2.94E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenz(a,h)anthracene		7.95E-09	2.84E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenzofuran			3.60E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Fluoranthene	2.55E-08		3.25E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Fluorene	2.97E-09		3.80E-02	100	1.00E-06	1	20	25	70	9,125	25,550

TABLE 7-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Indeno(1,2,3-cd)pyrene		9.19E-09	3.29E-01	100	1.00E-06	1	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)		2.66E-09	9.50E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Naphthalene			3.70E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Pentachlorophenol	5.17E-08	1.84E-08	6.60E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Phenanthrene			3.19E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Pyrene	2.36E-08		3.01E-01	100	1.00E-06	1	20	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether	1.73E-08		2.21E-01	100	1.00E-06	1	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate	2.57E-08	9.16E-09	3.28E-01	100	1.00E-06	1	20	25	70	9,125	25,550
PESTICIDES/PCB											
4,4'-DDD	2.35E-10	8.40E-11	3.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDE			5.78E-03	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDT	2.74E-10	9.77E-11	3.49E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Aldrin	1.06E-10	3.80E-11	1.36E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1260		7.22E-10	2.58E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Dieldrin	3.35E-10	1.20E-10	4.28E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan I	3.15E-10		4.02E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan sulfate	2.04E-10		2.61E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin	2.47E-10		3.16E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin ketone			3.45E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
alpha-Chlordane	8.30E-11	2.96E-11	1.06E-03	100	1.00E-06	1	20	25	70	9,125	25,550
beta-BHC		4.23E-11	1.51E-03	100	1.00E-06	1	20	25	70	9,125	25,550
delta-BHC			1.37E-03	100	1.00E-06	1	20	25	70	9,125	25,550

TABLE 7-16

**CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)**

**SEAD-17 Remedial Investigation
Seneca Army Depot Activity**

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
METALS											
Arsenic	4.34E-07	1.55E-07	5.54E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Barium	9.80E-06		1.25E+02	100	1.00E-06	1	20	25	70	9,125	25,550
Cadmium	1.61E-07		2.06E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Copper	4.88E-06		6.24E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Lead			6.19E+02	100	1.00E-06	1	20	25	70	9,125	25,550
Mercury	8.69E-09		1.11E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Selenium	9.06E-08		1.16E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Silver	5.87E-08		7.50E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Thallium	4.77E-08		6.10E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Zinc	1.20E-05		1.54E+02	100	1.00E-06	1	20	25	70	9,125	25,550
HERBICIDES											
MCPA	4.40E-07		5.63E+00	100	1.00E-06	1	20	25	70	9,125	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC Soil Data - RME
100 (RME Site Worker)
10-6
1 (All Receptors)
20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-45

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone	5.46E-10		1.00E-01	NA	5.46E-09	
Benzene		5.59E-11	NA	2.90E-02		1.62E-12
Methylene Chloride	0.00E+00	0.00E+00	6.00E-02	7.50E-03	0.00E+00	0.00E+00
Toluene	5.16E-10		2.00E-01	NA	2.58E-09	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene	2.18E-08		2.00E-03	NA	1.09E-05	
2,6-Dinitrotoluene	0.00E+00		1.00E-03	NA	0.00E+00	
2-Methylnaphthalene			NA	NA		
2-Methylphenol	0.00E+00		5.00E-02	NA	0.00E+00	
3,3'-Dichlorobenzidine		6.91E-09	NA	4.50E-01		3.11E-09
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene	2.58E-09		6.00E-02	NA	4.31E-08	
Acenaphthylene			NA	NA		
Anthracene	1.02E-08		3.00E-01	NA	3.39E-08	
Benzo(a)anthracene		9.61E-09	NA	7.30E-01		7.02E-09
Benzo(a)pyrene		1.06E-08	NA	7.30E+00		7.76E-08
Benzo(b)fluoranthene		1.04E-08	NA	7.30E-01		7.59E-09
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		8.24E-09	NA	7.30E-01		6.01E-09
Butylbenzylphthalate	3.60E-09		2.00E+00	NA	1.80E-09	
Carbazole		7.15E-09	NA	2.00E-02		1.43E-10
Chrysene		9.07E-09	NA	7.30E-02		6.62E-10
Di-n-butylphthalate	2.30E-08		1.00E-01	NA	2.30E-07	
Dibenz(a,h)anthracene		7.95E-09	NA	7.30E+00		5.80E-08
Dibenzofuran			NA	NA		
Fluoranthene	2.55E-08		4.00E-02	NA	6.37E-07	
Fluorene	2.97E-09		4.00E-02	NA	7.44E-08	
Indeno(1,2,3-cd)pyrene		9.19E-09	NA	7.30E-01		6.71E-09
N-Nitrosodiphenylamine (1)		2.66E-09	NA	4.90E-03		1.30E-11
Naphthalene			NA	NA		
Pentachlorophenol	5.17E-08	1.84E-08	3.00E-02	1.20E-01	1.72E-06	2.21E-09
Phenanthrene			NA	NA		
Pyrene	2.36E-08		3.00E-02	NA	7.86E-07	
bis(2-Chloroisopropyl) ether	1.73E-08		1.00E-03	NA	1.73E-05	
bis(2-Ethylhexyl)phthalate	2.57E-08	9.16E-09	2.00E-02	1.40E-02	1.28E-06	1.28E-10
PESTICIDES/PCB						
4,4'-DDD	2.35E-10	8.40E-11	5.00E-04	2.40E-01	4.70E-07	2.02E-11
4,4'-DDE			NA	NA		
4,4'-DDT	2.74E-10	9.77E-11	5.00E-04	3.40E-01	5.47E-07	3.32E-11
Aldrin	1.06E-10	3.80E-11	3.00E-05	1.70E+01	3.55E-06	6.46E-10
Aroclor-1260		7.22E-10	NA	7.70E+00		5.56E-09
Dieldrin	3.35E-10	1.20E-10	5.00E-05	1.60E+01	6.71E-06	1.92E-09
Endosulfan I	3.15E-10		6.00E-03	NA	5.25E-08	
Endosulfan sulfate	2.04E-10		5.00E-05	NA	4.09E-06	
Endrin	2.47E-10		3.00E-04	NA	8.24E-07	
Endrin ketone			NA	NA		
Heptachlor epoxide	0.00E+00	0.00E+00	1.30E-05	9.10E+00	0.00E+00	0.00E+00
alpha-Chlordane	8.30E-11	2.96E-11	6.00E-05	1.30E+00	1.38E-06	3.85E-11
beta-BHC		4.23E-11	NA	1.80E+00		7.61E-11
delta-BHC			NA	NA		

TABLE 7-45

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic	4.34E-07	1.55E-07	3.00E-04	1.75E+00	1.45E-03	2.71E-07
Barium	9.80E-06		7.00E-02	NA	1.40E-04	
Cadmium	1.61E-07		5.00E-04	NA	3.23E-04	
Copper	4.88E-06		4.00E-02	NA	1.22E-04	
Lead			NA	NA		
Mercury	8.69E-09		3.00E-04	NA	2.90E-05	
Selenium	9.06E-08		5.00E-03	NA	1.81E-05	
Silver	5.87E-08		5.00E-03	NA	1.17E-05	
Thallium	4.77E-08		7.00E-05	NA	6.82E-04	
Zinc	1.20E-05		3.00E-01	NA	4.01E-05	
HERBICIDES						
MCPA	4.40E-07		5.00E-04	NA	8.81E-04	
Totals - HQ & CR					**3.74E-03**	**4.49E-07**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-24

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
VOLATILE ORGANICS												
Acetone			6.98E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzene			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Methylene Chloride				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toluene			6.59E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			2.79E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2,6-Dinitrotoluene				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2-Methylnaphthalene			1.30E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2-Methylphenol				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3,3'-Dichlorobenzidine			2.47E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3-Nitroaniline			5.98E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4-Nitroaniline			5.98E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthene			3.30E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthylene			9.60E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Anthracene			1.30E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)anthracene			3.44E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)pyrene			3.80E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(b)fluoranthene			3.72E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(g,h,i)perylene			3.06E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(k)fluoranthene			2.95E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Butylbenzylphthalate			4.60E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbazole			2.56E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chrysene			3.25E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Di-n-butylphthalate			2.94E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenz(a,h)anthracene			2.84E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenzofuran			3.60E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluoranthene			3.25E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluorene			3.80E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550

TABLE 7-24

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Indeno(1,2,3-cd)pyrene			3.29E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			9.50E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Naphthalene			3.70E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pentachlorophenol			6.60E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Phenanthrene			3.19E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pyrene			3.01E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether			2.21E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			3.28E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
PESTICIDES/PCB												
4,4'-DDD			3.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDE			5.78E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDT			3.49E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aldrin			1.36E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aroclor-1260		2.51E-09	2.58E-02	1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Dieldrin			4.28E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan I			4.02E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan sulfate			2.61E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin			3.16E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin ketone			3.45E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor epoxide				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
alpha-Chlordane			1.06E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
beta-BHC			1.51E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
delta-BHC			1.37E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550

TABLE 7-24

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm^2/event)	Adherence Factor (mg soil/cm^2)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
METALS												
Arsenic			5.54E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Barium			1.25E+02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Cadmium	9.35E-08		2.06E+00	1.00E-06	5,800	1.0	0.01	20	25	70	9,125	25,550
Copper			6.24E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Lead			6.19E+02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Mercury			1.11E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Selenium			1.16E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Silver			7.50E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Thallium			6.10E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Zinc			1.54E+02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
HERBICIDES												
MCPA			5.63E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550

EQUATION: **Absorbed dose (mg/kg-day) =**

$$\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC Soil Data - RME
CF = Conversion Factor (10-6 kg/mg)	10-6
SA = Surface Area Contact (cm^2)	5,800 cm^2 (RME Site Worker)
AF =Soil to Skin Adherence Factor (mg/cm^2)	1.0 (RME all receptors)
ABS = Absorption Factor (unitless)	Compound Specific for PCBs and Cd EPA, 1992b (Default Assumption 0% = 0.0)
EF = Exposure Frequency (events/year)	20 (RME Site Worker)
ED = Exposure Duration (years)	25 (RME Site Worker)
BW = Bodyweight (kg)	70 (Adult Male)
AT = Averaging Time (days)	25 x 365 (Nc) 70 x 365 Adult (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-47

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Chloroisopropyl) ether			1.00E-03	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
PESTICIDES/PCB						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1260		2.51E-09	NA	8.11E+00		2.04E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		

TABLE 7-47

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Cadmium	9.35E-08		3.00E-05	NA	3.12E-03	
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			2.00E-02	NA		
HERBICIDES						
MCPA			5.00E-04	NA		
Totals - HQ & CR					**3.12E-03**	**2.04E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-18

CALCULATION OF INTAKE FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
VOLATILE ORGANICS											
Acetone	2.18E-09		6.98E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Benzene		2.24E-10	2.00E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Toluene	2.06E-09		6.59E-03	100	1.00E-06	1	80	25	70	9,125	25,550
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene	8.73E-08		2.79E-01	100	1.00E-06	1	80	25	70	9,125	25,550
2,6-Dinitrotoluene	0.00E+00		0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
2-Methylnaphthalene			1.30E-01	100	1.00E-06	1	80	25	70	9,125	25,550
2-Methylphenol	0.00E+00		0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
3,3'-Dichlorobenzidine		2.76E-08	2.47E-01	100	1.00E-06	1	80	25	70	9,125	25,550
3-Nitroaniline			5.98E-01	100	1.00E-06	1	80	25	70	9,125	25,550
4-Nitroaniline			5.98E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Acenaphthene	1.03E-08		3.30E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Acenaphthylene			9.60E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Anthracene	4.07E-08		1.30E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(a)anthracene		3.84E-08	3.44E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(a)pyrene		4.25E-08	3.80E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(b)fluoranthene		4.16E-08	3.72E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(g,h,i)perylene			3.06E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(k)fluoranthene		3.29E-08	2.95E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Butylbenzylphthalate	1.44E-08		4.60E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Carbazole		2.86E-08	2.56E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Chrysene		3.63E-08	3.25E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Di-n-butylphthalate	9.21E-08		2.94E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Dibenz(a,h)anthracene		3.18E-08	2.84E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Dibenzofuran			3.60E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Fluoranthene	1.02E-07		3.25E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Fluorene	1.19E-08		3.80E-02	100	1.00E-06	1	80	25	70	9,125	25,550

TABLE 7-18

**CALCULATION OF INTAKE FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)**

**SEAD-17 Remedial Investigation
Seneca Army Depot Activity**

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Indeno(1,2,3-cd)pyrene		3.68E-08	3.29E-01	100	1.00E-06	1	80	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)		1.06E-08	9.50E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Naphthalene			3.70E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Pentachlorophenol	2.07E-07	7.38E-08	6.60E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Phenanthrene			3.19E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Pyrene	9.43E-08		3.01E-01	100	1.00E-06	1	80	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether	6.93E-08		2.21E-01	100	1.00E-06	1	80	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate	1.03E-07	3.67E-08	3.28E-01	100	1.00E-06	1	80	25	70	9,125	25,550
PESTICIDES/PCB											
4,4'-DDD	9.41E-10	3.36E-10	3.00E-03	100	1.00E-06	1	80	25	70	9,125	25,550
4,4'-DDE			5.78E-03	100	1.00E-06	1	80	25	70	9,125	25,550
4,4'-DDT	1.09E-09	3.91E-10	3.49E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Aldrin	4.26E-10	1.52E-10	1.36E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Aroclor-1260		2.89E-09	2.58E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Dieldrin	1.34E-09	4.79E-10	4.28E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Endosulfan I	1.26E-09		4.02E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Endosulfan sulfate	8.18E-10		2.61E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Endrin	9.89E-10		3.16E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Endrin ketone			3.45E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
alpha-Chlordane	3.32E-10	1.19E-10	1.06E-03	100	1.00E-06	1	80	25	70	9,125	25,550
beta-BHC		1.69E-10	1.51E-03	100	1.00E-06	1	80	25	70	9,125	25,550
delta-BHC			1.37E-03	100	1.00E-06	1	80	25	70	9,125	25,550

TABLE 7-18

CALCULATION OF INTAKE FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
METALS											
Arsenic	1.73E-06	6.20E-07	5.54E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Barium	3.92E-05		1.25E+02	100	1.00E-06	1	80	25	70	9,125	25,550
Cadmium	6.45E-07		2.06E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Copper	1.95E-05		6.24E+01	100	1.00E-06	1	80	25	70	9,125	25,550
Lead			6.19E+02	100	1.00E-06	1	80	25	70	9,125	25,550
Mercury	3.48E-08		1.11E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Selenium	3.63E-07		1.16E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Silver	2.35E-07		7.50E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Thallium	1.91E-07		6.10E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Zinc	4.82E-05		1.54E+02	100	1.00E-06	1	80	25	70	9,125	25,550
HERBICIDES											
MCPA	1.76E-06		5.63E+00	100	1.00E-06	1	80	25	70	9,125	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC - Soil Data (RME)
100 (RME Adult Worker)
10-6
1 (All Receptors)
80 (RME Adult Industrial Worker)
25 (Upper bound limit)
70 (Adult male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-51

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone	2.18E-09		1.00E-01	NA	2.18E-08	
Benzene		2.24E-10	NA	2.90E-02		6.49E-12
Methylene Chloride	0.00E+00	0.00E+00	6.00E-02	7.50E-03	0.00E+00	0.00E+00
Toluene	2.06E-09		2.00E-01	NA	1.03E-08	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene	8.73E-08		2.00E-03	NA	4.37E-05	
2,6-Dinitrotoluene	0.00E+00		1.00E-03	NA	0.00E+00	
2-Methylnaphthalene			NA	NA		
2-Methylphenol	0.00E+00		5.00E-02	NA	0.00E+00	
3,3'-Dichlorobenzidine		2.76E-08	NA	4.50E-01		1.24E-08
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene	1.03E-08		6.00E-02	NA	1.72E-07	
Acenaphthylene			NA	NA		
Anthracene	4.07E-08		3.00E-01	NA	1.36E-07	
Benzo(a)anthracene		3.84E-08	NA	7.30E-01		2.81E-08
Benzo(a)pyrene		4.25E-08	NA	7.30E+00		3.10E-07
Benzo(b)fluoranthene		4.16E-08	NA	7.30E-01		3.04E-08
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		3.29E-08	NA	7.30E-01		2.40E-08
Butylbenzylphthalate	1.44E-08		2.00E+00	NA	7.20E-09	
Carbazole		2.86E-08	NA	2.00E-02		5.72E-10
Chrysene		3.63E-08	NA	7.30E-02		2.65E-09
Di-n-butylphthalate	9.21E-08		1.00E-01	NA	9.21E-07	
Dibenz(a,h)anthracene		3.18E-08	NA	7.30E+00		2.32E-07
Dibenzofuran			NA	NA		
Fluoranthene	1.02E-07		4.00E-02	NA	2.55E-06	
Fluorene	1.19E-08		4.00E-02	NA	2.97E-07	
Indeno(1,2,3-cd)pyrene		3.68E-08	NA	7.30E-01		2.68E-08
N-Nitrosodiphenylamine (1)		1.06E-08	NA	4.90E-03		5.21E-11
Naphthalene			NA	NA		
Pentachlorophenol	2.07E-07	7.38E-08	3.00E-02	1.20E-01	6.89E-06	8.86E-09
Phenanthrene			NA	NA		
Pyrene	9.43E-08		3.00E-02	NA	3.14E-06	
bis(2-Chloroisopropyl) ether	6.93E-08		1.00E-03	NA	6.93E-05	
bis(2-Ethylhexyl)phthalate	1.03E-07	3.67E-08	2.00E-02	1.40E-02	5.13E-06	5.13E-10
PESTICIDES/PCB						
4,4'-DDD	9.41E-10	3.36E-10	5.00E-04	2.40E-01	1.88E-06	8.06E-11
4,4'-DDE			NA	NA		
4,4'-DDT	1.09E-09	3.91E-10	5.00E-04	3.40E-01	2.19E-06	1.33E-10
Aldrin	4.26E-10	1.52E-10	3.00E-05	1.70E+01	1.42E-05	2.58E-09
Aroclor-1260		2.89E-09	NA	7.70E+00		2.22E-08
Dieldrin	1.34E-09	4.79E-10	5.00E-05	1.60E+01	2.68E-05	7.66E-09
Endosulfan I	1.26E-09		6.00E-03	NA	2.10E-07	
Endosulfan sulfate	8.18E-10		5.00E-05	NA	1.64E-05	
Endrin	9.89E-10		3.00E-04	NA	3.30E-06	
Endrin ketone			NA	NA		
Heptachlor epoxide	0.00E+00	0.00E+00	1.30E-05	9.10E+00	0.00E+00	0.00E+00
alpha-Chlordane	3.32E-10	1.19E-10	6.00E-05	1.30E+00	5.53E-06	1.54E-10
beta-BHC		1.69E-10	NA	1.80E+00		3.04E-10
delta-BHC			NA	NA		

TABLE 7-51

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic	1.73E-06	6.20E-07	3.00E-04	1.75E+00	5.78E-03	1.08E-06
Barium	3.92E-05		7.00E-02	NA	5.60E-04	
Cadmium	6.45E-07		5.00E-04	NA	1.29E-03	
Copper	1.95E-05		4.00E-02	NA	4.88E-04	
Lead			NA	NA		
Mercury	3.48E-08		3.00E-04	NA	1.16E-04	
Selenium	3.63E-07		5.00E-03	NA	7.25E-05	
Silver	2.35E-07		5.00E-03	NA	4.70E-05	
Thallium	1.91E-07		7.00E-05	NA	2.73E-03	
Zinc	4.82E-05		3.00E-01	NA	1.61E-04	
HERBICIDES						
MCPA	1.76E-06		5.00E-04	NA	3.52E-03	
Totals - HQ & CR					**1.50E-02**	**1.79E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
VOLATILE ORGANICS												
Acetone			6.98E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzene			2.00E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Methylene Chloride				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Toluene			6.59E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			2.79E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
2,6-Dinitrotoluene				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
2-Methylnaphthalene			1.30E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
2-Methylphenol				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
3,3'-Dichlorobenzidine			2.47E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
3-Nitroaniline			5.98E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
4-Nitroaniline			5.98E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Acenaphthene			3.30E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Acenaphthylene			9.60E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Anthracene			1.30E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(a)anthracene			3.44E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(a)pyrene			3.80E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(b)fluoranthene			3.72E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(g,h,i)perylene			3.06E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(k)fluoranthene			2.95E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Butylbenzylphthalate			4.60E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Carbazole			2.56E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Chrysene			3.25E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Di-n-butylphthalate			2.94E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Dibenz(a,h)anthracene			2.84E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Dibenzofuran			3.60E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Fluoranthene			3.25E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Fluorene			3.80E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550

TABLE 7-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Indeno(1,2,3-cd)pyrene			3.29E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			9.50E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Naphthalene			3.70E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Pentachlorophenol			6.60E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Phenanthrene			3.19E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Pyrene			3.01E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether			2.21E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			3.28E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
PESTICIDES/PCB												
4,4'-DDD			3.00E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
4,4'-DDE			5.78E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
4,4'-DDT			3.49E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Aldrin			1.36E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Aroclor-1260		1.01E-08	2.58E-02	1.00E-06	5,800	1.0	0.06	80	25	70	9,125	25,550
Dieldrin			4.28E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Endosulfan I			4.02E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Endosulfan sulfate			2.61E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Endrin			3.16E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Endrin ketone			3.45E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Heptachlor epoxide				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
alpha-Chlordane			1.06E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
beta-BHC			1.51E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
delta-BHC			1.37E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550

TABLE 7-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
METALS												
Arsenic			5.54E+00	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Barium			1.25E+02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Cadmium	3.741E-07		2.06E+00	1.00E-06	5,800	1.0	0.01	80	25	70	9,125	25,550
Copper			6.24E+01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Lead			6.19E+02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Mercury			1.11E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Selenium			1.16E+00	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Silver			7.50E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Thallium			6.10E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Zinc			1.54E+02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
HERBICIDES												
MCPA			5.63E+00	1.00E-06	5,800	1.0		80	25	70	9,125	25,550

EQUATION:

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

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC - Soil Data (RME)	EF = Exposure Frequency (days/year)	80 (RME Industrial Worker)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	25 (RME Industrial Worker)
SA = Surface Area Contact (cm²)	5,800 (RME Adult Worker)	BW = Bodyweight (kg)	70 (Adult Male)
AF =Soil to Skin Adherence Factor (mg/cm²)	1.0 (RME - All Receptors)	AT = Averaging Time (days)	25 x 365 (Nc), 70 x 365 (Car)
ABS = Absorption Factor (unitless)	Applicable for PCBs and Cadmium (EPA, 1992b)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-53

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Chloroisopropyl) ether			1.00E-03	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
PESTICIDES/PCB						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1260		1.01E-08	NA	8.11E+00		8.15E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		

TABLE 7-53

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Cadmium	3.74E-07		3.00E-05	NA	1.25E-02	
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			2.00E-02	NA		
HERBICIDES						
MCPA			5.00E-04	NA		
Totals - HQ & CR					**1.25E-02**	**8.15E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-20

CALCULATION OF INTAKE FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
VOLATILE ORGANICS											
Acetone	3.28E-08		6.98E-03	480	1.00E-06	1	250	1	70	365	25,550
Benzene		1.34E-10	2.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Methylene Chloride		0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
Toluene	3.10E-08	4.42E-10	6.59E-03	480	1.00E-06	1	250	1	70	365	25,550
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene	1.31E-06		2.79E-01	480	1.00E-06	1	250	1	70	365	25,550
2,6-Dinitrotoluene	0.00E+00		0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
2-Methylnaphthalene			1.30E-01	480	1.00E-06	1	250	1	70	365	25,550
2-Methylphenol	0.00E+00		0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
3,3'-Dichlorobenzidine		1.66E-08	2.47E-01	480	1.00E-06	1	250	1	70	365	25,550
3-Nitroaniline			5.98E-01	480	1.00E-06	1	250	1	70	365	25,550
4-Nitroaniline			5.98E-01	480	1.00E-06	1	250	1	70	365	25,550
Acenaphthene	1.55E-07		3.30E-02	480	1.00E-06	1	250	1	70	365	25,550
Acenaphthylene			9.60E-02	480	1.00E-06	1	250	1	70	365	25,550
Anthracene	6.11E-07		1.30E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(a)anthracene		2.31E-08	3.44E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(a)pyrene		2.55E-08	3.80E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(b)fluoranthene		2.50E-08	3.72E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(g,h,i)perylene			3.06E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(k)fluoranthene		1.98E-08	2.95E-01	480	1.00E-06	1	250	1	70	365	25,550
Butylbenzylphthalate	2.16E-07		4.60E-02	480	1.00E-06	1	250	1	70	365	25,550
Carbazole		1.72E-08	2.56E-01	480	1.00E-06	1	250	1	70	365	25,550
Chrysene		2.18E-08	3.25E-01	480	1.00E-06	1	250	1	70	365	25,550
Di-n-butylphthalate	1.38E-06		2.94E-01	480	1.00E-06	1	250	1	70	365	25,550

TABLE 7-20

CALCULATION OF INTAKE FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Dibenz(a,h)anthracene		1.91E-08	2.84E-01	480	1.00E-06	1	250	1	70	365	25,550
Dibenzofuran			3.60E-02	480	1.00E-06	1	250	1	70	365	25,550
Fluoranthene	1.53E-06		3.25E-01	480	1.00E-06	1	250	1	70	365	25,550
Fluorene	1.78E-07		3.80E-02	480	1.00E-06	1	250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene		2.21E-08	3.29E-01	480	1.00E-06	1	250	1	70	365	25,550
N-Nitrosodiphenylamine (1)		6.37E-09	9.50E-02	480	1.00E-06	1	250	1	70	365	25,550
Naphthalene			3.70E-02	480	1.00E-06	1	250	1	70	365	25,550
Pentachlorophenol	3.10E-06	4.43E-08	6.60E-01	480	1.00E-06	1	250	1	70	365	25,550
Phenanthrene			3.19E-01	480	1.00E-06	1	250	1	70	365	25,550
Pyrene	1.41E-06		3.01E-01	480	1.00E-06	1	250	1	70	365	25,550
bis(2-Chloroisopropyl) ether	1.04E-06		2.21E-01	480	1.00E-06	1	250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate	1.54E-06	2.20E-08	3.28E-01	480	1.00E-06	1	250	1	70	365	25,550
PESTICIDES/PCB											
4,4'-DDD	1.41E-08	2.02E-10	3.00E-03	480	1.00E-06	1	250	1	70	365	25,550
4,4'-DDE			5.78E-03	480	1.00E-06	1	250	1	70	365	25,550
4,4'-DDT	1.64E-08	2.34E-10	3.49E-03	480	1.00E-06	1	250	1	70	365	25,550
Aldrin	6.38E-09	9.12E-11	1.36E-03	480	1.00E-06	1	250	1	70	365	25,550
Aroclor-1254	0.00E+00	0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
Aroclor-1260		1.73E-09	2.58E-02	480	1.00E-06	1	250	1	70	365	25,550
Dieldrin	2.01E-08	2.87E-10	4.28E-03	480	1.00E-06	1	250	1	70	365	25,550
Endosulfan I	1.89E-08		4.02E-03	480	1.00E-06	1	250	1	70	365	25,550
Endosulfan sulfate	1.23E-08		2.61E-03	480	1.00E-06	1	250	1	70	365	25,550
Endrin	1.48E-08		3.16E-03	480	1.00E-06	1	250	1	70	365	25,550
Endrin ketone			3.45E-03	480	1.00E-06	1	250	1	70	365	25,550
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
alpha-Chlordane	4.98E-09	7.11E-11	1.06E-03	480	1.00E-06	1	250	1	70	365	25,550
beta-BHC		1.01E-10	1.51E-03	480	1.00E-06	1	250	1	70	365	25,550
delta-BHC			1.37E-03	480	1.00E-06	1	250	1	70	365	25,550

TABLE 7-20

CALCULATION OF INTAKE FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
METALS											
Antimony	3.67E-05		7.82E+00	480	1.00E-06	1	250	1	70	365	25,550
Arsenic	2.60E-05	3.72E-07	5.54E+00	480	1.00E-06	1	250	1	70	365	25,550
Barium	5.88E-04		1.25E+02	480	1.00E-06	1	250	1	70	365	25,550
Cadmium	9.67E-06		2.06E+00	480	1.00E-06	1	250	1	70	365	25,550
Copper	2.93E-04		6.24E+01	480	1.00E-06	1	250	1	70	365	25,550
Lead			6.19E+02	480	1.00E-06	1	250	1	70	365	25,550
Mercury	5.20E-07		1.11E-01	480	1.00E-06	1	250	1	70	365	25,550
Selenium	5.44E-06		1.16E+00	480	1.00E-06	1	250	1	70	365	25,550
Silver	3.52E-06		7.50E-01	480	1.00E-06	1	250	1	70	365	25,550
Zinc	7.22E-04		1.54E+02	480	1.00E-06	1	250	1	70	365	25,550
HERBICIDES											
MCPA	2.64E-05		5.63E+00	480	1.00E-06	1	250	1	70	365	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC - Soil Data (RME)
480 (RME Construction Worker)
10-6
1 (All Receptors)
250 (RME Construction Worker)
1 (Upper bound limit for Construction Worker)
70 (Adult male)
1 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-57

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone	3.28E-08		1.00E-01	NA	3.28E-07	
Benzene		1.34E-10	NA	2.90E-02		3.89E-12
Methylene Chloride		0.00E+00	NA	2.90E-02		0.00E+00
Toluene	3.10E-08	4.42E-10	6.00E-02	7.50E-03	5.16E-07	3.32E-12
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene	1.31E-06		2.00E-03	NA	6.55E-04	
2,6-Dinitrotoluene	0.00E+00		1.00E-03	NA	0.00E+00	
2-Methylnaphthalene			NA	NA		
2-Methylphenol	0.00E+00		5.00E-02	NA	0.00E+00	
3,3'-Dichlorobenzidine		1.66E-08	NA	4.50E-01		7.46E-09
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene	1.55E-07		6.00E-02	NA	2.58E-06	
Acenaphthylene			NA	NA		
Anthracene	6.11E-07		3.00E-01	NA	2.04E-06	
Benzo(a)anthracene		2.31E-08	NA	7.30E-01		1.68E-08
Benzo(a)pyrene		2.55E-08	NA	7.30E+00		1.86E-07
Benzo(b)fluoranthene		2.50E-08	NA	7.30E-01		1.82E-08
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		1.98E-08	NA	7.30E-01		1.44E-08
Butylbenzylphthalate	2.16E-07		2.00E+00	NA	1.08E-07	
Carbazole		1.72E-08	NA	2.00E-02		3.43E-10
Chrysene		2.18E-08	NA	7.30E-02		1.59E-09
Di-n-butylphthalate	1.38E-06		1.00E-01	NA	1.38E-05	
Dibenz(a,h)anthracene		1.91E-08	NA	7.30E+00		1.39E-07
Dibenzofuran			NA	NA		
Fluoranthene	1.53E-06		4.00E-02	NA	3.82E-05	
Fluorene	1.78E-07		4.00E-02	NA	4.46E-06	
Indeno(1,2,3-cd)pyrene		2.21E-08	NA	7.30E-01		1.61E-08
N-Nitrosodiphenylamine (1)		6.37E-09	NA	4.90E-03		3.12E-11
Naphthalene			NA	NA		
Pentachlorophenol	3.10E-06	4.43E-08	3.00E-02	1.20E-01	1.03E-04	5.31E-09
Phenanthrene			NA	NA		
Pyrene	1.41E-06		3.00E-02	NA	4.72E-05	
bis(2-Chloroisopropyl) ether	1.04E-06		1.00E-03	NA	1.04E-03	
bis(2-Ethylhexyl)phthalate	1.54E-06	2.20E-08	2.00E-02	1.40E-02	7.70E-05	3.08E-10

TABLE 7-57

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
PESTICIDES/PCB						
4,4'-DDD	1.41E-08	2.02E-10	5.00E-04	2.40E-01	2.82E-05	4.84E-11
4,4'-DDE			NA	NA		
4,4'-DDT	1.64E-08	2.34E-10	5.00E-04	3.40E-01	3.28E-05	7.97E-11
Aldrin	6.38E-09	9.12E-11	3.00E-05	1.70E+01	2.13E-04	1.55E-09
Aroclor-1254	0.00E+00	0.00E+00	2.00E-05	2.00E+00	0.00E+00	0.00E+00
Aroclor-1260		1.73E-09	NA	7.70E+00		1.33E-08
Dieldrin	2.01E-08	2.87E-10	5.00E-05	1.60E+01	4.02E-04	4.60E-09
Endosulfan I	1.89E-08		6.00E-03	NA	3.15E-06	
Endosulfan sulfate	1.23E-08		5.00E-05	NA	2.45E-04	
Endrin	1.48E-08		3.00E-04	NA	4.95E-05	
Endrin ketone			NA	NA		
Heptachlor epoxide	0.00E+00	0.00E+00	1.30E-05	9.10E+00	0.00E+00	0.00E+00
alpha-Chlordane	4.98E-09	7.11E-11	6.00E-05	1.30E+00	8.30E-05	9.25E-11
beta-BHC		1.01E-10	NA	1.80E+00		1.83E-10
delta-BHC			NA	NA		
METALS						
Antimony	3.67E-05		4.00E-04	NA	9.18E-02	
Arsenic	2.60E-05	3.72E-07	3.00E-04	1.75E+00	8.67E-02	6.51E-07
Barium	5.88E-04		7.00E-02	NA	8.40E-03	
Cadmium	9.67E-06		5.00E-04	NA	1.93E-02	
Copper	2.93E-04		4.00E-02	NA	7.33E-03	
Lead			NA	NA		
Mercury	5.20E-07		3.00E-04	NA	1.73E-03	
Selenium	5.44E-06		5.00E-03	NA	1.09E-03	
Silver	3.52E-06		5.00E-03	NA	7.04E-04	
Zinc	7.22E-04		3.00E-01	NA	2.41E-03	
HERBICIDES						
MCPA	2.64E-05		5.00E-04	NA	5.29E-02	
Totals - HQ & CR					**2.75E-01**	**1.08E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-28

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm^2)	Adherence Factor (mg soil/cm^2)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
VOLATILE ORGANICS												
Acetone			6.98E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzene			2.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Methylene Chloride				1.00E-06	5,800	1.0		250	1	70	365	25,550
Toluene			6.59E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			2.79E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
2,6-Dinitrotoluene				1.00E-06	5,800	1.0		250	1	70	365	25,550
2-Methylnaphthalene			1.30E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
2-Methylphenol				1.00E-06	5,800	1.0		250	1	70	365	25,550
3,3'-Dichlorobenzidine			2.47E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
3-Nitroaniline			5.98E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
4-Nitroaniline			5.98E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Acenaphthene			3.30E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Acenaphthylene			9.60E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Anthracene			1.30E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(a)anthracene			3.44E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(a)pyrene			3.80E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(b)fluoranthene			3.72E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(g,h,i)perylene			3.06E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(k)fluoranthene			2.95E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Butylbenzylphthalate			4.60E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Carbazole			2.56E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Chrysene			3.25E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Di-n-butylphthalate			2.94E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550

TABLE 7-28

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
Dibenz(a,h)anthracene			2.84E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Dibenzofuran			3.60E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Fluoranthene			3.25E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Fluorene			3.80E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene			3.29E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
N-Nitrosodiphenylamine (1)			9.50E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Naphthalene			3.70E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pentachlorophenol			6.60E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Phenanthrene			3.19E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pyrene			3.01E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
bis(2-Chloroisopropyl) ether			2.21E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate			3.28E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
PESTICIDES/PCB												
4,4'-DDD			3.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
4,4'-DDE			5.78E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
4,4'-DDT			3.49E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Aldrin			1.36E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Aroclor-1254				1.00E-06	5,800	1.0		250	1	70	365	25,550
Aroclor-1260	8.796E-08	1.257E-09	2.58E-02	1.00E-06	5,800	1.0	0.06	250	1	70	365	25,550
Dieldrin			4.28E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan I			4.02E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan sulfate			2.61E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin			3.16E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin ketone			3.45E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Heptachlor epoxide				1.00E-06	5,800	1.0		250	1	70	365	25,550
alpha-Chlordane			1.06E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
beta-BHC			1.51E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
delta-BHC			1.37E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550

TABLE 7-28

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm^2)	Adherence Factor (mg soil/cm^2)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
METALS												
Antimony			7.82E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Arsenic			5.54E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Barium			1.25E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Cadmium			2.06E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Copper			6.24E+01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Lead			6.19E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Mercury			1.11E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Selenium			1.16E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Silver			7.50E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Zinc			1.54E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
HERBICIDES												
MCPA			5.63E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550

EQUATION:

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

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC - Soil Data (RME)	EF = Exposure Frequency (days/year)	250 (RME Construction Worker)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	1 (Upper bound limit for CW)
SA = Surface Area Contact (cm^2)	5,800 (RME Adult Worker)	BW = Bodyweight (kg)	70 (Adult Male)
AF =Soil to Skin Adherence Factor (mg/cm^2)	1.0 (RME - All Receptors)	AT = Averaging Time (days)	1 x 365 (Nc) 70 x 365 (Car)
ABS = Absorption Factor (unitless)	Applicable for PCBs and Cadmium (EPA, 1992b)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-59

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Chloroisopropyl) ether			1.00E-03	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 7-59

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
PESTICIDES/PCB						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254			1.90E-05	2.11E+00		
Aroclor-1260	8.80E-08	1.26E-09	NA	8.11E+00		1.02E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		
METALS						
Antimony			4.00E-04	NA		
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Cadmium			3.00E-05	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Zinc			1.50E-01	NA		
HERBICIDES						
MCPA			5.00E-04	NA		
Totals - HQ & CR						**1.02E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-67

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS FROM THE INGESTION OF ONSITE SURFACE WATER FUTURE TRESSPASSER (Child) REASONABLE MAXIMUM EXPOSURE (RME) CASE 1 SEAD-17 Remedial Investigation Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
SEMIVOLATILE ORGANICS						
bis(2-Ethylhexyl)phthalate	2.74E-07	1.96E-08	2.00E-02	1.40E-02	1.37E-05	2.74E-10
METALS						
Antimony	3.03E-06		4.00E-04	NA	7.57E-03	
Arsenic	5.84E-07	4.17E-08	3.00E-04	1.75E+00	1.95E-03	7.30E-08
Barium	9.89E-06		7.00E-02	NA	1.41E-04	
Cadmium	1.07E-07		5.00E-04	NA	2.14E-04	
Calcium			NA	NA		
Chromium	8.64E-08		5.00E-03	NA	1.73E-05	
Copper	2.64E-06		4.00E-02	NA	6.59E-05	
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese	1.64E-06		5.00E-03	NA	3.28E-04	
Nickel	1.42E-07		2.00E-02	NA	7.08E-06	
Potassium			NA	NA		
Selenium	4.42E-07		5.00E-03	NA	8.84E-05	
Sodium			NA	NA		
Vanadium	1.23E-07		7.00E-03	NA	1.76E-05	
Zinc	4.97E-06		3.00E-01	NA	1.66E-05	
Totals - HQ & CR					**1.04E-02**	**7.33E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-34

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE WATER (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	Absorbed Dose/Event (mg-cm²-event)	EPC Surface W. (mg/L)	Child Skin Surface Area Contact (cm²)	Kp Permeability Coefficient (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Volumetric Conv. Factor (1 liter/1000 cm³)	B (unitless)	Tau (hours)	Child Body Weight (kg)	Averaging Time (days) Child (Nc)	Averaging Time (days) Car
SEMIVOLATILE ORGANICS															
bis(2-Ethylhexyl)phthalate	1.64E-07	1.17E-08	8.36E-04	2.00E-03	2,170	3.3E-02	1	25	5	1.0E-03	1.30E+01	2.10E+01	25	1,825	25,550
METALS															
Antimony	1.31E-10		2.21E-05	2.21E-02	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Arsenic	2.54E-11	1.81E-12	4.26E-06	4.26E-03	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Barium	4.29E-10		7.22E-05	7.22E-02	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Cadmium	4.65E-12		7.82E-07	7.82E-04	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Calcium			6.32E-02	6.32E+01	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Chromium	1.50E-11		1.26E-06	6.31E-04	2,170	2.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Copper				1.93E-02	2,170	NA	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Iron			1.93E-04	1.93E-01	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Lead			1.48E-07	3.71E-02	2,170	4.0E-06	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Magnesium			8.90E-03	8.90E+00	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Manganese	7.12E-11		1.20E-05	1.20E-02	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Nickel	6.14E-14		1.03E-07	1.03E-03	2,170	1.0E-04	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Potassium			3.52E-03	3.52E+00	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Selenium	1.92E-11		3.23E-06	3.23E-03	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Sodium			7.03E-03	7.03E+00	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Vanadium	5.35E-12		9.00E-07	9.00E-04	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Zinc	7.76E-11		2.18E-05	3.63E-02	2,170	6.0E-04	1	25	5	1.0E-03	NA	NA	25	1,825	25,550

EQUATION:

$$\text{Absorbed Dose (mg/kg-day)} = \frac{DA \times SA \times Kp \times ET \times EF \times ED \times CF}{BW \times AT}$$

Variables:	Assumptions:	Variables:	Assumptions:
DA = Absorbed Dose per Event (mg-cm²/event)	Calculated from EPA, 1992	EF = Exposure Frequency (days/year)	25
SA = Surface Area Contact (cm²)	2,170 (RME Child)	ED = Exposure Duration (years)	5 (RME)
Kp = Permeability Coefficient (cm/hour)	Compound Specific, EPA, 1992	CF = Vol. Conv. Factor (1 L/1000 cm³)	0.001
ET = Exposure Time (hours/day)	1 (RME)	BW = Bodyweight (kg)	25 (Child)
Tao = Lag time (hours)	Compound Specific, EPA, 1992	B = Bunge Model Value	Compound Specific, EPA, 1992

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-69

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS FROM DERMAL CONTACT TO SURFACE WATER (while Wading) FUTURE TRESSPASSER (Child) REASONABLE MAXIMUM EXPOSURE (RME) CASE 1 SEAD-17 Remedial Investigation Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg)	Child CDI (Car) (mg/kg)	Dermal RfD (mg/kg/day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
SEMIVOLATILE ORGANICS						
bis(2-Ethylhexyl)phthalate	1.64E-07	1.17E-08	2.00E-02	1.40E-02	8.20E-06	2.30E-09
METALS						
Antimony	1.31E-10		4.00E-04	NA	3.28E-07	
Arsenic	2.54E-11	1.81E-12	2.94E-04	1.79E+00	8.62E-08	4.54E-11
Barium	4.29E-10		7.00E-03	NA	6.13E-08	
Cadmium	4.65E-12		3.00E-05	NA	1.55E-07	
Calcium			NA	NA		
Chromium	1.50E-11		2.50E-04	NA	6.00E-08	
Copper			2.00E-02	NA		
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese	7.12E-11		5.00E-03	NA	1.42E-08	
Nickel	6.14E-14		1.00E-03	NA	6.14E-11	
Potassium			NA	NA		
Selenium	1.92E-11		3.00E-03	NA	6.40E-09	
Sodium			NA	NA		
Vanadium	5.35E-12		7.00E-03	NA	7.64E-10	
Zinc	7.76E-11		1.50E-01	NA	5.17E-10	
Totals - HQ & CR					**8.91E-06**	**2.34E-09**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-32

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SURFACE WATER (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Surface W. (mg/L)	Contact Rate (L/hr)	Exposure Time (hr/day)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
									Child(Nc)	Car
SEMIVOLATILE ORGANICS										
bis(2-Ethylhexyl)phthalate	2.74E-07	1.96E-08	2.00E-03	0.05	1	25	5	25	1,825	25,550
METALS										
Antimony	3.03E-06		2.21E-02	0.05	1	25	5	25	1,825	25,550
Arsenic	5.84E-07	4.17E-08	4.26E-03	0.05	1	25	5	25	1,825	25,550
Barium	9.89E-06		7.22E-02	0.05	1	25	5	25	1,825	25,550
Cadmium	1.07E-07		7.82E-04	0.05	1	25	5	25	1,825	25,550
Calcium			6.32E+01	0.05	1	25	5	25	1,825	25,550
Chromium	8.64E-08		6.31E-04	0.05	1	25	5	25	1,825	25,550
Copper	2.64E-06		1.93E-02	0.05	1	25	5	25	1,825	25,550
Iron			1.93E-01	0.05	1	25	5	25	1,825	25,550
Lead			3.71E-02	0.05	1	25	5	25	1,825	25,550
Magnesium			8.90E+00	0.05	1	25	5	25	1,825	25,550
Manganese	1.64E-06		1.20E-02	0.05	1	25	5	25	1,825	25,550
Nickel	1.42E-07		1.03E-03	0.05	1	25	5	25	1,825	25,550
Potassium			3.52E+00	0.05	1	25	5	25	1,825	25,550
Selenium	4.42E-07		3.23E-03	0.05	1	25	5	25	1,825	25,550
Sodium			7.03E+00	0.05	1	25	5	25	1,825	25,550
Vanadium	1.23E-07		9.00E-04	0.05	1	25	5	25	1,825	25,550
Zinc	4.97E-06		3.63E-02	0.05	1	25	5	25	1,825	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times CR \times ET \times EF \times ED}{BW \times AT}$$

Variables:	Assumptions:
CS = Chemical Concentration in Surface Water (mg/L)	EPC - Surface Water Data - RME
CR = Contact Rate (Liters/hour)	0.05 (all recreators)
ET = Exposure Time (hours/day)	1 (RME - all recreators)
EF = Exposure Frequency (days/year)	25
ED = Exposure Duration (years)	5 (RME)
BW = Bodyweight (kg)	25 (Child)
AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-67

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SURFACE WATER
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 1
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
SEMIVOLATILE ORGANICS						
bis(2-Ethylhexyl)phthalate	2.74E-07	1.96E-08	2.00E-02	1.40E-02	1.37E-05	2.74E-10
METALS						
Antimony	3.03E-06		4.00E-04	NA	7.57E-03	
Arsenic	5.84E-07	4.17E-08	3.00E-04	1.75E+00	1.95E-03	7.30E-08
Barium	9.89E-06		7.00E-02	NA	1.41E-04	
Cadmium	1.07E-07		5.00E-04	NA	2.14E-04	
Calcium			NA	NA		
Chromium	8.64E-08		5.00E-03	NA	1.73E-05	
Copper	2.64E-06		4.00E-02	NA	6.59E-05	
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese	1.64E-06		5.00E-03	NA	3.28E-04	
Nickel	1.42E-07		2.00E-02	NA	7.08E-06	
Potassium			NA	NA		
Selenium	4.42E-07		5.00E-03	NA	8.84E-05	
Sodium			NA	NA		
Vanadium	1.23E-07		7.00E-03	NA	1.76E-05	
Zinc	4.97E-06		3.00E-01	NA	1.66E-05	
Totals - HQ & CR					**1.04E-02**	**7.33E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-22

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
VOLATILE ORGANICS											
Acetone	7.64E-09		6.98E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Benzene		1.57E-10	2.00E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Methylene Chloride				200	1.0E-06	1	50	5	25	1,825	25,550
Toluene	7.22E-09		6.59E-03	200	1.0E-06	1	50	5	25	1,825	25,550
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene	3.06E-07		2.79E-01	200	1.0E-06	1	50	5	25	1,825	25,550
2,6-Dinitrotoluene				200	1.0E-06	1	50	5	25	1,825	25,550
2-Methylnaphthalene			1.30E-01	200	1.0E-06	1	50	5	25	1,825	25,550
2-Methylphenol				200	1.0E-06	1	50	5	25	1,825	25,550
3,3'-Dichlorobenzidine		1.93E-08	2.47E-01	200	1.0E-06	1	50	5	25	1,825	25,550
3-Nitroaniline			5.98E-01	200	1.0E-06	1	50	5	25	1,825	25,550
4-Nitroaniline			5.98E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Acenaphthene	3.62E-08		3.30E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Acenaphthylene			9.60E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Anthracene	1.42E-07		1.30E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(a)anthracene		2.69E-08	3.44E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(a)pyrene		2.98E-08	3.80E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(b)fluoranthene		2.91E-08	3.72E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(g,h,i)perylene			3.06E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(k)fluoranthene		2.31E-08	2.95E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Butylbenzylphthalate	5.04E-08		4.60E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Carbazole		2.00E-08	2.56E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Chrysene		2.54E-08	3.25E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Di-n-butylphthalate	3.23E-07		2.94E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Dibenz(a,h)anthracene		2.23E-08	2.84E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Dibenzofuran			3.60E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Fluoranthene	3.57E-07		3.25E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Fluorene	4.16E-08		3.80E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene		2.57E-08	3.29E-01	200	1.0E-06	1	50	5	25	1,825	25,550

TABLE 7-22

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
N-Nitrosodiphenylamine (1)		7.44E-09	9.50E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Naphthalene			3.70E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Pentachlorophenol	7.23E-07	5.17E-08	6.60E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Phenanthrene			3.19E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Pyrene	3.30E-07		3.01E-01	200	1.0E-06	1	50	5	25	1,825	25,550
bis(2-Chloroisopropyl) ether	2.43E-07		2.21E-01	200	1.0E-06	1	50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate	3.59E-07	2.57E-08	3.28E-01	200	1.0E-06	1	50	5	25	1,825	25,550
PESTICIDES/PCB											
4,4'-DDD	3.29E-09	2.35E-10	3.00E-03	200	1.0E-06	1	50	5	25	1,825	25,550
4,4'-DDE			5.78E-03	200	1.0E-06	1	50	5	25	1,825	25,550
4,4'-DDT	3.83E-09	2.74E-10	3.49E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Aldrin	1.49E-09	1.06E-10	1.36E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Aroclor-1260		2.02E-09	2.58E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Dieldrin	4.69E-09	3.35E-10	4.28E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Endosulfan I	4.41E-09		4.02E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Endosulfan sulfate	2.86E-09		2.61E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Endrin	3.46E-09		3.16E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Endrin ketone			3.45E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Heptachlor epoxide				200	1.0E-06	1	50	5	25	1,825	25,550
alpha-Chlordane	1.16E-09	8.30E-11	1.06E-03	200	1.0E-06	1	50	5	25	1,825	25,550
beta-BHC		1.18E-10	1.51E-03	200	1.0E-06	1	50	5	25	1,825	25,550
delta-BHC			1.37E-03	200	1.0E-06	1	50	5	25	1,825	25,550

TABLE 7-22

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
METALS											
Arsenic	6.07E-06	4.34E-07	5.54E+00	200	1.0E-06	1	50	5	25	1,825	25,550
Barium	1.37E-04		1.25E+02	200	1.0E-06	1	50	5	25	1,825	25,550
Cadmium	2.26E-06		2.06E+00	200	1.0E-06	1	50	5	25	1,825	25,550
Copper	6.84E-05		6.24E+01	200	1.0E-06	1	50	5	25	1,825	25,550
Lead			6.19E+02	200	1.0E-06	1	50	5	25	1,825	25,550
Mercury	1.22E-07		1.11E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Selenium	1.27E-06		1.16E+00	200	1.0E-06	1	50	5	25	1,825	25,550
Silver	8.22E-07		7.50E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Thallium	6.68E-07		6.10E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Zinc	1.69E-04		1.54E+02	200	1.0E-06	1	50	5	25	1,825	25,550
HERBICIDES											
MCPA	6.17E-06		5.63E+00	200	1.0E-06	1	50	5	25	1,825	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC Soil Data - RME
IR = Ingestion Rate (mg soil/day)	200 (RME Child)
CF = Conversion Factor (10-6 kg/mg)	10-6
FI = Fraction Ingested (unitless)	1
EF = Exposure Frequency (days/years)	50 (RME)
ED = Exposure Duration (years)	5 (RME)
BW = Bodyweight (kg)	25 (Child)
AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-63

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone	7.64E-09		1.00E-01	NA	7.64E-08	
Benzene		1.57E-10	NA	2.90E-02		4.54E-12
Methylene Chloride			6.00E-02	7.50E-03		
Toluene	7.22E-09		2.00E-01	NA	3.61E-08	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene	3.06E-07		2.00E-03	NA	1.53E-04	
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine		1.93E-08	NA	4.50E-01		8.71E-09
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene	3.62E-08		6.00E-02	NA	6.03E-07	
Acenaphthylene			NA	NA		
Anthracene	1.42E-07		3.00E-01	NA	4.75E-07	
Benzo(a)anthracene		2.69E-08	NA	7.30E-01		1.96E-08
Benzo(a)pyrene		2.98E-08	NA	7.30E+00		2.17E-07
Benzo(b)fluoranthene		2.91E-08	NA	7.30E-01		2.13E-08
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		2.31E-08	NA	7.30E-01		1.68E-08
Butylbenzylphthalate	5.04E-08		2.00E+00	NA	2.52E-08	
Carbazole		2.00E-08	NA	2.00E-02		4.00E-10
Chrysene		2.54E-08	NA	7.30E-02		1.85E-09
Di-n-butylphthalate	3.23E-07		1.00E-01	NA	3.23E-06	
Dibenz(a,h)anthracene		2.23E-08	NA	7.30E+00		1.62E-07
Dibenzofuran			NA	NA		
Fluoranthene	3.57E-07		4.00E-02	NA	8.92E-06	
Fluorene	4.16E-08		4.00E-02	NA	1.04E-06	
Indeno(1,2,3-cd)pyrene		2.57E-08	NA	7.30E-01		1.88E-08
N-Nitrosodiphenylamine (1)		7.44E-09	NA	4.90E-03		3.64E-11
Naphthalene			NA	NA		
Pentachlorophenol	7.23E-07	5.17E-08	3.00E-02	1.20E-01	2.41E-05	6.20E-09
Phenanthrene			NA	NA		
Pyrene	3.30E-07		3.00E-02	NA	1.10E-05	
bis(2-Chloroisopropyl) ether	2.43E-07		1.00E-03	NA	2.43E-04	
bis(2-Ethylhexyl)phthalate	3.59E-07	2.57E-08	2.00E-02	1.40E-02	1.80E-05	3.59E-10
PESTICIDES/PCB						
4,4'-DDD	3.29E-09	2.35E-10	5.00E-04	2.40E-01	6.59E-06	5.64E-11
4,4'-DDE			NA	NA		
4,4'-DDT	3.83E-09	2.74E-10	5.00E-04	3.40E-01	7.66E-06	9.30E-11
Aldrin	1.49E-09	1.06E-10	3.00E-05	1.70E+01	4.97E-05	1.81E-09
Aroclor-1260		2.02E-09	NA	7.70E+00		1.56E-08
Dieldrin	4.69E-09	3.35E-10	5.00E-05	1.60E+01	9.39E-05	5.37E-09
Endosulfan I	4.41E-09		6.00E-03	NA	7.35E-07	
Endosulfan sulfate	2.86E-09		5.00E-05	NA	5.72E-05	
Endrin	3.46E-09		3.00E-04	NA	1.15E-05	
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane	1.16E-09	8.30E-11	6.00E-05	1.30E+00	1.94E-05	1.08E-10
beta-BHC		1.18E-10	NA	1.80E+00		2.13E-10
delta-BHC			NA	NA		
METALS						
Arsenic	6.07E-06	4.34E-07	3.00E-04	1.75E+00	2.02E-02	7.59E-07
Barium	1.37E-04		7.00E-02	NA	1.96E-03	
Cadmium	2.26E-06		5.00E-04	NA	4.52E-03	
Copper	6.84E-05		4.00E-02	NA	1.71E-03	
Lead			NA	NA		
Mercury	1.22E-07		3.00E-04	NA	4.05E-04	
Selenium	1.27E-06		5.00E-03	NA	2.54E-04	
Silver	8.22E-07		5.00E-03	NA	1.64E-04	
Thallium	6.68E-07		7.00E-05	NA	9.55E-03	
Zinc	1.69E-04		3.00E-01	NA	5.62E-04	
HERBICIDES						
MCPA	6.17E-06		5.00E-04	NA	1.23E-02	
Totals - HQ & CR					**5.24E-02**	**1.26E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-30

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
											Nc	Car
VOLATILE ORGANICS												
Acetone			6.98E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzene			2.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Methylene Chloride				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Toluene			6.59E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			2.79E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2,6-Dinitrotoluene				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2-Methylnaphthalene			1.30E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2-Methylphenol				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
3,3'-Dichlorobenzidine			2.47E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
3-Nitroaniline			5.98E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4-Nitroaniline			5.98E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acenaphthene			3.30E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acenaphthylene			9.60E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Anthracene			1.30E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(a)anthracene			3.44E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(a)pyrene			3.80E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(b)fluoranthene			3.72E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(g,h,i)perylene			3.06E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(k)fluoranthene			2.95E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Butylbenzylphthalate			4.60E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Carbazole			2.56E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Chrysene			3.25E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Di-n-butylphthalate			2.94E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Dibenz(a,h)anthracene			2.84E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Dibenzofuran			3.60E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Fluoranthene			3.25E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Fluorene			3.80E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550

TABLE 7-30

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Indeno(1,2,3-cd)pyrene			3.29E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			9.50E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Naphthalene			3.70E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pentachlorophenol			6.60E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Phenanthrene			3.19E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pyrene			3.01E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
bis(2-Chloroisopropyl) ether			2.21E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			3.28E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
PESTICIDES/PCB												
4,4'-DDD			3.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4,4'-DDE			5.78E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4,4'-DDT			3.49E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Aldrin			1.36E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Aroclor-1260		1.395E-09	2.58E-02	1.00E-06	2,300	1.0	0.06	50	5	25	1,825	25,550
Dieldrin			4.28E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan I			4.02E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan sulfate			2.61E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin			3.16E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin ketone			3.45E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Heptachlor epoxide				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
alpha-Chlordane			1.06E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
beta-BHC			1.51E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
delta-BHC			1.37E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550

TABLE 7-30

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm^2/event)	Adherence Factor (mg soil/cm^2)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
METALS												
Arsenic			5.54E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Barium			1.25E+02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Cadmium	2.60E-07		2.06E+00	1.00E-06	2,300	1.0	0.01	50	5	25	1,825	25,550
Copper			6.24E+01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Lead			6.19E+02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Mercury			1.11E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Selenium			1.16E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Silver			7.50E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Thallium			6.10E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Zinc			1.54E+02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
HERBICIDES												
MCPA			5.63E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550

EQUATION:

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

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC Soil Data - RME	EF = Exposure Frequency (events/year)	50 (RME)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	5 (RME)
SA = Surface Area Contact (cm^2)	2,300 (RME Child)	BW = Bodyweight (kg)	25 kg (child)
AF = Soil to Skin Adherence Factor (mg/cm^2)	1.0 (RME all receptors)	AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (Car)
ABS = Absorption Factor (unitless)	Compound Specific PCBs and Cd (EPA, 1992b) (Default Assumption 0% = 0.0)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-65

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Chloroisopropyl) ether			1.00E-03	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
PESTICIDES/PCB						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1260		1.40E-09	NA	8.11E+00		1.13E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		

TABLE 7-65

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
METALS						
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Cadmium	2.60E-07		3.00E-05	NA	8.65E-03	
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			2.00E-02	NA		
HERBICIDES						
MCPA			5.00E-04	NA		
Totals - HQ & CR					**8.65E-03**	**1.13E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
VOLATILE ORGANICS											
Acetone	5.46E-10		6.98E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Benzene		5.59E-11	2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Toluene	5.16E-10		6.59E-03	100	1.00E-06	1	20	25	70	9,125	25,550
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene	2.18E-08		2.79E-01	100	1.00E-06	1	20	25	70	9,125	25,550
2,6-Dinitrotoluene	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
2-Methylnaphthalene			1.30E-01	100	1.00E-06	1	20	25	70	9,125	25,550
2-Methylphenol	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine		6.91E-09	2.47E-01	100	1.00E-06	1	20	25	70	9,125	25,550
3-Nitroaniline			5.98E-01	100	1.00E-06	1	20	25	70	9,125	25,550
4-Nitroaniline			5.98E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthene	2.58E-09		3.30E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthylene			9.60E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Anthracene	1.02E-08		1.30E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)anthracene		9.61E-09	3.44E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)pyrene		1.06E-08	3.80E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(b)fluoranthene		1.04E-08	3.72E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			3.06E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(k)fluoranthene		8.24E-09	2.95E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Butylbenzylphthalate	3.60E-09		4.60E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Carbazole		7.15E-09	2.56E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Chrysene		9.07E-09	3.25E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Di-n-butylphthalate	2.30E-08		2.94E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenz(a,h)anthracene		7.95E-09	2.84E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenzofuran			3.60E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Fluoranthene	2.55E-08		3.25E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Fluorene	2.97E-09		3.80E-02	100	1.00E-06	1	20	25	70	9,125	25,550

TABLE 7-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Indeno(1,2,3-cd)pyrene		9.19E-09	3.29E-01	100	1.00E-06	1	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)		2.66E-09	9.50E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Naphthalene			3.70E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Pentachlorophenol	5.17E-08	1.84E-08	6.60E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Phenanthrene			3.19E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Pyrene	2.36E-08		3.01E-01	100	1.00E-06	1	20	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether	1.73E-08		2.21E-01	100	1.00E-06	1	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate	2.57E-08	9.16E-09	3.28E-01	100	1.00E-06	1	20	25	70	9,125	25,550
PESTICIDES/PCB											
4,4'-DDD	2.35E-10	8.40E-11	3.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDE			5.78E-03	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDT	2.74E-10	9.77E-11	3.49E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Aldrin	1.06E-10	3.80E-11	1.36E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1260		7.22E-10	2.58E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Dieldrin	3.35E-10	1.20E-10	4.28E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan I	3.15E-10		4.02E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan sulfate	2.04E-10		2.61E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin	2.47E-10		3.16E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin ketone			3.45E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
alpha-Chlordane	8.30E-11	2.96E-11	1.06E-03	100	1.00E-06	1	20	25	70	9,125	25,550
beta-BHC		4.23E-11	1.51E-03	100	1.00E-06	1	20	25	70	9,125	25,550
delta-BHC			1.37E-03	100	1.00E-06	1	20	25	70	9,125	25,550

TABLE 7-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
METALS											
Arsenic	4.34E-07	1.55E-07	5.54E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Barium	9.80E-06		1.25E+02	100	1.00E-06	1	20	25	70	9,125	25,550
Cadmium	1.61E-07		2.06E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Copper	4.88E-06		6.24E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Lead			6.19E+02	100	1.00E-06	1	20	25	70	9,125	25,550
Mercury	8.69E-09		1.11E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Selenium	9.06E-08		1.16E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Silver	5.87E-08		7.50E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Thallium	4.77E-08		6.10E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Zinc	1.20E-05		1.54E+02	100	1.00E-06	1	20	25	70	9,125	25,550
HERBICIDES											
MCPA	4.40E-07		5.63E+00	100	1.00E-06	1	20	25	70	9,125	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC Soil Data - RME
100 (RME Site Worker)
10-6
1 (All Receptors)
20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-45

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone	5.46E-10		1.00E-01	NA	5.46E-09	
Benzene		5.59E-11	NA	2.90E-02		1.62E-12
Methylene Chloride	0.00E+00	0.00E+00	6.00E-02	7.50E-03	0.00E+00	0.00E+00
Toluene	5.16E-10		2.00E-01	NA	2.58E-09	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene	2.18E-08		2.00E-03	NA	1.09E-05	
2,6-Dinitrotoluene	0.00E+00		1.00E-03	NA	0.00E+00	
2-Methylnaphthalene			NA	NA		
2-Methylphenol	0.00E+00		5.00E-02	NA	0.00E+00	
3,3'-Dichlorobenzidine		6.91E-09	NA	4.50E-01		3.11E-09
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene	2.58E-09		6.00E-02	NA	4.31E-08	
Acenaphthylene			NA	NA		
Anthracene	1.02E-08		3.00E-01	NA	3.39E-08	
Benzo(a)anthracene		9.61E-09	NA	7.30E-01		7.02E-09
Benzo(a)pyrene		1.06E-08	NA	7.30E+00		7.76E-08
Benzo(b)fluoranthene		1.04E-08	NA	7.30E-01		7.59E-09
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		8.24E-09	NA	7.30E-01		6.01E-09
Butylbenzylphthalate	3.60E-09		2.00E+00	NA	1.80E-09	
Carbazole		7.15E-09	NA	2.00E-02		1.43E-10
Chrysene		9.07E-09	NA	7.30E-02		6.62E-10
Di-n-butylphthalate	2.30E-08		1.00E-01	NA	2.30E-07	
Dibenz(a,h)anthracene		7.95E-09	NA	7.30E+00		5.80E-08
Dibenzofuran			NA	NA		
Fluoranthene	2.55E-08		4.00E-02	NA	6.37E-07	
Fluorene	2.97E-09		4.00E-02	NA	7.44E-08	
Indeno(1,2,3-cd)pyrene		9.19E-09	NA	7.30E-01		6.71E-09
N-Nitrosodiphenylamine (1)		2.66E-09	NA	4.90E-03		1.30E-11
Naphthalene			NA	NA		
Pentachlorophenol	5.17E-08	1.84E-08	3.00E-02	1.20E-01	1.72E-06	2.21E-09
Phenanthrene			NA	NA		
Pyrene	2.36E-08		3.00E-02	NA	7.86E-07	
bis(2-Chloroisopropyl) ether	1.73E-08		1.00E-03	NA	1.73E-05	
bis(2-Ethylhexyl)phthalate	2.57E-08	9.16E-09	2.00E-02	1.40E-02	1.28E-06	1.28E-10
PESTICIDES/PCB						
4,4'-DDD	2.35E-10	8.40E-11	5.00E-04	2.40E-01	4.70E-07	2.02E-11
4,4'-DDE			NA	NA		
4,4'-DDT	2.74E-10	9.77E-11	5.00E-04	3.40E-01	5.47E-07	3.32E-11
Aldrin	1.06E-10	3.80E-11	3.00E-05	1.70E+01	3.55E-06	6.46E-10
Aroclor-1260		7.22E-10	NA	7.70E+00		5.56E-09
Dieldrin	3.35E-10	1.20E-10	5.00E-05	1.60E+01	6.71E-06	1.92E-09
Endosulfan I	3.15E-10		6.00E-03	NA	5.25E-08	
Endosulfan sulfate	2.04E-10		5.00E-05	NA	4.09E-06	
Endrin	2.47E-10		3.00E-04	NA	8.24E-07	
Endrin ketone			NA	NA		
Heptachlor epoxide	0.00E+00	0.00E+00	1.30E-05	9.10E+00	0.00E+00	0.00E+00
alpha-Chlordane	8.30E-11	2.96E-11	6.00E-05	1.30E+00	1.38E-06	3.85E-11
beta-BHC		4.23E-11	NA	1.80E+00		7.61E-11
delta-BHC			NA	NA		

TABLE 7-45

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic	4.34E-07	1.55E-07	3.00E-04	1.75E+00	1.45E-03	2.71E-07
Barium	9.80E-06		7.00E-02	NA	1.40E-04	
Cadmium	1.61E-07		5.00E-04	NA	3.23E-04	
Copper	4.88E-06		4.00E-02	NA	1.22E-04	
Lead			NA	NA		
Mercury	8.69E-09		3.00E-04	NA	2.90E-05	
Selenium	9.06E-08		5.00E-03	NA	1.81E-05	
Silver	5.87E-08		5.00E-03	NA	1.17E-05	
Thallium	4.77E-08		7.00E-05	NA	6.82E-04	
Zinc	1.20E-05		3.00E-01	NA	4.01E-05	
HERBICIDES						
MCPA	4.40E-07		5.00E-04	NA	8.81E-04	
Totals - HQ & CR					**3.74E-03**	**4.49E-07**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-24

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
VOLATILE ORGANICS												
Acetone			6.98E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzene			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Methylene Chloride				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toluene			6.59E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			2.79E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2,6-Dinitrotoluene				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2-Methylnaphthalene			1.30E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2-Methylphenol				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3,3'-Dichlorobenzidine			2.47E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3-Nitroaniline			5.98E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4-Nitroaniline			5.98E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthene			3.30E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthylene			9.60E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Anthracene			1.30E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)anthracene			3.44E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)pyrene			3.80E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(b)fluoranthene			3.72E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(g,h,i)perylene			3.06E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(k)fluoranthene			2.95E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Butylbenzylphthalate			4.60E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbazole			2.56E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chrysene			3.25E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Di-n-butylphthalate			2.94E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenz(a,h)anthracene			2.84E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenzofuran			3.60E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluoranthene			3.25E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluorene			3.80E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550

TABLE 7-24

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
Indeno(1,2,3-cd)pyrene			3.29E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			9.50E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Naphthalene			3.70E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pentachlorophenol			6.60E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Phenanthrene			3.19E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pyrene			3.01E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether			2.21E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			3.28E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
PESTICIDES/PCB												
4,4'-DDD			3.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDE			5.78E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDT			3.49E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aldrin			1.36E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aroclor-1260		2.51E-09	2.58E-02	1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Dieldrin			4.28E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan I			4.02E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan sulfate			2.61E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin			3.16E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin ketone			3.45E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor epoxide				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
alpha-Chlordane			1.06E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
beta-BHC			1.51E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
delta-BHC			1.37E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550

TABLE 7-24

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
METALS												
Arsenic			5.54E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Barium			1.25E+02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Cadmium	9.35E-08		2.06E+00	1.00E-06	5,800	1.0	0.01	20	25	70	9,125	25,550
Copper			6.24E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Lead			6.19E+02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Mercury			1.11E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Selenium			1.16E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Silver			7.50E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Thallium			6.10E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Zinc			1.54E+02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
HERBICIDES												
MCPA			5.63E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550

EQUATION: Absorbed dose (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
CF = Conversion Factor (10-6 kg/mg)
SA = Surface Area Contact (cm²)
AF =Soil to Skin Adherence Factor (mg/cm²)
ABS = Absorption Factor (unitless)

Assumptions:

EPC Soil Data - RME
10-6
5,800 cm² (RME Site Worker)
1.0 (RME all receptors)
Compound Specific for PCBs and Cd
EPA, 1992b (Default Assumption 0% = 0.0)

Variables:

EF = Exposure Frequency (events/year)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult Male)
25 x 365 (Nc) 70 x 365 Adult (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-47

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Chloroisopropyl) ether			1.00E-03	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
PESTICIDES/PCB						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1260		2.51E-09	NA	8.11E+00		2.04E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		

TABLE 7-47

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Cadmium	9.35E-08		3.00E-05	NA	3.12E-03	
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			2.00E-02	NA		
HERBICIDES						
MCPA			5.00E-04	NA		
Totals - HQ & CR					**3.12E-03**	**2.04E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-18

CALCULATION OF INTAKE FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
VOLATILE ORGANICS											
Acetone	2.18E-09		6.98E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Benzene		2.24E-10	2.00E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Toluene	2.06E-09		6.59E-03	100	1.00E-06	1	80	25	70	9,125	25,550
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene	8.73E-08		2.79E-01	100	1.00E-06	1	80	25	70	9,125	25,550
2,6-Dinitrotoluene	0.00E+00		0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
2-Methylnaphthalene			1.30E-01	100	1.00E-06	1	80	25	70	9,125	25,550
2-Methylphenol	0.00E+00		0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
3,3'-Dichlorobenzidine		2.76E-08	2.47E-01	100	1.00E-06	1	80	25	70	9,125	25,550
3-Nitroaniline			5.98E-01	100	1.00E-06	1	80	25	70	9,125	25,550
4-Nitroaniline			5.98E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Acenaphthene	1.03E-08		3.30E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Acenaphthylene			9.60E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Anthracene	4.07E-08		1.30E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(a)anthracene		3.84E-08	3.44E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(a)pyrene		4.25E-08	3.80E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(b)fluoranthene		4.16E-08	3.72E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(g,h,i)perylene			3.06E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(k)fluoranthene		3.29E-08	2.95E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Butylbenzylphthalate	1.44E-08		4.60E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Carbazole		2.86E-08	2.56E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Chrysene		3.63E-08	3.25E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Di-n-butylphthalate	9.21E-08		2.94E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Dibenz(a,h)anthracene		3.18E-08	2.84E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Dibenzofuran			3.60E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Fluoranthene	1.02E-07		3.25E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Fluorene	1.19E-08		3.80E-02	100	1.00E-06	1	80	25	70	9,125	25,550

TABLE 7-18

CALCULATION OF INTAKE FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Indeno(1,2,3-cd)pyrene		3.68E-08	3.29E-01	100	1.00E-06	1	80	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)		1.06E-08	9.50E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Naphthalene			3.70E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Pentachlorophenol	2.07E-07	7.38E-08	6.60E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Phenanthrene			3.19E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Pyrene	9.43E-08		3.01E-01	100	1.00E-06	1	80	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether	6.93E-08		2.21E-01	100	1.00E-06	1	80	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate	1.03E-07	3.67E-08	3.28E-01	100	1.00E-06	1	80	25	70	9,125	25,550
PESTICIDES/PCB											
4,4'-DDD	9.41E-10	3.36E-10	3.00E-03	100	1.00E-06	1	80	25	70	9,125	25,550
4,4'-DDE			5.78E-03	100	1.00E-06	1	80	25	70	9,125	25,550
4,4'-DDT	1.09E-09	3.91E-10	3.49E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Aldrin	4.26E-10	1.52E-10	1.36E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Aroclor-1260		2.89E-09	2.58E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Dieldrin	1.34E-09	4.79E-10	4.28E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Endosulfan I	1.26E-09		4.02E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Endosulfan sulfate	8.18E-10		2.61E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Endrin	9.89E-10		3.16E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Endrin ketone			3.45E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
alpha-Chlordane	3.32E-10	1.19E-10	1.06E-03	100	1.00E-06	1	80	25	70	9,125	25,550
beta-BHC		1.69E-10	1.51E-03	100	1.00E-06	1	80	25	70	9,125	25,550
delta-BHC			1.37E-03	100	1.00E-06	1	80	25	70	9,125	25,550

TABLE 7-18

CALCULATION OF INTAKE FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
METALS											
Arsenic	1.73E-06	6.20E-07	5.54E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Barium	3.92E-05		1.25E+02	100	1.00E-06	1	80	25	70	9,125	25,550
Cadmium	6.45E-07		2.06E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Copper	1.95E-05		6.24E+01	100	1.00E-06	1	80	25	70	9,125	25,550
Lead			6.19E+02	100	1.00E-06	1	80	25	70	9,125	25,550
Mercury	3.48E-08		1.11E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Selenium	3.63E-07		1.16E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Silver	2.35E-07		7.50E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Thallium	1.91E-07		6.10E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Zinc	4.82E-05		1.54E+02	100	1.00E-06	1	80	25	70	9,125	25,550
HERBICIDES											
MCPA	1.76E-06		5.63E+00	100	1.00E-06	1	80	25	70	9,125	25,550

EQUATION:

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

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC - Soil Data (RME)
100 (RME Adult Worker)
10-6
1 (All Receptors)
80 (RME Adult Industrial Worker)
25 (Upper bound limit)
70 (Adult male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-51

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone	2.18E-09		1.00E-01	NA	2.18E-08	
Benzene		2.24E-10	NA	2.90E-02		6.49E-12
Methylene Chloride	0.00E+00	0.00E+00	6.00E-02	7.50E-03	0.00E+00	0.00E+00
Toluene	2.06E-09		2.00E-01	NA	1.03E-08	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene	8.73E-08		2.00E-03	NA	4.37E-05	
2,6-Dinitrotoluene	0.00E+00		1.00E-03	NA	0.00E+00	
2-Methylnaphthalene			NA	NA		
2-Methylphenol	0.00E+00		5.00E-02	NA	0.00E+00	
3,3'-Dichlorobenzidine		2.76E-08	NA	4.50E-01		1.24E-08
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene	1.03E-08		6.00E-02	NA	1.72E-07	
Acenaphthylene			NA	NA		
Anthracene	4.07E-08		3.00E-01	NA	1.36E-07	
Benzo(a)anthracene		3.84E-08	NA	7.30E-01		2.81E-08
Benzo(a)pyrene		4.25E-08	NA	7.30E+00		3.10E-07
Benzo(b)fluoranthene		4.16E-08	NA	7.30E-01		3.04E-08
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		3.29E-08	NA	7.30E-01		2.40E-08
Butylbenzylphthalate	1.44E-08		2.00E+00	NA	7.20E-09	
Carbazole		2.86E-08	NA	2.00E-02		5.72E-10
Chrysene		3.63E-08	NA	7.30E-02		2.65E-09
Di-n-butylphthalate	9.21E-08		1.00E-01	NA	9.21E-07	
Dibenz(a,h)anthracene		3.18E-08	NA	7.30E+00		2.32E-07
Dibenzofuran			NA	NA		
Fluoranthene	1.02E-07		4.00E-02	NA	2.55E-06	
Fluorene	1.19E-08		4.00E-02	NA	2.97E-07	
Indeno(1,2,3-cd)pyrene		3.68E-08	NA	7.30E-01		2.68E-08
N-Nitrosodiphenylamine (1)		1.06E-08	NA	4.90E-03		5.21E-11
Naphthalene			NA	NA		
Pentachlorophenol	2.07E-07	7.38E-08	3.00E-02	1.20E-01	6.89E-06	8.86E-09
Phenanthrene			NA	NA		
Pyrene	9.43E-08		3.00E-02	NA	3.14E-06	
bis(2-Chloroisopropyl) ether	6.93E-08		1.00E-03	NA	6.93E-05	
bis(2-Ethylhexyl)phthalate	1.03E-07	3.67E-08	2.00E-02	1.40E-02	5.13E-06	5.13E-10
PESTICIDES/PCB						
4,4'-DDD	9.41E-10	3.36E-10	5.00E-04	2.40E-01	1.88E-06	8.06E-11
4,4'-DDE			NA	NA		
4,4'-DDT	1.09E-09	3.91E-10	5.00E-04	3.40E-01	2.19E-06	1.33E-10
Aldrin	4.26E-10	1.52E-10	3.00E-05	1.70E+01	1.42E-05	2.58E-09
Aroclor-1260		2.89E-09	NA	7.70E+00		2.22E-08
Dieldrin	1.34E-09	4.79E-10	5.00E-05	1.60E+01	2.68E-05	7.66E-09
Endosulfan I	1.26E-09		6.00E-03	NA	2.10E-07	
Endosulfan sulfate	8.18E-10		5.00E-05	NA	1.64E-05	
Endrin	9.89E-10		3.00E-04	NA	3.30E-06	
Endrin ketone			NA	NA		
Heptachlor epoxide	0.00E+00	0.00E+00	1.30E-05	9.10E+00	0.00E+00	0.00E+00
alpha-Chlordane	3.32E-10	1.19E-10	6.00E-05	1.30E+00	5.53E-06	1.54E-10
beta-BHC		1.69E-10	NA	1.80E+00		3.04E-10
delta-BHC			NA	NA		

TABLE 7-51

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic	1.73E-06	6.20E-07	3.00E-04	1.75E+00	5.78E-03	1.08E-06
Barium	3.92E-05		7.00E-02	NA	5.60E-04	
Cadmium	6.45E-07		5.00E-04	NA	1.29E-03	
Copper	1.95E-05		4.00E-02	NA	4.88E-04	
Lead			NA	NA		
Mercury	3.48E-08		3.00E-04	NA	1.16E-04	
Selenium	3.63E-07		5.00E-03	NA	7.25E-05	
Silver	2.35E-07		5.00E-03	NA	4.70E-05	
Thallium	1.91E-07		7.00E-05	NA	2.73E-03	
Zinc	4.82E-05		3.00E-01	NA	1.61E-04	
HERBICIDES						
MCPA	1.76E-06		5.00E-04	NA	3.52E-03	
Totals - HQ & CR					**1.50E-02**	**1.79E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm^2)	Adherence Factor (mg soil/cm^2)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
VOLATILE ORGANICS												
Acetone			6.98E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzene			2.00E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Methylene Chloride				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Toluene			6.59E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			2.79E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
2,6-Dinitrotoluene				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
2-Methylnaphthalene			1.30E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
2-Methylphenol				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
3,3'-Dichlorobenzidine			2.47E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
3-Nitroaniline			5.98E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
4-Nitroaniline			5.98E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Acenaphthene			3.30E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Acenaphthylene			9.60E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Anthracene			1.30E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(a)anthracene			3.44E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(a)pyrene			3.80E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(b)fluoranthene			3.72E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(g,h,i)perylene			3.06E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(k)fluoranthene			2.95E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Butylbenzylphthalate			4.60E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Carbazole			2.56E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Chrysene			3.25E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Di-n-butylphthalate			2.94E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Dibenz(a,h)anthracene			2.84E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Dibenzofuran			3.60E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Fluoranthene			3.25E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Fluorene			3.80E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550

TABLE 7-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Indeno(1,2,3-cd)pyrene			3.29E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			9.50E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Naphthalene			3.70E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Pentachlorophenol			6.60E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Phenanthrene			3.19E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Pyrene			3.01E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether			2.21E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			3.28E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
PESTICIDES/PCB												
4,4'-DDD			3.00E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
4,4'-DDE			5.78E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
4,4'-DDT			3.49E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Aldrin			1.36E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Aroclor-1260		1.01E-08	2.58E-02	1.00E-06	5,800	1.0	0.06	80	25	70	9,125	25,550
Dieldrin			4.28E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Endosulfan I			4.02E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Endosulfan sulfate			2.61E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Endrin			3.16E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Endrin ketone			3.45E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Heptachlor epoxide				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
alpha-Chlordane			1.06E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
beta-BHC			1.51E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
delta-BHC			1.37E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550

TABLE 7-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm^2)	Adherence Factor (mg soil/cm^2)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
METALS												
Arsenic			5.54E+00	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Barium			1.25E+02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Cadmium	3.741E-07		2.06E+00	1.00E-06	5,800	1.0	0.01	80	25	70	9,125	25,550
Copper			6.24E+01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Lead			6.19E+02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Mercury			1.11E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Selenium			1.16E+00	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Silver			7.50E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Thallium			6.10E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Zinc			1.54E+02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
HERBICIDES												
MCPA			5.63E+00	1.00E-06	5,800	1.0		80	25	70	9,125	25,550

EQUATION:

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

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
CF = Conversion Factor (10-6 kg/mg)
SA = Surface Area Contact (cm^2)
AF =Soil to Skin Adherence Factor (mg/cm^2)
ABS = Absorption Factor (unitless)

Assumptions:

EPC - Soil Data (RME)
10-6
5,800 (RME Adult Worker)
1.0 (RME - All Receptors)
Applicable for PCBs and Cadmium (EPA, 1992b)

Variables:

EF = Exposure Frequency (days/year)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

80 (RME Industrial Worker)
25 (RME Industrial Worker)
70 (Adult Male)
25 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-53

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Chloroisopropyl) ether			1.00E-03	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
PESTICIDES/PCB						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1260		1.01E-08	NA	8.11E+00		8.15E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		

TABLE 7-53

**CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity**

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Cadmium	3.74E-07		3.00E-05	NA	1.25E-02	
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			2.00E-02	NA		
HERBICIDES						
MCPA			5.00E-04	NA		
Totals - HQ & CR					**1.25E-02**	**8.15E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-14

CALCULATION OF INTAKE (ONSITE)
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
VOLATILE ORGANICS									
Acetone			2.65E-10	2	50	5	25	1,825	25,550
Benzene		5.95E-14	7.60E-11	2	50	5	25	1,825	25,550
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
Toluene	2.74E-12		2.50E-10	2	50	5	25	1,825	25,550
SEMIVOLATILE ORGANICS									
2,4-Dinitrotoluene			1.06E-08	2	50	5	25	1,825	25,550
2,6-Dinitrotoluene			0.00E+00	2	50	5	25	1,825	25,550
2-Methylnaphthalene			4.94E-09	2	50	5	25	1,825	25,550
2-Methylphenol			0.00E+00	2	50	5	25	1,825	25,550
3,3'-Dichlorobenzidine			9.39E-09	2	50	5	25	1,825	25,550
3-Nitroaniline			2.27E-08	2	50	5	25	1,825	25,550
4-Nitroaniline			2.27E-08	2	50	5	25	1,825	25,550
Acenaphthene			1.25E-09	2	50	5	25	1,825	25,550
Acenaphthylene			3.65E-09	2	50	5	25	1,825	25,550
Anthracene			4.94E-09	2	50	5	25	1,825	25,550
Benzo(a)anthracene			1.31E-08	2	50	5	25	1,825	25,550
Benzo(a)pyrene			1.44E-08	2	50	5	25	1,825	25,550
Benzo(b)fluoranthene			1.41E-08	2	50	5	25	1,825	25,550
Benzo(g,h,i)perylene			1.16E-08	2	50	5	25	1,825	25,550
Benzo(k)fluoranthene			1.12E-08	2	50	5	25	1,825	25,550
Butylbenzylphthalate			1.75E-09	2	50	5	25	1,825	25,550
Carbazole			9.72E-09	2	50	5	25	1,825	25,550
Chrysene			1.23E-08	2	50	5	25	1,825	25,550
Di-n-butylphthalate			1.12E-08	2	50	5	25	1,825	25,550
Dibenz(a,h)anthracene			1.08E-08	2	50	5	25	1,825	25,550
Dibenzofuran			1.37E-09	2	50	5	25	1,825	25,550
Fluoranthene			1.24E-08	2	50	5	25	1,825	25,550
Fluorene			1.44E-09	2	50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene			1.25E-08	2	50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			3.61E-09	2	50	5	25	1,825	25,550
Naphthalene			1.41E-09	2	50	5	25	1,825	25,550
Pentachlorophenol			2.51E-08	2	50	5	25	1,825	25,550
Phenanthrene			1.21E-08	2	50	5	25	1,825	25,550
Pyrene			1.14E-08	2	50	5	25	1,825	25,550
bis(2-Chloroisopropyl) ether	9.22E-11		8.41E-09	2	50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			1.25E-08	2	50	5	25	1,825	25,550
PESTICIDES/PCB									
4,4'-DDD			1.14E-10	2	50	5	25	1,825	25,550
4,4'-DDE			2.20E-10	2	50	5	25	1,825	25,550
4,4'-DDT		1.04E-13	1.33E-10	2	50	5	25	1,825	25,550
Aldrin	5.66E-13	4.04E-14	5.17E-11	2	50	5	25	1,825	25,550
Aroclor-1260			9.82E-10	2	50	5	25	1,825	25,550
Dieldrin		1.27E-13	1.63E-10	2	50	5	25	1,825	25,550
Endosulfan I			1.53E-10	2	50	5	25	1,825	25,550
Endosulfan sulfate			9.92E-11	2	50	5	25	1,825	25,550
Endrin			1.20E-10	2	50	5	25	1,825	25,550
Endrin ketone			1.31E-10	2	50	5	25	1,825	25,550
Heptachlor epoxide		0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
alpha-Chlordane			4.03E-11	2	50	5	25	1,825	25,550
beta-BHC		4.50E-14	5.74E-11	2	50	5	25	1,825	25,550
delta-BHC			5.21E-11	2	50	5	25	1,825	25,550

TABLE 7-14

CALCULATION OF INTAKE (ONSITE)
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
METALS									
Arsenic		1.65E-10	2.11E-07	2	50	5	25	1,825	25,550
Barium	5.22E-08		4.76E-06	2	50	5	25	1,825	25,550
Cadmium		6.13E-11	7.83E-08	2	50	5	25	1,825	25,550
Copper			2.37E-06	2	50	5	25	1,825	25,550
Lead			2.35E-05	2	50	5	25	1,825	25,550
Mercury	4.62E-11		4.22E-09	2	50	5	25	1,825	25,550
Selenium			4.40E-08	2	50	5	25	1,825	25,550
Silver			2.85E-08	2	50	5	25	1,825	25,550
Thallium			2.32E-08	2	50	5	25	1,825	25,550
Zinc			5.85E-06	2	50	5	25	1,825	25,550
HERBICIDES									
MCPA			2.14E-07	2	50	5	25	1,825	25,550

EQUATION: Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:

CA = Chemical Concentration in Air (mg/m³)
IR = Inhalation Rate (m³/day)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

Calculated EPC Air Data - RME
2 (RME Child)
50
5
25 (Child)
5 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-61

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			NA	NA		
Benzene		5.95E-14	NA	2.91E-02		1.73E-15
Methylene Chloride	0.00E+00	0.00E+00	8.57E-01	1.65E-03	0.00E+00	0.00E+00
Toluene	2.74E-12		1.14E-01	NA	2.40E-11	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Butylbenzylphthalate			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Chloroisopropyl) ether	9.22E-11		1.00E-03	NA	9.22E-08	
bis(2-Ethylhexyl)phthalate			NA	NA		
PESTICIDES/PCB						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		1.04E-13	NA	3.40E-01		3.53E-14
Aldrin	5.66E-13	4.04E-14	1.70E+01	1.72E+01	3.33E-14	6.93E-13
Aroclor-1260			NA	NA		
Dieldrin		1.27E-13	NA	1.61E+01		2.05E-12
Endosulfan I			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide		0.00E+00	NA	9.10E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		4.50E-14	NA	1.86E+00		8.36E-14
delta-BHC			NA	NA		

TABLE 7-61

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic		1.65E-10	NA	1.51E+01		2.48E-09
Barium	5.22E-08		1.43E-04	NA	3.65E-04	
Cadmium		6.13E-11	NA	6.30E+00		3.86E-10
Copper			NA	NA		
Lead			NA	NA		
Mercury	4.62E-11		8.57E-05	NA	5.39E-07	
Selenium			NA	NA		
Silver			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
HERBICIDES						
MCPA			NA	NA		
Total HQ & CR					**3.66E-04**	**2.87E-09**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-7A

AMBIENT AIR EXPOSURE POINT CONCENTRATIONS
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

COMPOUND	SURFACE SOIL EPC Data mg/kg	AVERAGE TSP (ug/m³)	CONVERSION FACTOR (kg/ug)	AIR CALCULATED EPC (mg/m³)
VOLATILE ORGANICS				
Acetone	6.98E-03	3.80E+01	1.00E-09	2.65E-10
Benzene	2.00E-03	3.80E+01	1.00E-09	7.60E-11
Methylene Chloride	0.00E+00	3.80E+01	1.00E-09	0.00E+00
Toluene	6.59E-03	3.80E+01	1.00E-09	2.50E-10
SEMIVOLATILE ORGANICS				
2,4-Dinitrotoluene	2.79E-01	3.80E+01	1.00E-09	1.06E-08
2,6-Dinitrotoluene	0.00E+00	3.80E+01	1.00E-09	0.00E+00
2-Methylnaphthalene	1.30E-01	3.80E+01	1.00E-09	4.94E-09
2-Methylphenol	0.00E+00	3.80E+01	1.00E-09	0.00E+00
3,3'-Dichlorobenzidine	2.47E-01	3.80E+01	1.00E-09	9.39E-09
3-Nitroaniline	5.98E-01	3.80E+01	1.00E-09	2.27E-08
4-Nitroaniline	5.98E-01	3.80E+01	1.00E-09	2.27E-08
Acenaphthene	3.30E-02	3.80E+01	1.00E-09	1.25E-09
Acenaphthylene	9.60E-02	3.80E+01	1.00E-09	3.65E-09
Anthracene	1.30E-01	3.80E+01	1.00E-09	4.94E-09
Benzo(a)anthracene	3.44E-01	3.80E+01	1.00E-09	1.31E-08
Benzo(a)pyrene	3.80E-01	3.80E+01	1.00E-09	1.44E-08
Benzo(b)fluoranthene	3.72E-01	3.80E+01	1.00E-09	1.41E-08
Benzo(g,h,i)perylene	3.06E-01	3.80E+01	1.00E-09	1.16E-08
Benzo(k)fluoranthene	2.95E-01	3.80E+01	1.00E-09	1.12E-08
Butylbenzylphthalate	4.60E-02	3.80E+01	1.00E-09	1.75E-09
Carbazole	2.56E-01	3.80E+01	1.00E-09	9.72E-09
Chrysene	3.25E-01	3.80E+01	1.00E-09	1.23E-08
Di-n-butylphthalate	2.94E-01	3.80E+01	1.00E-09	1.12E-08
Dibenz(a,h)anthracene	2.84E-01	3.80E+01	1.00E-09	1.08E-08
Dibenzofuran	3.60E-02	3.80E+01	1.00E-09	1.37E-09
Fluoranthene	3.25E-01	3.80E+01	1.00E-09	1.24E-08
Fluorene	3.80E-02	3.80E+01	1.00E-09	1.44E-09
Indeno(1,2,3-cd)pyrene	3.29E-01	3.80E+01	1.00E-09	1.25E-08
N-Nitrosodiphenylamine (1)	9.50E-02	3.80E+01	1.00E-09	3.61E-09
Naphthalene	3.70E-02	3.80E+01	1.00E-09	1.41E-09
Pentachlorophenol	6.60E-01	3.80E+01	1.00E-09	2.51E-08
Phenanthrene	3.19E-01	3.80E+01	1.00E-09	1.21E-08
Pyrene	3.01E-01	3.80E+01	1.00E-09	1.14E-08
bis(2-Chloroisopropyl) ether	2.21E-01	3.80E+01	1.00E-09	8.41E-09
bis(2-Ethylhexyl)phthalate	3.28E-01	3.80E+01	1.00E-09	1.25E-08
PESTICIDES/PCB				
4,4'-DDD	3.00E-03	3.80E+01	1.00E-09	1.14E-10
4,4'-DDE	5.78E-03	3.80E+01	1.00E-09	2.20E-10
4,4'-DDT	3.49E-03	3.80E+01	1.00E-09	1.33E-10
Aldrin	1.36E-03	3.80E+01	1.00E-09	5.17E-11
Aroclor-1260	2.58E-02	3.80E+01	1.00E-09	9.82E-10
Dieldrin	4.28E-03	3.80E+01	1.00E-09	1.63E-10
Endosulfan I	4.02E-03	3.80E+01	1.00E-09	1.53E-10
Endosulfan sulfate	2.61E-03	3.80E+01	1.00E-09	9.92E-11
Endrin	3.16E-03	3.80E+01	1.00E-09	1.20E-10
Endrin ketone	3.45E-03	3.80E+01	1.00E-09	1.31E-10
Heptachlor epoxide	0.00E+00	3.80E+01	1.00E-09	0.00E+00
alpha-Chlordane	1.06E-03	3.80E+01	1.00E-09	4.03E-11
beta-BHC	1.51E-03	3.80E+01	1.00E-09	5.74E-11
delta-BHC	1.37E-03	3.80E+01	1.00E-09	5.21E-11

TABLE 7-7A

AMBIENT AIR EXPOSURE POINT CONCENTRATIONS
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

COMPOUND	SURFACE SOIL EPC Data mg/kg	AVERAGE TSP (ug/m^3)	CONVERSION FACTOR (kg/ug)	AIR CALCULATED EPC (mg/m^3)
METALS				
Arsenic	5.54E+00	3.80E+01	1.00E-09	2.11E-07
Barium	1.25E+02	3.80E+01	1.00E-09	4.76E-06
Cadmium	2.06E+00	3.80E+01	1.00E-09	7.83E-08
Copper	6.24E+01	3.80E+01	1.00E-09	2.37E-06
Lead	6.19E+02	3.80E+01	1.00E-09	2.35E-05
Mercury	1.11E-01	3.80E+01	1.00E-09	4.22E-09
Selenium	1.16E+00	3.80E+01	1.00E-09	4.40E-08
Silver	7.50E-01	3.80E+01	1.00E-09	2.85E-08
Thallium	6.10E-01	3.80E+01	1.00E-09	2.32E-08
Zinc	1.54E+02	3.80E+01	1.00E-09	5.85E-06
HERBICIDES				
MCPA	5.63E+00	3.80E+01	1.00E-09	2.14E-07

EQUATION: **Calculated Air EPC (mg/m3) = Soil EPC x TSP x CF**

Variables:	**Assumptions:**
TSP = Total Suspended Particulates	**Average value - 38 ug/m3**
CF = Conversion Factor	**10-9 kg/ug**

TABLE 7-8

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m^3)	Inhalation Rate (m^3/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
VOLATILE ORGANICS									
Acetone			2.65E-10	20	20	25	70	9,125	25,550
Benzene		4.25E-13	7.60E-11	20	20	25	70	9,125	25,550
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
Toluene	3.92E-12		2.50E-10	20	20	25	70	9,125	25,550
SEMIVOLATILE ORGANICS									
2,4-Dinitrotoluene			1.06E-08	20	20	25	70	9,125	25,550
2,6-Dinitrotoluene			0.00E+00	20	20	25	70	9,125	25,550
2-Methylnaphthalene			4.94E-09	20	20	25	70	9,125	25,550
2-Methylphenol			0.00E+00	20	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine			9.39E-09	20	20	25	70	9,125	25,550
3-Nitroaniline			2.27E-08	20	20	25	70	9,125	25,550
4-Nitroaniline			2.27E-08	20	20	25	70	9,125	25,550
Acenaphthene			1.25E-09	20	20	25	70	9,125	25,550
Acenaphthylene			3.65E-09	20	20	25	70	9,125	25,550
Anthracene			4.94E-09	20	20	25	70	9,125	25,550
Benzo(a)anthracene			1.31E-08	20	20	25	70	9,125	25,550
Benzo(a)pyrene			1.44E-08	20	20	25	70	9,125	25,550
Benzo(b)fluoranthene			1.41E-08	20	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			1.16E-08	20	20	25	70	9,125	25,550
Benzo(k)fluoranthene			1.12E-08	20	20	25	70	9,125	25,550
Butylbenzylphthalate			1.75E-09	20	20	25	70	9,125	25,550
Carbazole			9.72E-09	20	20	25	70	9,125	25,550
Chrysene			1.23E-08	20	20	25	70	9,125	25,550
Di-n-butylphthalate			1.12E-08	20	20	25	70	9,125	25,550
Dibenz(a,h)anthracene			1.08E-08	20	20	25	70	9,125	25,550
Dibenzofuran			1.37E-09	20	20	25	70	9,125	25,550
Fluoranthene			1.24E-08	20	20	25	70	9,125	25,550
Fluorene			1.44E-09	20	20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			1.25E-08	20	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			3.61E-09	20	20	25	70	9,125	25,550
Naphthalene			1.41E-09	20	20	25	70	9,125	25,550
Pentachlorophenol			2.51E-08	20	20	25	70	9,125	25,550
Phenanthrene			1.21E-08	20	20	25	70	9,125	25,550
Pyrene			1.14E-08	20	20	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether	1.32E-10		8.41E-09	20	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			1.25E-08	20	20	25	70	9,125	25,550
PESTICIDES/PCB									
4,4'-DDD			1.14E-10	20	20	25	70	9,125	25,550
4,4'-DDE			2.20E-10	20	20	25	70	9,125	25,550
4,4'-DDT		7.42E-13	1.33E-10	20	20	25	70	9,125	25,550
Aldrin	8.09E-13	2.89E-13	5.17E-11	20	20	25	70	9,125	25,550
Aroclor-1260			9.82E-10	20	20	25	70	9,125	25,550
Dieldrin		9.10E-13	1.63E-10	20	20	25	70	9,125	25,550
Endosulfan I			1.53E-10	20	20	25	70	9,125	25,550
Endosulfan sulfate			9.92E-11	20	20	25	70	9,125	25,550
Endrin			1.20E-10	20	20	25	70	9,125	25,550
Endrin ketone			1.31E-10	20	20	25	70	9,125	25,550
Heptachlor epoxide		0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
alpha-Chlordane			4.03E-11	20	20	25	70	9,125	25,550
beta-BHC		3.21E-13	5.74E-11	20	20	25	70	9,125	25,550
delta-BHC			5.21E-11	20	20	25	70	9,125	25,550

TABLE 7-8

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
METALS									
Arsenic		1.18E-09	2.11E-07	20	20	25	70	9,125	25,550
Barium	7.45E-08		4.76E-06	20	20	25	70	9,125	25,550
Cadmium		4.38E-10	7.83E-08	20	20	25	70	9,125	25,550
Copper			2.37E-06	20	20	25	70	9,125	25,550
Lead			2.35E-05	20	20	25	70	9,125	25,550
Mercury	6.60E-11		4.22E-09	20	20	25	70	9,125	25,550
Selenium			4.40E-08	20	20	25	70	9,125	25,550
Silver			2.85E-08	20	20	25	70	9,125	25,550
Thallium			2.32E-08	20	20	25	70	9,125	25,550
Zinc			5.85E-06	20	20	25	70	9,125	25,550
HERBICIDES									
MCPA			2.14E-07	20	20	25	70	9,125	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:

CA = Chemical Concentration in Air (mg/m³)
IR = Inhalation Rate (m³/day)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

Calculated EPC Air Data - RME
20 (RME All Receptors)
20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult Male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-43
CASE 2
CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SITE WORKER EXPOSURE (CURRENT LAND USE)
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			NA	NA		
Benzene		4.25E-13	NA	2.91E-02		1.24E-14
Methylene Chloride	0.00E+00	0.00E+00	8.57E-01	1.65E-03	0.00E+00	0.00E+00
Toluene	3.92E-12		1.14E-01	NA	3.43E-11	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Butylbenzylphthalate			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Chloroisopropyl) ether	1.32E-10		1.00E-03	NA	1.32E-07	
bis(2-Ethylhexyl)phthalate			NA	NA		
PESTICIDES/PCB						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		7.42E-13	NA	3.40E-01		2.52E-13
Aldrin	8.09E-13	2.89E-13	1.70E+01	1.72E+01	4.76E-14	4.95E-12
Aroclor-1260			NA	NA		
Dieldrin		9.10E-13	NA	1.61E+01		1.47E-11
Endosulfan I			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide		0.00E+00	NA	9.10E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		3.21E-13	NA	1.86E+00		5.97E-13
delta-BHC			NA	NA		

TABLE 7-43
CASE 2
CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SITE WORKER EXPOSURE (CURRENT LAND USE)
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic		1.18E-09	NA	1.51E+01		1.77E-08
Barium	7.45E-08		1.43E-04	NA	5.22E-04	
Cadmium		4.38E-10	NA	6.30E+00		2.76E-09
Copper			NA	NA		
Lead			NA	NA		
Mercury	6.60E-11		8.57E-05	NA	7.70E-07	
Selenium			NA	NA		
Silver			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
HERBICIDES						
MCPA			NA	NA		
Total HQ & CR					**5.22E-04**	**2.05E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-12

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
VOLATILE ORGANICS									
Acetone			2.65E-10	20	250	1	70	365	25,550
Benzene		2.12E-13	7.60E-11	20	250	1	70	365	25,550
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	20	250	1	70	365	25,550
Toluene	4.90E-11		2.50E-10	20	250	1	70	365	25,550
SEMIVOLATILE ORGANICS									
2,4-Dinitrotoluene			1.06E-08	20	250	1	70	365	25,550
2,6-Dinitrotoluene			0.00E+00	20	250	1	70	365	25,550
2-Methylnaphthalene			4.94E-09	20	250	1	70	365	25,550
2-Methylphenol			0.00E+00	20	250	1	70	365	25,550
3,3'-Dichlorobenzidine			9.39E-09	20	250	1	70	365	25,550
3-Nitroaniline			2.27E-08	20	250	1	70	365	25,550
4-Nitroaniline			2.27E-08	20	250	1	70	365	25,550
Acenaphthene			1.25E-09	20	250	1	70	365	25,550
Acenaphthylene			3.65E-09	20	250	1	70	365	25,550
Anthracene			4.94E-09	20	250	1	70	365	25,550
Benzo(a)anthracene			1.31E-08	20	250	1	70	365	25,550
Benzo(a)pyrene			1.44E-08	20	250	1	70	365	25,550
Benzo(b)fluoranthene			1.41E-08	20	250	1	70	365	25,550
Benzo(g,h,i)perylene			1.16E-08	20	250	1	70	365	25,550
Benzo(k)fluoranthene			1.12E-08	20	250	1	70	365	25,550
Butylbenzylphthalate			1.75E-09	20	250	1	70	365	25,550
Carbazole			9.72E-09	20	250	1	70	365	25,550
Chrysene			1.23E-08	20	250	1	70	365	25,550
Di-n-butylphthalate			1.12E-08	20	250	1	70	365	25,550
Dibenz(a,h)anthracene			1.08E-08	20	250	1	70	365	25,550
Dibenzofuran			1.37E-09	20	250	1	70	365	25,550
Fluoranthene			1.24E-08	20	250	1	70	365	25,550
Fluorene			1.44E-09	20	250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene			1.25E-08	20	250	1	70	365	25,550
N-Nitrosodiphenylamine (1)			3.61E-09	20	250	1	70	365	25,550
Naphthalene			1.41E-09	20	250	1	70	365	25,550
Pentachlorophenol			2.51E-08	20	250	1	70	365	25,550
Phenanthrene			1.21E-08	20	250	1	70	365	25,550
Pyrene			1.14E-08	20	250	1	70	365	25,550
bis(2-Chloroisopropyl) ether	1.65E-09		8.41E-09	20	250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate			1.25E-08	20	250	1	70	365	25,550
PESTICIDES/PCB									
4,4'-DDD			1.14E-10	20	250	1	70	365	25,550
4,4'-DDE			2.20E-10	20	250	1	70	365	25,550
4,4'-DDT		3.71E-13	1.33E-10	20	250	1	70	365	25,550
Aldrin	1.01E-11	1.44E-13	5.17E-11	20	250	1	70	365	25,550
Aroclor-1260			9.82E-10	20	250	1	70	365	25,550
Dieldrin		4.55E-13	1.63E-10	20	250	1	70	365	25,550
Endosulfan I			1.53E-10	20	250	1	70	365	25,550
Endosulfan sulfate			9.92E-11	20	250	1	70	365	25,550
Endrin			1.20E-10	20	250	1	70	365	25,550
Endrin ketone			1.31E-10	20	250	1	70	365	25,550
Heptachlor epoxide		0.00E+00	0.00E+00	20	250	1	70	365	25,550
alpha-Chlordane			4.03E-11	20	250	1	70	365	25,550
beta-BHC		1.61E-13	5.74E-11	20	250	1	70	365	25,550
delta-BHC			5.21E-11	20	250	1	70	365	25,550

TABLE 7-12

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m^3)	Inhalation Rate (m^3/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
METALS									
Arsenic		5.89E-10	2.11E-07	20	250	1	70	365	25,550
Barium	9.31E-07		4.76E-06	20	250	1	70	365	25,550
Cadmium		2.19E-10	7.83E-08	20	250	1	70	365	25,550
Copper			2.37E-06	20	250	1	70	365	25,550
Lead			2.35E-05	20	250	1	70	365	25,550
Mercury	8.25E-10		4.22E-09	20	250	1	70	365	25,550
Selenium			4.40E-08	20	250	1	70	365	25,550
Silver			2.85E-08	20	250	1	70	365	25,550
Thallium			2.32E-08	20	250	1	70	365	25,550
Zinc			5.85E-06	20	250	1	70	365	25,550
HERBICIDES									
MCPA			2.14E-07	20	250	1	70	365	25,550

EQUATION: **Intake (mg/kg-day) =** $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:

CA = Chemical Concentration in Air (mg/m^3)
IR = Inhalation Rate (m^3/day)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

Calculated EPC Air Data - RME
20 (all receptors)
250 (RME Construction Workers)
1 (Upper bound period of Construction Worker)
70 (Adult Male)
1 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-55

**CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity**

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			NA	NA		
Benzene		2.12E-13	NA	2.91E-02		6.18E-15
Methylene Chloride	0.00E+00	0.00E+00	8.57E-01	1.65E-03	0.00E+00	0.00E+00
Toluene	4.90E-11		1.14E-01	NA	4.29E-10	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Butylbenzylphthalate			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Chloroisopropyl) ether	1.65E-09		1.00E-03	NA	1.65E-06	
bis(2-Ethylhexyl)phthalate			NA	NA		
PESTICIDES/PCB						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		3.71E-13	NA	3.40E-01		1.26E-13
Aldrin	1.01E-11	1.44E-13	1.70E+01	1.72E+01	5.95E-13	2.48E-12
Aroclor-1260			NA	NA		
Dieldrin		4.55E-13	NA	1.61E+01		7.33E-12
Endosulfan I			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide		0.00E+00	NA	9.10E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		1.61E-13	NA	1.86E+00		2.99E-13
delta-BHC			NA	NA		

TABLE 7-55

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic		5.89E-10	NA	1.51E+01		8.86E-09
Barium	9.31E-07		1.43E-04	NA	6.52E-03	
Cadmium		2.19E-10	NA	6.30E+00		1.38E-09
Copper			NA	NA		
Lead			NA	NA		
Mercury	8.25E-10		8.57E-05	NA	9.63E-06	
Selenium			NA	NA		
Silver			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
HERBICIDES						
MCPA			NA	NA		
Total HQ & CR					**6.53E-03**	**1.02E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-10

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m^3)	Inhalation Rate (m^3/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
METALS									
Arsenic		1.47E-08	2.11E-07	20	250	25	70	9,125	25,550
Barium	9.31E-07		4.76E-06	20	250	25	70	9,125	25,550
Cadmium		5.47E-09	7.83E-08	20	250	25	70	9,125	25,550
Copper			2.37E-06	20	250	25	70	9,125	25,550
Lead			2.35E-05	20	250	25	70	9,125	25,550
Mercury	8.25E-10		4.22E-09	20	250	25	70	9,125	25,550
Selenium			4.40E-08	20	250	25	70	9,125	25,550
Silver			2.85E-08	20	250	25	70	9,125	25,550
Thallium			2.32E-08	20	250	25	70	9,125	25,550
Zinc			5.85E-06	20	250	25	70	9,125	25,550
HERBICIDES									
MCPA			2.14E-07	20	250	25	70	9,125	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CA \times IR \times EF \times ED}{BW \times AT}$$

Variables:	Assumptions:
CA = Chemical Concentration in Air (mg/m^3)	Calculated EPC Air Data - RME
IR = Inhalation Rate (m^3/day)	20 (all receptors)
EF = Exposure Frequency (days/yr)	250 (RME Industrial Workers)
ED = Exposure Duration (years)	5
BW = Bodyweight (kg)	70 (Adult Male)
AT = Averaging Time (days)	5 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-10

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
VOLATILE ORGANICS									
Acetone			2.65E-10	20	250	25	70	9,125	25,550
Benzene		5.31E-12	7.60E-11	20	250	25	70	9,125	25,550
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	20	250	25	70	9,125	25,550
Toluene	4.90E-11		2.50E-10	20	250	25	70	9,125	25,550
SEMIVOLATILE ORGANICS									
2,4-Dinitrotoluene			1.06E-08	20	250	25	70	9,125	25,550
2,6-Dinitrotoluene			0.00E+00	20	250	25	70	9,125	25,550
2-Methylnaphthalene			4.94E-09	20	250	25	70	9,125	25,550
2-Methylphenol			0.00E+00	20	250	25	70	9,125	25,550
3,3'-Dichlorobenzidine			9.39E-09	20	250	25	70	9,125	25,550
3-Nitroaniline			2.27E-08	20	250	25	70	9,125	25,550
4-Nitroaniline			2.27E-08	20	250	25	70	9,125	25,550
Acenaphthene			1.25E-09	20	250	25	70	9,125	25,550
Acenaphthylene			3.65E-09	20	250	25	70	9,125	25,550
Anthracene			4.94E-09	20	250	25	70	9,125	25,550
Benzo(a)anthracene			1.31E-08	20	250	25	70	9,125	25,550
Benzo(a)pyrene			1.44E-08	20	250	25	70	9,125	25,550
Benzo(b)fluoranthene			1.41E-08	20	250	25	70	9,125	25,550
Benzo(g,h,i)perylene			1.16E-08	20	250	25	70	9,125	25,550
Benzo(k)fluoranthene			1.12E-08	20	250	25	70	9,125	25,550
Butylbenzylphthalate			1.75E-09	20	250	25	70	9,125	25,550
Carbazole			9.72E-09	20	250	25	70	9,125	25,550
Chrysene			1.23E-08	20	250	25	70	9,125	25,550
Di-n-butylphthalate			1.12E-08	20	250	25	70	9,125	25,550
Dibenz(a,h)anthracene			1.08E-08	20	250	25	70	9,125	25,550
Dibenzofuran			1.37E-09	20	250	25	70	9,125	25,550
Fluoranthene			1.24E-08	20	250	25	70	9,125	25,550
Fluorene			1.44E-09	20	250	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			1.25E-08	20	250	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			3.61E-09	20	250	25	70	9,125	25,550
Naphthalene			1.41E-09	20	250	25	70	9,125	25,550
Pentachlorophenol			2.51E-08	20	250	25	70	9,125	25,550
Phenanthrene			1.21E-08	20	250	25	70	9,125	25,550
Pyrene			1.14E-08	20	250	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether	1.65E-09		8.41E-09	20	250	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			1.25E-08	20	250	25	70	9,125	25,550
PESTICIDES/PCB									
4,4'-DDD			1.14E-10	20	250	25	70	9,125	25,550
4,4'-DDE			2.20E-10	20	250	25	70	9,125	25,550
4,4'-DDT		9.28E-12	1.33E-10	20	250	25	70	9,125	25,550
Aldrin	1.01E-11	3.61E-12	5.17E-11	20	250	25	70	9,125	25,550
Aroclor-1260			9.82E-10	20	250	25	70	9,125	25,550
Dieldrin		1.14E-11	1.63E-10	20	250	25	70	9,125	25,550
Endosulfan I			1.53E-10	20	250	25	70	9,125	25,550
Endosulfan sulfate			9.92E-11	20	250	25	70	9,125	25,550
Endrin			1.20E-10	20	250	25	70	9,125	25,550
Endrin ketone			1.31E-10	20	250	25	70	9,125	25,550
Heptachlor epoxide		0.00E+00	0.00E+00	20	250	25	70	9,125	25,550
alpha-Chlordane			4.03E-11	20	250	25	70	9,125	25,550
beta-BHC		4.01E-12	5.74E-11	20	250	25	70	9,125	25,550
delta-BHC			5.21E-11	20	250	25	70	9,125	25,550

TABLE 7-49

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			NA	NA		
Benzene		5.31E-12	NA	2.91E-02		1.55E-13
Methylene Chloride	0.00E+00	0.00E+00	8.57E-01	1.65E-03	0.00E+00	0.00E+00
Toluene	4.90E-11		1.14E-01	NA	4.29E-10	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Butylbenzylphthalate			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Chloroisopropyl) ether	1.65E-09		1.00E-03	NA	1.65E-06	
bis(2-Ethylhexyl)phthalate			NA	NA		
PESTICIDES/PCB						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		9.28E-12	NA	3.40E-01		3.15E-12
Aldrin	1.01E-11	3.61E-12	1.70E+01	1.72E+01	5.95E-13	6.19E-11
Aroclor-1260			NA	NA		
Dieldrin		1.14E-11	NA	1.61E+01		1.83E-10
Endosulfan I			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide		0.00E+00	NA	9.10E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		4.01E-12	NA	1.86E+00		7.47E-12
delta-BHC			NA	NA		

TABLE 7-49

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic		1.47E-08	NA	1.51E+01		2.21E-07
Barium	9.31E-07		1.43E-04	NA	6.52E-03	
Cadmium		5.47E-09	NA	6.30E+00		3.45E-08
Copper			NA	NA		
Lead			NA	NA		
Mercury	8.25E-10		8.57E-05	NA	9.63E-06	
Selenium			NA	NA		
Silver			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
HERBICIDES						
MCPA			NA	NA		
Total HQ & CR					**6.53E-03**	**2.56E-07**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-38

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg sed/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
											Child(Nc)	Car
Volatile Organics												
Acetone			1.44E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Toluene			8.00E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Semivolatile Organics												
2,4-Dimethylphenol			3.20E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
2,4-Dinitrotoluene			3.14E-01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(a)anthracene			2.50E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(a)pyrene			3.00E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(b)fluoranthene			4.30E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(g,h,i)perylene			3.10E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(k)fluoranthene			3.30E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Chrysene			4.80E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Fluoranthene			7.00E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene			2.40E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Phenanthrene			3.50E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Pyrene			4.70E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			7.70E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Pesticides												
4,4'-DDD			6.46E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
4,4'-DDE			4.82E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
4,4'-DDT			4.90E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Dieldrin			3.26E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Endosulfan I			1.43E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Endosulfan II			3.05E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550

TABLE 7-38

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg sed/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Child(Nc)	Averaging Time (days) Car
Metals												
Aluminum			1.83E+04	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Antimony			5.50E+00	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Arsenic			6.10E+00	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Barium			1.32E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Beryllium			7.64E-01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Cadmium	1.43E-07		2.40E+00	1.0E-06	2,170	1.0	0.01	25	5	25	1,825	25,550
Calcium			1.08E+04	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Chromium			2.47E+01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Cobalt			1.26E+01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Copper			1.33E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Iron			2.94E+04	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Lead			6.83E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Magnesium			5.54E+03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Manganese			5.32E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Mercury			8.11E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Nickel			3.16E+01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Potassium			2.18E+03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Selenium			1.27E+00	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Sodium			4.27E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Thallium			8.24E-01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Vanadium			2.97E+01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Zinc			1.88E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550

EQUATION:

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

Variables:

CS = Chemical Concentration in Sediment (mg sediment/kg)
CF = Conversion Factor (10-6 kg/mg)
SA = Surface Area Contact (cm²)
AF =Sediment to Skin Adherence Factor (mg/cm²)
ABS = Absorption Factor (unitless)

Assumptions:

EPC - Sediment Data - RME
10-6
2,170 (RME Child)
1.0 (RME all receptors)
Compound Specific PCBs and Cd, (EPA, 1992b)
(Default Assumption 0% = 0.0)

Variables:

EF = Exposure Frequency (events/year)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

25 (RME)
5 (RME)
25 kg (child)
5 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-73

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Volatile Organics						
Acetone			1.00E-01	NA		
Toluene			1.20E-01	NA		
Semivolatile Organics						
2,4-Dimethylphenol			2.00E-02	NA		
2,4-Dinitrotoluene			2.00E-03	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Chrysene			NA	1.46E-01		
Fluoranthene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Metals						
Aluminum			NA	NA		
Antimony			4.00E-04	NA		
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Beryllium			5.00E-06	4.30E+03		
Cadmium	1.43E-07		3.00E-05	NA	4.76E-03	
Calcium			NA	NA		
Chromium			2.50E-04	NA		
Cobalt			NA	NA		
Copper			2.00E-02	NA		
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese			5.00E-03	NA		
Mercury			4.50E-05	NA		
Nickel			1.00E-03	NA		
Potassium			NA	NA		
Selenium			3.00E-03	NA		
Sodium			NA	NA		
Thallium			7.00E-05	NA		
Vanadium			7.00E-03	NA		
Zinc			1.50E-01	NA		
Totals - HQ & CR					**4.76E-03**	

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-36

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Child Ingestion Rate (mg sed/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Volatile Organics											
Acetone	7.88E-09		1.44E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Toluene	4.38E-09		8.00E-03	200	1.0E-06	1	25	5	25	1,825	25,550
Semivolatile Organics											
2,4-Dimethylphenol	1.75E-08		3.20E-02	200	1.0E-06	1	25	5	25	1,825	25,550
2,4-Dinitrotoluene	1.72E-07		3.14E-01	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(a)anthracene		9.78E-10	2.50E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(a)pyrene		1.17E-09	3.00E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(b)fluoranthene		1.68E-09	4.30E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(g,h,i)perylene			3.10E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(k)fluoranthene		1.29E-09	3.30E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Chrysene		1.88E-09	4.80E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Fluoranthene	3.84E-08		7.00E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene		9.39E-10	2.40E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Phenanthrene			3.50E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Pyrene	2.58E-08		4.70E-02	200	1.0E-06	1	25	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate	4.22E-08	3.01E-09	7.70E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Pesticides											
4,4'-DDD	3.54E-09	2.53E-10	6.46E-03	200	1.0E-06	1	25	5	25	1,825	25,550
4,4'-DDE			4.82E-02	200	1.0E-06	1	25	5	25	1,825	25,550
4,4'-DDT	2.68E-09	1.92E-10	4.90E-03	200	1.0E-06	1	25	5	25	1,825	25,550
Dieldrin	1.78E-09	1.27E-10	3.26E-03	200	1.0E-06	1	25	5	25	1,825	25,550
Endosulfan I	7.82E-10		1.43E-03	200	1.0E-06	1	25	5	25	1,825	25,550
Endosulfan II			3.05E-03	200	1.0E-06	1	25	5	25	1,825	25,550

TABLE 7-36

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Child Ingestion Rate (mg sed/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Metals											
Aluminum			1.83E+04	200	1.0E-06	1	25	5	25	1,825	25,550
Antimony	3.01E-06		5.50E+00	200	1.0E-06	1	25	5	25	1,825	25,550
Arsenic	3.34E-06	2.39E-07	6.10E+00	200	1.0E-06	1	25	5	25	1,825	25,550
Barium	7.21E-05		1.32E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Beryllium	4.19E-07	2.99E-08	7.64E-01	200	1.0E-06	1	25	5	25	1,825	25,550
Cadmium	1.32E-06		2.40E+00	200	1.0E-06	1	25	5	25	1,825	25,550
Calcium			1.08E+04	200	1.0E-06	1	25	5	25	1,825	25,550
Chromium	1.35E-05		2.47E+01	200	1.0E-06	1	25	5	25	1,825	25,550
Cobalt			1.26E+01	200	1.0E-06	1	25	5	25	1,825	25,550
Copper	7.31E-05		1.33E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Iron			2.94E+04	200	1.0E-06	1	25	5	25	1,825	25,550
Lead			6.83E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Magnesium			5.54E+03	200	1.0E-06	1	25	5	25	1,825	25,550
Manganese	2.92E-04		5.32E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Mercury	4.44E-08		8.11E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Nickel	1.73E-05		3.16E+01	200	1.0E-06	1	25	5	25	1,825	25,550
Potassium			2.18E+03	200	1.0E-06	1	25	5	25	1,825	25,550
Selenium	6.94E-07		1.27E+00	200	1.0E-06	1	25	5	25	1,825	25,550
Sodium			4.27E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Thallium	4.51E-07		8.24E-01	200	1.0E-06	1	25	5	25	1,825	25,550
Vanadium	1.63E-05		2.97E+01	200	1.0E-06	1	25	5	25	1,825	25,550
Zinc	1.03E-04		1.88E+02	200	1.0E-06	1	25	5	25	1,825	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:	Assumptions:
CS = Chemical Concentration in Sediment (mg sediment/kg)	EPC - Sediment Data - RME
IR = Ingestion Rate (mg sediment/day)	200 (RME Child)
CF = Conversion Factor (10-6 kg/mg)	10-6
FI = Fraction Ingested (unitless)	1
EF = Exposure Frequency (days/years)	25 (RME)
ED = Exposure Duration (years)	5 (RME)
BW = Bodyweight (kg)	25 (Child)
AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (C)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-71

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Volatile Organics						
Acetone	7.88E-09		1.00E-01	NA	7.88E-08	
Toluene	4.38E-09		2.00E-01	NA	2.19E-08	
Semivolatile Organics						
2,4-Dimethylphenol	1.75E-08		2.00E-02	NA	8.77E-07	
2,4-Dinitrotoluene	1.72E-07		2.00E-03	NA	8.61E-05	
Benzo(a)anthracene		9.78E-10	NA	7.30E-01		7.14E-10
Benzo(a)pyrene		1.17E-09	NA	7.30E+00		8.57E-09
Benzo(b)fluoranthene		1.68E-09	NA	7.30E-01		1.23E-09
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		1.29E-09	NA	7.30E-01		9.43E-10
Chrysene		1.88E-09	NA	7.30E-02		1.37E-10
Fluoranthene	3.84E-08		4.00E-02	NA	9.59E-07	
Indeno(1,2,3-cd)pyrene		9.39E-10	NA	7.30E-01		6.86E-10
Phenanthrene			NA	NA		
Pyrene	2.58E-08		3.00E-02	NA	8.58E-07	
bis(2-Ethylhexyl)phthalate	4.22E-08	3.01E-09	2.00E-02	1.40E-02	2.11E-06	4.22E-11
Pesticides						
4,4'-DDD	3.54E-09	2.53E-10	5.00E-04	2.40E-01	7.08E-06	6.07E-11
4,4'-DDE			NA	NA		
4,4'-DDT	2.68E-09	1.92E-10	5.00E-04	3.40E-01	5.37E-06	6.52E-11
Dieldrin	1.78E-09	1.27E-10	5.00E-05	1.60E+01	3.57E-05	2.04E-09
Endosulfan I	7.82E-10		6.00E-03	NA	1.30E-07	
Endosulfan II			NA	NA		
Metals						
Aluminum			NA	NA		
Antimony	3.01E-06		4.00E-04	NA	7.53E-03	
Arsenic	3.34E-06	2.39E-07	3.00E-04	1.75E+00	1.11E-02	4.17E-07
Barium	7.21E-05		7.00E-02	NA	1.03E-03	
Beryllium	4.19E-07	2.99E-08	5.00E-03	4.30E+00	8.37E-05	1.29E-07
Cadmium	1.32E-06		5.00E-04	NA	2.63E-03	
Calcium			NA	NA		
Chromium	1.35E-05		5.00E-03	NA	2.70E-03	
Cobalt			NA	NA		
Copper	7.31E-05		4.00E-02	NA	1.83E-03	
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese	2.92E-04		5.00E-03	NA	5.83E-02	
Mercury	4.44E-08		3.00E-04	NA	1.48E-04	
Nickel	1.73E-05		2.00E-02	NA	8.66E-04	
Potassium			NA	NA		
Selenium	6.94E-07		5.00E-03	NA	1.39E-04	
Sodium			NA	NA		
Thallium	4.51E-07		7.00E-05	NA	6.45E-03	
Vanadium	1.63E-05		7.00E-03	NA	2.33E-03	
Zinc	1.03E-04		3.00E-01	NA	3.44E-04	
Totals - HQ & CR					**9.57E-02**	**5.61E-07**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-20

CALCULATION OF INTAKE FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
VOLATILE ORGANICS											
Acetone	3.28E-08		6.98E-03	480	1.00E-06	1	250	1	70	365	25,550
Benzene		1.34E-10	2.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Methylene Chloride		0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
Toluene	3.10E-08	4.42E-10	6.59E-03	480	1.00E-06	1	250	1	70	365	25,550
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene	1.31E-06		2.79E-01	480	1.00E-06	1	250	1	70	365	25,550
2,6-Dinitrotoluene	0.00E+00		0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
2-Methylnaphthalene			1.30E-01	480	1.00E-06	1	250	1	70	365	25,550
2-Methylphenol	0.00E+00		0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
3,3'-Dichlorobenzidine		1.66E-08	2.47E-01	480	1.00E-06	1	250	1	70	365	25,550
3-Nitroaniline			5.98E-01	480	1.00E-06	1	250	1	70	365	25,550
4-Nitroaniline			5.98E-01	480	1.00E-06	1	250	1	70	365	25,550
Acenaphthene	1.55E-07		3.30E-02	480	1.00E-06	1	250	1	70	365	25,550
Acenaphthylene			9.60E-02	480	1.00E-06	1	250	1	70	365	25,550
Anthracene	6.11E-07		1.30E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(a)anthracene		2.31E-08	3.44E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(a)pyrene		2.55E-08	3.80E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(b)fluoranthene		2.50E-08	3.72E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(g,h,i)perylene			3.06E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(k)fluoranthene		1.98E-08	2.95E-01	480	1.00E-06	1	250	1	70	365	25,550
Butylbenzylphthalate	2.16E-07		4.60E-02	480	1.00E-06	1	250	1	70	365	25,550
Carbazole		1.72E-08	2.56E-01	480	1.00E-06	1	250	1	70	365	25,550
Chrysene		2.18E-08	3.25E-01	480	1.00E-06	1	250	1	70	365	25,550
Di-n-butylphthalate	1.38E-06		2.94E-01	480	1.00E-06	1	250	1	70	365	25,550

TABLE 7-20

CALCULATION OF INTAKE FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Dibenz(a,h)anthracene		1.91E-08	2.84E-01	480	1.00E-06	1	250	1	70	365	25,550
Dibenzofuran			3.60E-02	480	1.00E-06	1	250	1	70	365	25,550
Fluoranthene	1.53E-06		3.25E-01	480	1.00E-06	1	250	1	70	365	25,550
Fluorene	1.78E-07		3.80E-02	480	1.00E-06	1	250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene		2.21E-08	3.29E-01	480	1.00E-06	1	250	1	70	365	25,550
N-Nitrosodiphenylamine (1)		6.37E-09	9.50E-02	480	1.00E-06	1	250	1	70	365	25,550
Naphthalene			3.70E-02	480	1.00E-06	1	250	1	70	365	25,550
Pentachlorophenol	3.10E-06	4.43E-08	6.60E-01	480	1.00E-06	1	250	1	70	365	25,550
Phenanthrene			3.19E-01	480	1.00E-06	1	250	1	70	365	25,550
Pyrene	1.41E-06		3.01E-01	480	1.00E-06	1	250	1	70	365	25,550
bis(2-Chloroisopropyl) ether	1.04E-06		2.21E-01	480	1.00E-06	1	250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate	1.54E-06	2.20E-08	3.28E-01	480	1.00E-06	1	250	1	70	365	25,550
PESTICIDES/PCB											
4,4'-DDD	1.41E-08	2.02E-10	3.00E-03	480	1.00E-06	1	250	1	70	365	25,550
4,4'-DDE			5.78E-03	480	1.00E-06	1	250	1	70	365	25,550
4,4'-DDT	1.64E-08	2.34E-10	3.49E-03	480	1.00E-06	1	250	1	70	365	25,550
Aldrin	6.38E-09	9.12E-11	1.36E-03	480	1.00E-06	1	250	1	70	365	25,550
Aroclor-1254	0.00E+00	0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
Aroclor-1260		1.73E-09	2.58E-02	480	1.00E-06	1	250	1	70	365	25,550
Dieldrin	2.01E-08	2.87E-10	4.28E-03	480	1.00E-06	1	250	1	70	365	25,550
Endosulfan I	1.89E-08		4.02E-03	480	1.00E-06	1	250	1	70	365	25,550
Endosulfan sulfate	1.23E-08		2.61E-03	480	1.00E-06	1	250	1	70	365	25,550
Endrin	1.48E-08		3.16E-03	480	1.00E-06	1	250	1	70	365	25,550
Endrin ketone			3.45E-03	480	1.00E-06	1	250	1	70	365	25,550
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
alpha-Chlordane	4.98E-09	7.11E-11	1.06E-03	480	1.00E-06	1	250	1	70	365	25,550
beta-BHC		1.01E-10	1.51E-03	480	1.00E-06	1	250	1	70	365	25,550
delta-BHC			1.37E-03	480	1.00E-06	1	250	1	70	365	25,550

TABLE 7-20

CALCULATION OF INTAKE FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2

SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
METALS											
Antimony	3.67E-05		7.82E+00	480	1.00E-06	1	250	1	70	365	25,550
Arsenic	2.60E-05	3.72E-07	5.54E+00	480	1.00E-06	1	250	1	70	365	25,550
Barium	5.88E-04		1.25E+02	480	1.00E-06	1	250	1	70	365	25,550
Cadmium	9.67E-06		2.06E+00	480	1.00E-06	1	250	1	70	365	25,550
Copper	2.93E-04		6.24E+01	480	1.00E-06	1	250	1	70	365	25,550
Lead			6.19E+02	480	1.00E-06	1	250	1	70	365	25,550
Mercury	5.20E-07		1.11E-01	480	1.00E-06	1	250	1	70	365	25,550
Selenium	5.44E-06		1.16E+00	480	1.00E-06	1	250	1	70	365	25,550
Silver	3.52E-06		7.50E-01	480	1.00E-06	1	250	1	70	365	25,550
Zinc	7.22E-04		1.54E+02	480	1.00E-06	1	250	1	70	365	25,550
HERBICIDES											
MCPA	2.64E-05		5.63E+00	480	1.00E-06	1	250	1	70	365	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC - Soil Data (RME)
480 (RME Construction Worker)
10-6
1 (All Receptors)
250 (RME Construction Worker)
1 (Upper bound limit for Construction Worker)
70 (Adult male)
1 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-57

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone	3.28E-08		1.00E-01	NA	3.28E-07	
Benzene		1.34E-10	NA	2.90E-02		3.89E-12
Methylene Chloride		0.00E+00	NA	2.90E-02		0.00E+00
Toluene	3.10E-08	4.42E-10	6.00E-02	7.50E-03	5.16E-07	3.32E-12
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene	1.31E-06		2.00E-03	NA	6.55E-04	
2,6-Dinitrotoluene	0.00E+00		1.00E-03	NA	0.00E+00	
2-Methylnaphthalene			NA	NA		
2-Methylphenol	0.00E+00		5.00E-02	NA	0.00E+00	
3,3'-Dichlorobenzidine		1.66E-08	NA	4.50E-01		7.46E-09
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene	1.55E-07		6.00E-02	NA	2.58E-06	
Acenaphthylene			NA	NA		
Anthracene	6.11E-07		3.00E-01	NA	2.04E-06	
Benzo(a)anthracene		2.31E-08	NA	7.30E-01		1.68E-08
Benzo(a)pyrene		2.55E-08	NA	7.30E+00		1.86E-07
Benzo(b)fluoranthene		2.50E-08	NA	7.30E-01		1.82E-08
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		1.98E-08	NA	7.30E-01		1.44E-08
Butylbenzylphthalate	2.16E-07		2.00E+00	NA	1.08E-07	
Carbazole		1.72E-08	NA	2.00E-02		3.43E-10
Chrysene		2.18E-08	NA	7.30E-02		1.59E-09
Di-n-butylphthalate	1.38E-06		1.00E-01	NA	1.38E-05	
Dibenz(a,h)anthracene		1.91E-08	NA	7.30E+00		1.39E-07
Dibenzofuran			NA	NA		
Fluoranthene	1.53E-06		4.00E-02	NA	3.82E-05	
Fluorene	1.78E-07		4.00E-02	NA	4.46E-06	
Indeno(1,2,3-cd)pyrene		2.21E-08	NA	7.30E-01		1.61E-08
N-Nitrosodiphenylamine (1)		6.37E-09	NA	4.90E-03		3.12E-11
Naphthalene			NA	NA		
Pentachlorophenol	3.10E-06	4.43E-08	3.00E-02	1.20E-01	1.03E-04	5.31E-09
Phenanthrene			NA	NA		
Pyrene	1.41E-06		3.00E-02	NA	4.72E-05	
bis(2-Chloroisopropyl) ether	1.04E-06		1.00E-03	NA	1.04E-03	
bis(2-Ethylhexyl)phthalate	1.54E-06	2.20E-08	2.00E-02	1.40E-02	7.70E-05	3.08E-10

TABLE 7-57

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
PESTICIDES/PCB						
4,4'-DDD	1.41E-08	2.02E-10	5.00E-04	2.40E-01	2.82E-05	4.84E-11
4,4'-DDE			NA	NA		
4,4'-DDT	1.64E-08	2.34E-10	5.00E-04	3.40E-01	3.28E-05	7.97E-11
Aldrin	6.38E-09	9.12E-11	3.00E-05	1.70E+01	2.13E-04	1.55E-09
Aroclor-1254	0.00E+00	0.00E+00	2.00E-05	2.00E+00	0.00E+00	0.00E+00
Aroclor-1260		1.73E-09	NA	7.70E+00		1.33E-08
Dieldrin	2.01E-08	2.87E-10	5.00E-05	1.60E+01	4.02E-04	4.60E-09
Endosulfan I	1.89E-08		6.00E-03	NA	3.15E-06	
Endosulfan sulfate	1.23E-08		5.00E-05	NA	2.45E-04	
Endrin	1.48E-08		3.00E-04	NA	4.95E-05	
Endrin ketone			NA	NA		
Heptachlor epoxide	0.00E+00	0.00E+00	1.30E-05	9.10E+00	0.00E+00	0.00E+00
alpha-Chlordane	4.98E-09	7.11E-11	6.00E-05	1.30E+00	8.30E-05	9.25E-11
beta-BHC		1.01E-10	NA	1.80E+00		1.83E-10
delta-BHC			NA	NA		
METALS						
Antimony	3.67E-05		4.00E-04	NA	9.18E-02	
Arsenic	2.60E-05	3.72E-07	3.00E-04	1.75E+00	8.67E-02	6.51E-07
Barium	5.88E-04		7.00E-02	NA	8.40E-03	
Cadmium	9.67E-06		5.00E-04	NA	1.93E-02	
Copper	2.93E-04		4.00E-02	NA	7.33E-03	
Lead			NA	NA		
Mercury	5.20E-07		3.00E-04	NA	1.73E-03	
Selenium	5.44E-06		5.00E-03	NA	1.09E-03	
Silver	3.52E-06		5.00E-03	NA	7.04E-04	
Zinc	7.22E-04		3.00E-01	NA	2.41E-03	
HERBICIDES						
MCPA	2.64E-05		5.00E-04	NA	5.29E-02	
Totals - HQ & CR					**2.75E-01**	**1.08E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-28

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
VOLATILE ORGANICS												
Acetone			6.98E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzene			2.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Methylene Chloride				1.00E-06	5,800	1.0		250	1	70	365	25,550
Toluene			6.59E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			2.79E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
2,6-Dinitrotoluene				1.00E-06	5,800	1.0		250	1	70	365	25,550
2-Methylnaphthalene			1.30E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
2-Methylphenol				1.00E-06	5,800	1.0		250	1	70	365	25,550
3,3'-Dichlorobenzidine			2.47E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
3-Nitroaniline			5.98E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
4-Nitroaniline			5.98E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Acenaphthene			3.30E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Acenaphthylene			9.60E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Anthracene			1.30E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(a)anthracene			3.44E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(a)pyrene			3.80E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(b)fluoranthene			3.72E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(g,h,i)perylene			3.06E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(k)fluoranthene			2.95E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Butylbenzylphthalate			4.60E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Carbazole			2.56E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Chrysene			3.25E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Di-n-butylphthalate			2.94E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550

TABLE 7-28

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm^2)	Adherence Factor (mg soil/cm^2)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Dibenz(a,h)anthracene			2.84E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Dibenzofuran			3.60E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Fluoranthene			3.25E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Fluorene			3.80E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene			3.29E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
N-Nitrosodiphenylamine (1)			9.50E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Naphthalene			3.70E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pentachlorophenol			6.60E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Phenanthrene			3.19E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pyrene			3.01E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
bis(2-Chloroisopropyl) ether			2.21E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate			3.28E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
PESTICIDES/PCB												
4,4'-DDD			3.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
4,4'-DDE			5.78E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
4,4'-DDT			3.49E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Aldrin			1.36E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Aroclor-1254				1.00E-06	5,800	1.0		250	1	70	365	25,550
Aroclor-1260	8.796E-08	1.257E-09	2.58E-02	1.00E-06	5,800	1.0	0.06	250	1	70	365	25,550
Dieldrin			4.28E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan I			4.02E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan sulfate			2.61E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin			3.16E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin ketone			3.45E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Heptachlor epoxide				1.00E-06	5,800	1.0		250	1	70	365	25,550
alpha-Chlordane			1.06E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
beta-BHC			1.51E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
delta-BHC			1.37E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550

TABLE 7-28

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
METALS												
Antimony			7.82E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Arsenic			5.54E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Barium			1.25E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Cadmium			2.06E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Copper			6.24E+01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Lead			6.19E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Mercury			1.11E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Selenium			1.16E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Silver			7.50E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Zinc			1.54E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
HERBICIDES												
MCPA			5.63E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550

EQUATION:

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

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC - Soil Data (RME)	EF = Exposure Frequency (days/year)	250 (RME Construction Worker)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	1 (Upper bound limit for CW)
SA = Surface Area Contact (cm²)	5,800 (RME Adult Worker)	BW = Bodyweight (kg)	70 (Adult Male)
AF =Soil to Skin Adherence Factor (mg/cm²)	1.0 (RME - All Receptors)	AT = Averaging Time (days)	1 x 365 (Nc) 70 x 365 (Car)
ABS = Absorption Factor (unitless)	Applicable for PCBs and Cadmium (EPA, 1992b)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-59

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Chloroisopropyl) ether			1.00E-03	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 7-59

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
PESTICIDES/PCB						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254			1.90E-05	2.11E+00		
Aroclor-1260	8.80E-08	1.26E-09	NA	8.11E+00		1.02E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		
METALS						
Antimony			4.00E-04	NA		
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Cadmium			3.00E-05	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Zinc			1.50E-01	NA		
HERBICIDES						
MCPA			5.00E-04	NA		
Totals - HQ & CR						**1.02E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-34

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE WATER (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	Absorbed Dose/Event (mg-cm²-event)	EPC Surface W. (mg/L)	Child Skin Surface Area Contact (cm²)	Kp Permeability Coefficient (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Volumetric Conv. Factor (1 liter/1000 cm³)	B (unitless)	Tau (hours)	Child Body Weight (kg)	Averaging Time (days) Child (Nc)	Averaging Time (days) Car
SEMIVOLATILE ORGANICS															
bis(2-Ethylhexyl)phthalate	1.64E-07	1.17E-08	8.36E-04	2.00E-03	2,170	3.3E-02	1	25	5	1.0E-03	1.30E+01	2.10E+01	25	1,825	25,550
METALS															
Antimony	1.31E-10		2.21E-05	2.21E-02	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Arsenic	2.54E-11	1.81E-12	4.26E-06	4.26E-03	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Barium	4.29E-10		7.22E-05	7.22E-02	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Cadmium	4.65E-12		7.82E-07	7.82E-04	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Calcium			6.32E-02	6.32E+01	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Chromium	1.50E-11		1.26E-06	6.31E-04	2,170	2.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Copper				1.93E-02	2,170	NA	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Iron			1.93E-04	1.93E-01	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Lead			1.48E-07	3.71E-02	2,170	4.0E-06	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Magnesium			8.90E-03	8.90E+00	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Manganese	7.12E-11		1.20E-05	1.20E-02	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Nickel	6.14E-14		1.03E-07	1.03E-03	2,170	1.0E-04	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Potassium			3.52E-03	3.52E+00	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Selenium	1.92E-11		3.23E-06	3.23E-03	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Sodium			7.03E-03	7.03E+00	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Vanadium	5.35E-12		9.00E-07	9.00E-04	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Zinc	7.76E-11		2.18E-05	3.63E-02	2,170	6.0E-04	1	25	5	1.0E-03	NA	NA	25	1,825	25,550

EQUATION:

$$\text{Absorbed Dose (mg/kg-day)} = \frac{DA \times SA \times Kp \times ET \times EF \times ED \times CF}{BW \times AT}$$

Variables:	Assumptions:	Variables:	Assumptions:
DA = Absorbed Dose per Event (mg-cm²/event)	Calculated from EPA, 1992	EF = Exposure Frequency (days/year)	25
SA = Surface Area Contact (cm²)	2,170 (RME Child)	ED = Exposure Duration (years)	5 (RME)
Kp = Permeability Coefficient (cm/hour)	Compound Specific, EPA, 1992	CF = Vol. Conv. Factor (1 L/1000 cm³)	0.001
ET = Exposure Time (hours/day)	1 (RME)	BW = Bodyweight (kg)	25 (Child)
Tao = Lag time (hours)	Compound Specific, EPA, 1992	B = Bunge Model Value	Compound Specific, EPA, 1992

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-69

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SURFACE WATER (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg)	Child CDI (Car) (mg/kg)	Dermal RfD (mg/kg/day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
SEMIVOLATILE ORGANICS						
bis(2-Ethylhexyl)phthalate	1.64E-07	1.17E-08	2.00E-02	1.40E-02	8.20E-06	2.30E-09
METALS						
Antimony	1.31E-10		4.00E-04	NA	3.28E-07	
Arsenic	2.54E-11	1.81E-12	2.94E-04	1.79E+00	8.62E-08	4.54E-11
Barium	4.29E-10		7.00E-03	NA	6.13E-08	
Cadmium	4.65E-12		3.00E-05	NA	1.55E-07	
Calcium			NA	NA		
Chromium	1.50E-11		2.50E-04	NA	6.00E-08	
Copper			2.00E-02	NA		
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese	7.12E-11		5.00E-03	NA	1.42E-08	
Nickel	6.14E-14		1.00E-03	NA	6.14E-11	
Potassium			NA	NA		
Selenium	1.92E-11		3.00E-03	NA	6.40E-09	
Sodium			NA	NA		
Vanadium	5.35E-12		7.00E-03	NA	7.64E-10	
Zinc	7.76E-11		1.50E-01	NA	5.17E-10	
Totals - HQ & CR					**8.91E-06**	**2.34E-09**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-32

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SURFACE WATER (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 2
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Surface W. (mg/L)	Contact Rate (L/hr)	Exposure Time (hr/day)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
									Child(Nc)	Car
SEMIVOLATILE ORGANICS										
bis(2-Ethylhexyl)phthalate	2.74E-07	1.96E-08	2.00E-03	0.05	1	25	5	25	1,825	25,550
METALS										
Antimony	3.03E-06		2.21E-02	0.05	1	25	5	25	1,825	25,550
Arsenic	5.84E-07	4.17E-08	4.26E-03	0.05	1	25	5	25	1,825	25,550
Barium	9.89E-06		7.22E-02	0.05	1	25	5	25	1,825	25,550
Cadmium	1.07E-07		7.82E-04	0.05	1	25	5	25	1,825	25,550
Calcium			6.32E+01	0.05	1	25	5	25	1,825	25,550
Chromium	8.64E-08		6.31E-04	0.05	1	25	5	25	1,825	25,550
Copper	2.64E-06		1.93E-02	0.05	1	25	5	25	1,825	25,550
Iron			1.93E-01	0.05	1	25	5	25	1,825	25,550
Lead			3.71E-02	0.05	1	25	5	25	1,825	25,550
Magnesium			8.90E+00	0.05	1	25	5	25	1,825	25,550
Manganese	1.64E-06		1.20E-02	0.05	1	25	5	25	1,825	25,550
Nickel	1.42E-07		1.03E-03	0.05	1	25	5	25	1,825	25,550
Potassium			3.52E+00	0.05	1	25	5	25	1,825	25,550
Selenium	4.42E-07		3.23E-03	0.05	1	25	5	25	1,825	25,550
Sodium			7.03E+00	0.05	1	25	5	25	1,825	25,550
Vanadium	1.23E-07		9.00E-04	0.05	1	25	5	25	1,825	25,550
Zinc	4.97E-06		3.63E-02	0.05	1	25	5	25	1,825	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times CR \times ET \times EF \times ED}{BW \times AT}$$

Variables:

- CS = Chemical Concentration in Surface Water (mg/L)
- CR = Contact Rate (Liters/hour)
- ET = Exposure Time (hours/day)
- EF = Exposure Frequency (days/year)
- ED = Exposure Duration (years)
- BW = Bodyweight (kg)
- AT = Averaging Time (days)

Assumptions:

- EPC - Surface Water Data - RME
- 0.05 (all recreators)
- 1 (RME - all recreators)
- 25
- 5 (RME)
- 25 (Child)
- 5 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-67

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS FROM THE INGESTION OF ONSITE SURFACE WATER FUTURE TRESSPASSER (Child) REASONABLE MAXIMUM EXPOSURE (RME) CASE 2 SEAD-17 Remedial Investigation Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
SEMIVOLATILE ORGANICS						
bis(2-Ethylhexyl)phthalate	2.74E-07	1.96E-08	2.00E-02	1.40E-02	1.37E-05	2.74E-10
METALS						
Antimony	3.03E-06		4.00E-04	NA	7.57E-03	
Arsenic	5.84E-07	4.17E-08	3.00E-04	1.75E+00	1.95E-03	7.30E-08
Barium	9.89E-06		7.00E-02	NA	1.41E-04	
Cadmium	1.07E-07		5.00E-04	NA	2.14E-04	
Calcium			NA	NA		
Chromium	8.64E-08		5.00E-03	NA	1.73E-05	
Copper	2.64E-06		4.00E-02	NA	6.59E-05	
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese	1.64E-06		5.00E-03	NA	3.28E-04	
Nickel	1.42E-07		2.00E-02	NA	7.08E-06	
Potassium			NA	NA		
Selenium	4.42E-07		5.00E-03	NA	8.84E-05	
Sodium			NA	NA		
Vanadium	1.23E-07		7.00E-03	NA	1.76E-05	
Zinc	4.97E-06		3.00E-01	NA	1.66E-05	
Totals - HQ & CR					**1.04E-02**	**7.33E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	Acetone	UG/KG	31	1	1	3.2%	6.581	2.659	8.000	FALSE	FALSE	7.038	7.038
VOLATILE ORGANICS	Benzene	UG/KG	32	0	2	6.3%	5.953	1.180	2.000	FALSE	FALSE	6.610	2.000
VOLATILE ORGANICS	Toluene	UG/KG	32	0	3	9.4%	6.063	1.134	8.000	FALSE	FALSE	6.624	6.624
SEMIVOLATILE ORGANICS	2,4-Dinitrotoluene	UG/KG	32	0	3	9.4%	251.906	208.161	880.000	FALSE	FALSE	285.788	285.788
SEMIVOLATILE ORGANICS	2,6-Dinitrotoluene	UG/KG	31	1	0	0.0%	196.452	15.286	0.000	TRUE	TRUE	201.107	0.000
SEMIVOLATILE ORGANICS	2-Methylnaphthalene	UG/KG	31	1	2	6.5%	190.419	35.362	130.000	FALSE	FALSE	220.816	130.000
SEMIVOLATILE ORGANICS	3,3`-Dichlorobenzidine	UG/KG	32	0	1	3.1%	232.656	172.257	410.000	FALSE	FALSE	251.163	251.163
SEMIVOLATILE ORGANICS	3-Nitroaniline	UG/KG	32	0	1	3.1%	562.500	411.049	990.000	FALSE	FALSE	607.294	607.294
SEMIVOLATILE ORGANICS	4-Nitroaniline	UG/KG	32	0	1	3.1%	562.500	411.049	990.000	FALSE	FALSE	607.294	607.294
SEMIVOLATILE ORGANICS	Acenaphthene	UG/KG	31	1	2	6.5%	186.323	45.420	33.000	FALSE	FALSE	239.797	33.000
SEMIVOLATILE ORGANICS	Acenaphthylene	UG/KG	31	1	2	6.5%	189.548	36.756	96.000	FALSE	FALSE	216.576	96.000
SEMIVOLATILE ORGANICS	Anthracene	UG/KG	31	1	2	6.5%	193.065	24.072	130.000	FALSE	FALSE	202.377	130.000
SEMIVOLATILE ORGANICS	Benzo[a]anthracene	UG/KG	32	0	10	31.3%	213.063	217.411	720.000	FALSE	FALSE	358.367	358.367
SEMIVOLATILE ORGANICS	Benzo[a]pyrene	UG/KG	32	0	12	37.5%	214.781	248.342	940.000	FALSE	FALSE	398.693	398.693
SEMIVOLATILE ORGANICS	Benzo[b]fluoranthene	UG/KG	32	0	10	31.3%	265.938	405.604	2200.000	FALSE	FALSE	390.703	390.703
SEMIVOLATILE ORGANICS	Benzo[ghi]perylene	UG/KG	32	0	8	25.0%	228.969	211.235	710.000	FALSE	FALSE	317.024	317.024
SEMIVOLATILE ORGANICS	Benzo[k]fluoranthene	UG/KG	32	0	8	25.0%	205.438	195.453	530.000	FALSE	FALSE	303.775	303.775
SEMIVOLATILE ORGANICS	Bis(2-Chloroisopropyl)ether	UG/KG	17	0	1	5.9%	203.235	54.571	410.000	FALSE	FALSE	221.331	221.331
SEMIVOLATILE ORGANICS	Bis(2-Ethylhexyl)phthalate	UG/KG	32	0	8	25.0%	256.438	263.989	1300.000	FALSE	FALSE	323.444	323.444
SEMIVOLATILE ORGANICS	Butylbenzylphthalate	UG/KG	31	1	1	3.2%	192.290	30.902	46.000	FALSE	FALSE	212.610	46.000
SEMIVOLATILE ORGANICS	Carbazole	UG/KG	32	0	3	9.4%	225.781	176.891	410.000	FALSE	FALSE	260.800	260.800
SEMIVOLATILE ORGANICS	Chrysene	UG/KG	32	0	18	56.3%	172.031	230.290	670.000	FALSE	FALSE	330.564	330.564
SEMIVOLATILE ORGANICS	Cresols (-o)	UG/KG	31	1	1	3.2%	193.710	20.452	120.000	FALSE	FALSE	201.080	120.000
SEMIVOLATILE ORGANICS	Di-n-butylphthalate	UG/KG	32	0	9	28.1%	241.406	222.192	1200.000	FALSE	FALSE	303.389	303.389
SEMIVOLATILE ORGANICS	Dibenz[a,h]anthracene	UG/KG	32	0	5	15.6%	222.063	183.669	470.000	FALSE	FALSE	292.389	292.389
SEMIVOLATILE ORGANICS	Dibenzofuran	UG/KG	31	1	1	3.2%	191.968	32.492	36.000	FALSE	FALSE	216.839	36.000
SEMIVOLATILE ORGANICS	Fluoranthene	UG/KG	32	0	19	59.4%	192.938	271.582	1000.000	FALSE	FALSE	333.775	333.775
SEMIVOLATILE ORGANICS	Fluorene	UG/KG	31	1	1	3.2%	192.032	32.172	38.000	FALSE	FALSE	215.844	38.000
SEMIVOLATILE ORGANICS	Indeno[1,2,3-cd]pyrene	UG/KG	32	0	8	25.0%	228.813	218.186	790.000	FALSE	FALSE	341.962	341.962
SEMIVOLATILE ORGANICS	N-Nitrosodiphenylamine	UG/KG	31	1	2	6.5%	189.903	35.189	95.000	FALSE	FALSE	211.815	95.000
SEMIVOLATILE ORGANICS	Naphthalene	UG/KG	31	1	3	9.7%	182.484	53.270	37.000	FALSE	FALSE	250.492	37.000
SEMIVOLATILE ORGANICS	Pentachlorophenol	UG/KG	32	0	2	6.3%	549.469	420.895	990.000	FALSE	FALSE	675.909	675.909
SEMIVOLATILE ORGANICS	Phenanthrene	UG/KG	32	0	10	31.3%	197.969	193.325	360.000	FALSE	FALSE	329.947	329.947
SEMIVOLATILE ORGANICS	Pyrene	UG/KG	32	0	19	59.4%	194.531	282.622	1200.000	FALSE	FALSE	307.838	307.838
PESTICIDES/PCB	4,4`-DDD	UG/KG	32	0	2	6.3%	2.866	3.528	15.000	FALSE	FALSE	3.093	3.093
PESTICIDES/PCB	4,4`-DDE	UG/KG	32	0	7	21.9%	7.750	24.932	140.000	FALSE	FALSE	6.212	6.212
PESTICIDES/PCB	4,4`-DDT	UG/KG	32	0	3	9.4%	3.208	3.570	13.000	FALSE	FALSE	3.626	3.626
PESTICIDES/PCB	Aldrin	UG/KG	32	0	1	3.1%	1.305	1.415	1.900	FALSE	FALSE	1.387	1.387
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	31	1	1	3.2%	1.029	0.077	1.100	FALSE	FALSE	1.064	1.064
PESTICIDES/PCB	Aroclor-1260	UG/KG	32	0	2	6.3%	24.875	27.473	28.000	FALSE	FALSE	26.326	26.326
PESTICIDES/PCB	Beta-BHC	UG/KG	32	0	1	3.1%	1.617	3.355	20.000	FALSE	FALSE	1.555	1.555

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
PESTICIDES/PCB	Delta-BHC	UG/KG	32	0	1	3.1%	1.313	1.420	2.200	FALSE	FALSE	1.400	1.400
PESTICIDES/PCB	Dieldrin	UG/KG	32	0	3	9.4%	4.572	10.735	62.000	FALSE	FALSE	4.509	4.509
PESTICIDES/PCB	Endosulfan I	UG/KG	32	0	3	9.4%	14.797	75.791	430.000	FALSE	FALSE	4.431	4.431
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	32	0	1	3.1%	2.545	3.189	20.000	FALSE	FALSE	2.664	2.664
PESTICIDES/PCB	Endrin	UG/KG	32	0	2	6.3%	3.386	7.258	43.000	FALSE	FALSE	3.263	3.263
PESTICIDES/PCB	Endrin ketone	UG/KG	32	0	2	6.3%	4.236	12.194	71.000	FALSE	FALSE	3.585	3.585
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	32	0	32	100.0%	0.339	0.423	2.400	FALSE	TRUE	0.460	0.460
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	32	0	1	3.1%	70.625	47.396	330.000	FALSE	FALSE	75.387	75.387
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	32	0	1	3.1%	88.594	148.086	900.000	FALSE	FALSE	89.191	89.191
METALS	Aluminum	MG/KG	32	0	32	100.0%	########	2969.022	19300.000	FALSE	FALSE	########	14736.484
METALS	Antimony	MG/KG	32	0	17	53.1%	4.675	8.917	52.000	FALSE	TRUE	7.790	7.790
METALS	Arsenic	MG/KG	32	0	32	100.0%	5.188	1.074	8.900	FALSE	TRUE	5.507	5.507
METALS	Barium	MG/KG	32	0	26	81.3%	105.920	60.489	357.000	FALSE	TRUE	125.562	125.562
METALS	Beryllium	MG/KG	32	0	32	100.0%	0.579	0.176	0.990	TRUE	FALSE	0.631	0.631
METALS	Cadmium	MG/KG	32	0	23	71.9%	1.224	1.992	3.500	FALSE	TRUE	2.043	2.043
METALS	Calcium	MG/KG	32	0	32	100.0%	########	########	#########	FALSE	FALSE	########	41678.432
METALS	Chromium	MG/KG	32	0	32	100.0%	19.609	3.820	27.900	TRUE	FALSE	20.754	20.754
METALS	Cobalt	MG/KG	32	0	32	100.0%	10.272	3.834	21.900	FALSE	TRUE	11.448	11.448
METALS	Copper	MG/KG	32	0	32	100.0%	55.522	91.711	546.000	FALSE	FALSE	62.476	62.476
METALS	Cyanide	MG/KG	32	0	1	3.1%	0.313	0.227	1.500	FALSE	FALSE	0.379	0.379
METALS	Iron	MG/KG	32	0	32	100.0%	########	5072.381	36100.000	TRUE	FALSE	########	24746.207
METALS	Lead	MG/KG	32	0	31	96.9%	275.619	553.353	496.000	FALSE	TRUE	576.842	496.000
METALS	Magnesium	MG/KG	32	0	32	100.0%	5032.813	1990.612	9830.000	FALSE	TRUE	5695.790	5695.790
METALS	Manganese	MG/KG	32	0	32	100.0%	527.594	221.797	1080.000	TRUE	TRUE	594.029	594.029
METALS	Mercury	MG/KG	32	0	29	90.6%	0.103	0.187	1.000	FALSE	FALSE	0.117	0.117
METALS	Nickel	MG/KG	32	0	32	100.0%	26.697	9.321	50.800	FALSE	TRUE	29.792	29.792
METALS	Potassium	MG/KG	32	0	32	100.0%	1330.813	283.073	1960.000	TRUE	TRUE	1415.601	1415.601
METALS	Selenium	MG/KG	32	0	20	62.5%	0.670	0.520	1.600	FALSE	FALSE	1.250	1.250
METALS	Silver	MG/KG	32	0	4	12.5%	0.536	0.788	4.600	FALSE	FALSE	0.738	0.738
METALS	Sodium	MG/KG	32	0	21	65.6%	69.575	69.949	383.000	FALSE	FALSE	84.336	84.336
METALS	Thallium	MG/KG	32	0	7	21.9%	0.435	0.390	1.500	FALSE	FALSE	0.656	0.656
METALS	Vanadium	MG/KG	32	0	32	100.0%	22.981	4.497	30.700	TRUE	TRUE	24.328	24.328
METALS	Zinc	MG/KG	32	0	32	100.0%	133.325	110.589	620.000	FALSE	FALSE	155.685	155.685
HERBICIDES	MCPA	UG/KG	15	0	1	6.7%	5016.667	7469.239	32000.000	FALSE	FALSE	6203.085	6203.085

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
VOLATILE ORGANICS	Acetone	UG/KG	31	1	1	3.2%	6.581	2.659	8.000	FALSE	FALSE	7.038	7.038
VOLATILE ORGANICS	Benzene	UG/KG	32	0	2	6.3%	5.953	1.180	2.000	FALSE	FALSE	6.610	2.000
VOLATILE ORGANICS	Toluene	UG/KG	32	0	3	9.4%	6.063	1.134	8.000	FALSE	FALSE	6.624	6.624
SEMIVOLATILE ORGANICS	2,4-Dinitrotoluene	UG/KG	32	0	3	9.4%	251.906	208.161	880.000	FALSE	FALSE	285.788	285.788
SEMIVOLATILE ORGANICS	2,6-Dinitrotoluene	UG/KG	31	1	0	0.0%	196.452	15.286	0.000	TRUE	TRUE	201.107	0.000
SEMIVOLATILE ORGANICS	2-Methylnaphthalene	UG/KG	31	1	2	6.5%	190.419	35.362	130.000	FALSE	FALSE	220.816	130.000
SEMIVOLATILE ORGANICS	3,3`-Dichlorobenzidine	UG/KG	32	0	1	3.1%	232.656	172.257	410.000	FALSE	FALSE	251.163	251.163
SEMIVOLATILE ORGANICS	3-Nitroaniline	UG/KG	32	0	1	3.1%	562.500	411.049	990.000	FALSE	FALSE	607.294	607.294
SEMIVOLATILE ORGANICS	4-Nitroaniline	UG/KG	32	0	1	3.1%	562.500	411.049	990.000	FALSE	FALSE	607.294	607.294
SEMIVOLATILE ORGANICS	Acenaphthene	UG/KG	31	1	2	6.5%	186.323	45.420	33.000	FALSE	FALSE	239.797	33.000
SEMIVOLATILE ORGANICS	Acenaphthylene	UG/KG	31	1	2	6.5%	189.548	36.756	96.000	FALSE	FALSE	216.576	96.000
SEMIVOLATILE ORGANICS	Anthracene	UG/KG	31	1	2	6.5%	193.065	24.072	130.000	FALSE	FALSE	202.377	130.000
SEMIVOLATILE ORGANICS	Benzo[a]anthracene	UG/KG	32	0	10	31.3%	213.063	217.411	720.000	FALSE	FALSE	358.367	358.367
SEMIVOLATILE ORGANICS	Benzo[a]pyrene	UG/KG	32	0	12	37.5%	214.781	248.342	940.000	FALSE	FALSE	398.693	398.693
SEMIVOLATILE ORGANICS	Benzo[b]fluoranthene	UG/KG	32	0	10	31.3%	265.938	405.604	2200.000	FALSE	FALSE	390.703	390.703
SEMIVOLATILE ORGANICS	Benzo[ghi]perylene	UG/KG	32	0	8	25.0%	228.969	211.235	710.000	FALSE	FALSE	317.024	317.024
SEMIVOLATILE ORGANICS	Benzo[k]fluoranthene	UG/KG	32	0	8	25.0%	205.438	195.453	530.000	FALSE	FALSE	303.775	303.775
SEMIVOLATILE ORGANICS	Bis(2-Chloroisopropyl)ether	UG/KG	17	0	1	5.9%	203.235	54.571	410.000	FALSE	FALSE	221.331	221.331
SEMIVOLATILE ORGANICS	Bis(2-Ethylhexyl)phthalate	UG/KG	32	0	8	25.0%	256.438	263.989	1300.000	FALSE	FALSE	323.444	323.444
SEMIVOLATILE ORGANICS	Butylbenzylphthalate	UG/KG	31	1	1	3.2%	192.290	30.902	46.000	FALSE	FALSE	212.610	46.000
SEMIVOLATILE ORGANICS	Carbazole	UG/KG	32	0	3	9.4%	225.781	176.891	410.000	FALSE	FALSE	260.800	260.800
SEMIVOLATILE ORGANICS	Chrysene	UG/KG	32	0	18	56.3%	172.031	230.290	670.000	FALSE	FALSE	330.564	330.564
SEMIVOLATILE ORGANICS	Cresols (-o)	UG/KG	31	1	1	3.2%	193.710	20.452	120.000	FALSE	FALSE	201.080	120.000
SEMIVOLATILE ORGANICS	Di-n-butylphthalate	UG/KG	32	0	9	28.1%	241.406	222.192	1200.000	FALSE	FALSE	303.389	303.389
SEMIVOLATILE ORGANICS	Dibenz[a,h]anthracene	UG/KG	32	0	5	15.6%	222.063	183.669	470.000	FALSE	FALSE	292.389	292.389
SEMIVOLATILE ORGANICS	Dibenzofuran	UG/KG	31	1	1	3.2%	191.968	32.492	36.000	FALSE	FALSE	216.839	36.000
SEMIVOLATILE ORGANICS	Fluoranthene	UG/KG	32	0	19	59.4%	192.938	271.582	1000.000	FALSE	FALSE	333.775	333.775
SEMIVOLATILE ORGANICS	Fluorene	UG/KG	31	1	1	3.2%	192.032	32.172	38.000	FALSE	FALSE	215.844	38.000
SEMIVOLATILE ORGANICS	Indeno[1,2,3-cd]pyrene	UG/KG	32	0	8	25.0%	228.813	218.186	790.000	FALSE	FALSE	341.962	341.962
SEMIVOLATILE ORGANICS	N-Nitrosodiphenylamine	UG/KG	31	1	2	6.5%	189.903	35.189	95.000	FALSE	FALSE	211.815	95.000
SEMIVOLATILE ORGANICS	Naphthalene	UG/KG	31	1	3	9.7%	182.484	53.270	37.000	FALSE	FALSE	250.492	37.000
SEMIVOLATILE ORGANICS	Pentachlorophenol	UG/KG	32	0	2	6.3%	549.469	420.895	990.000	FALSE	FALSE	675.909	675.909
SEMIVOLATILE ORGANICS	Phenanthrene	UG/KG	32	0	10	31.3%	197.969	193.325	360.000	FALSE	FALSE	329.947	329.947
SEMIVOLATILE ORGANICS	Pyrene	UG/KG	32	0	19	59.4%	194.531	282.622	1200.000	FALSE	FALSE	307.838	307.838
PESTICIDES/PCB	4,4`-DDD	UG/KG	32	0	2	6.3%	2.866	3.528	15.000	FALSE	FALSE	3.093	3.093
PESTICIDES/PCB	4,4`-DDE	UG/KG	32	0	7	21.9%	7.750	24.932	140.000	FALSE	FALSE	6.212	6.212
PESTICIDES/PCB	4,4`-DDT	UG/KG	32	0	3	9.4%	3.208	3.570	13.000	FALSE	FALSE	3.626	3.626
PESTICIDES/PCB	Aldrin	UG/KG	32	0	1	3.1%	1.305	1.415	1.900	FALSE	FALSE	1.387	1.387
PESTICIDES/PCB	Alpha-Chlordane	UG/KG	31	1	1	3.2%	1.029	0.077	1.100	FALSE	FALSE	1.064	1.064
PESTICIDES/PCB	Aroclor-1260	UG/KG	32	0	2	6.3%	24.875	27.473	28.000	FALSE	FALSE	26.326	26.326
PESTICIDES/PCB	Beta-BHC	UG/KG	32	0	1	3.1%	1.617	3.355	20.000	FALSE	FALSE	1.555	1.555

Class	Parameter	Units	No. of Valid Analyses	No. of Rejected SQLs	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	Lognormal ?	95th UCL of Mean	EPC
PESTICIDES/PCB	Delta-BHC	UG/KG	32	0	1	3.1%	1.313	1.420	2.200	FALSE	FALSE	1.400	1.400
PESTICIDES/PCB	Dieldrin	UG/KG	32	0	3	9.4%	4.572	10.735	62.000	FALSE	FALSE	4.509	4.509
PESTICIDES/PCB	Endosulfan I	UG/KG	32	0	3	9.4%	14.797	75.791	430.000	FALSE	FALSE	4.431	4.431
PESTICIDES/PCB	Endosulfan sulfate	UG/KG	32	0	1	3.1%	2.545	3.189	20.000	FALSE	FALSE	2.664	2.664
PESTICIDES/PCB	Endrin	UG/KG	32	0	2	6.3%	3.386	7.258	43.000	FALSE	FALSE	3.263	3.263
PESTICIDES/PCB	Endrin ketone	UG/KG	32	0	2	6.3%	4.236	12.194	71.000	FALSE	FALSE	3.585	3.585
OTHER ANALYSES	Nitrate/Nitrite Nitrogen	MG/KG	32	0	32	100.0%	0.339	0.423	2.400	FALSE	TRUE	0.460	0.460
NITROAROMATICS	2,4-Dinitrotoluene	UG/KG	32	0	1	3.1%	70.625	47.396	330.000	FALSE	FALSE	75.387	75.387
NITROAROMATICS	2,6-Dinitrotoluene	UG/KG	32	0	1	3.1%	88.594	148.086	900.000	FALSE	FALSE	89.191	89.191
METALS	Aluminum	MG/KG	32	0	32	100.0%	13317.188	2969.022	19300.000	FALSE	FALSE	14736.484	14736.484
METALS	Antimony	MG/KG	32	0	17	53.1%	4.675	8.917	52.000	FALSE	TRUE	7.790	7.790
METALS	Arsenic	MG/KG	32	0	32	100.0%	5.188	1.074	8.900	FALSE	TRUE	5.507	5.507
METALS	Barium	MG/KG	32	0	26	81.3%	105.920	60.489	357.000	FALSE	TRUE	125.562	125.562
METALS	Beryllium	MG/KG	32	0	32	100.0%	0.579	0.176	0.990	TRUE	FALSE	0.631	0.631
METALS	Cadmium	MG/KG	32	0	23	71.9%	1.224	1.992	3.500	FALSE	TRUE	2.043	2.043
METALS	Calcium	MG/KG	32	0	32	100.0%	26394.375	52842.403	#########	FALSE	FALSE	41678.432	41678.432
METALS	Chromium	MG/KG	32	0	32	100.0%	19.609	3.820	27.900	TRUE	FALSE	20.754	20.754
METALS	Cobalt	MG/KG	32	0	32	100.0%	10.272	3.834	21.900	FALSE	TRUE	11.448	11.448
METALS	Copper	MG/KG	32	0	32	100.0%	55.522	91.711	546.000	FALSE	FALSE	62.476	62.476
METALS	Cyanide	MG/KG	32	0	1	3.1%	0.313	0.227	1.500	FALSE	FALSE	0.379	0.379
METALS	Iron	MG/KG	32	0	32	100.0%	23226.875	5072.381	36100.000	TRUE	FALSE	24746.207	24746.207
METALS	Lead	MG/KG	32	0	31	96.9%	275.619	553.353	496.000	FALSE	TRUE	576.842	496.000
METALS	Magnesium	MG/KG	32	0	32	100.0%	5032.813	1990.612	9830.000	FALSE	TRUE	5695.790	5695.790
METALS	Manganese	MG/KG	32	0	32	100.0%	527.594	221.797	1080.000	TRUE	TRUE	594.029	594.029
METALS	Mercury	MG/KG	32	0	29	90.6%	0.103	0.187	1.000	FALSE	FALSE	0.117	0.117
METALS	Nickel	MG/KG	32	0	32	100.0%	26.697	9.321	50.800	FALSE	TRUE	29.792	29.792
METALS	Potassium	MG/KG	32	0	32	100.0%	1330.813	283.073	1960.000	TRUE	TRUE	1415.601	1415.601
METALS	Selenium	MG/KG	32	0	20	62.5%	0.670	0.520	1.600	FALSE	FALSE	1.250	1.250
METALS	Silver	MG/KG	32	0	4	12.5%	0.536	0.788	4.600	FALSE	FALSE	0.738	0.738
METALS	Sodium	MG/KG	32	0	21	65.6%	69.575	69.949	383.000	FALSE	FALSE	84.336	84.336
METALS	Thallium	MG/KG	32	0	7	21.9%	0.435	0.390	1.500	FALSE	FALSE	0.656	0.656
METALS	Vanadium	MG/KG	32	0	32	100.0%	22.981	4.497	30.700	TRUE	TRUE	24.328	24.328
METALS	Zinc	MG/KG	32	0	32	100.0%	133.325	110.589	620.000	FALSE	FALSE	155.685	155.685
HERBICIDES	MCPA	UG/KG	15	0	1	6.7%	5016.667	7469.239	32000.000	FALSE	FALSE	6203.085	6203.085

TABLE 7-14

CALCULATION OF INTAKE (ONSITE)
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
VOLATILE ORGANICS									
Acetone			2.67E-10	2	50	5	25	1,825	25,550
Benzene		5.95E-14	7.60E-11	2	50	5	25	1,825	25,550
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
Toluene	2.76E-12		2.52E-10	2	50	5	25	1,825	25,550
SEMIVOLATILE ORGANICS									
2,4-Dinitrotoluene			1.09E-08	2	50	5	25	1,825	25,550
2,6-Dinitrotoluene			0.00E+00	2	50	5	25	1,825	25,550
2-Methylnaphthalene			4.94E-09	2	50	5	25	1,825	25,550
2-Methylphenol			0.00E+00	2	50	5	25	1,825	25,550
3,3'-Dichlorobenzidine			9.54E-09	2	50	5	25	1,825	25,550
3-Nitroaniline			2.31E-08	2	50	5	25	1,825	25,550
4-Nitroaniline			2.31E-08	2	50	5	25	1,825	25,550
Acenaphthene			1.25E-09	2	50	5	25	1,825	25,550
Acenaphthylene			3.65E-09	2	50	5	25	1,825	25,550
Anthracene			4.94E-09	2	50	5	25	1,825	25,550
Benzo(a)anthracene			1.36E-08	2	50	5	25	1,825	25,550
Benzo(a)pyrene			1.52E-08	2	50	5	25	1,825	25,550
Benzo(b)fluoranthene			1.48E-08	2	50	5	25	1,825	25,550
Benzo(g,h,i)perylene			1.20E-08	2	50	5	25	1,825	25,550
Benzo(k)fluoranthene			1.15E-08	2	50	5	25	1,825	25,550
Butylbenzylphthalate			1.75E-09	2	50	5	25	1,825	25,550
Carbazole			9.91E-09	2	50	5	25	1,825	25,550
Chrysene			1.26E-08	2	50	5	25	1,825	25,550
Di-n-butylphthalate			1.15E-08	2	50	5	25	1,825	25,550
Dibenz(a,h)anthracene			1.11E-08	2	50	5	25	1,825	25,550
Dibenzofuran			1.37E-09	2	50	5	25	1,825	25,550
Fluoranthene			1.27E-08	2	50	5	25	1,825	25,550
Fluorene			1.44E-09	2	50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene			1.30E-08	2	50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			3.61E-09	2	50	5	25	1,825	25,550
Naphthalene			1.41E-09	2	50	5	25	1,825	25,550
Pentachlorophenol			2.57E-08	2	50	5	25	1,825	25,550
Phenanthrene			1.25E-08	2	50	5	25	1,825	25,550
Pyrene			1.17E-08	2	50	5	25	1,825	25,550
bis(2-Chloroisopropyl) ether	9.22E-11		8.41E-09	2	50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			1.23E-08	2	50	5	25	1,825	25,550
PESTICIDES/PCB									
4,4'-DDD			1.18E-10	2	50	5	25	1,825	25,550
4,4'-DDE			2.36E-10	2	50	5	25	1,825	25,550
4,4'-DDT		1.08E-13	1.38E-10	2	50	5	25	1,825	25,550
Aldrin	5.78E-13	4.13E-14	5.27E-11	2	50	5	25	1,825	25,550
Aroclor-1260			1.00E-09	2	50	5	25	1,825	25,550
Dieldrin		1.34E-13	1.71E-10	2	50	5	25	1,825	25,550
Endosulfan I			1.68E-10	2	50	5	25	1,825	25,550
Endosulfan sulfate			1.01E-10	2	50	5	25	1,825	25,550
Endrin			1.24E-10	2	50	5	25	1,825	25,550
Endrin ketone			1.36E-10	2	50	5	25	1,825	25,550
Heptachlor epoxide		0.00E+00	0.00E+00	2	50	5	25	1,825	25,550
alpha-Chlordane			4.04E-11	2	50	5	25	1,825	25,550
beta-BHC		4.62E-14	5.91E-11	2	50	5	25	1,825	25,550
delta-BHC			5.32E-11	2	50	5	25	1,825	25,550

TABLE 7-14

CALCULATION OF INTAKE (ONSITE)
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m^3)	Inhalation Rate (m^3/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
METALS									
Arsenic		1.64E-10	2.09E-07	2	50	5	25	1,825	25,550
Barium	5.23E-08		4.77E-06	2	50	5	25	1,825	25,550
Cadmium		6.08E-11	7.76E-08	2	50	5	25	1,825	25,550
Copper			2.37E-06	2	50	5	25	1,825	25,550
Lead			1.88E-05	2	50	5	25	1,825	25,550
Mercury	4.87E-11		4.45E-09	2	50	5	25	1,825	25,550
Selenium			4.75E-08	2	50	5	25	1,825	25,550
Silver			2.80E-08	2	50	5	25	1,825	25,550
Thallium			2.49E-08	2	50	5	25	1,825	25,550
Zinc			5.92E-06	2	50	5	25	1,825	25,550
HERBICIDES									
MCPA			2.36E-07	2	50	5	25	1,825	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CA \times IR \times EF \times ED}{BW \times AT}$$

Variables:

CA = Chemical Concentration in Air (mg/m^3)
IR = Inhalation Rate (m^3/day)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

Calculated EPC Air Data - RME
2 (RME Child)
50
5
25 (Child)
5 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-61

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			NA	NA		
Benzene		5.95E-14	NA	2.91E-02		1.73E-15
Methylene Chloride	0.00E+00	0.00E+00	8.57E-01	1.65E-03	0.00E+00	0.00E+00
Toluene	2.76E-12		1.14E-01	NA	2.41E-11	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Butylbenzylphthalate			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Chloroisopropyl) ether	9.22E-11		1.00E-03	NA	9.22E-08	
bis(2-Ethylhexyl)phthalate			NA	NA		
PESTICIDES/PCB						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		1.08E-13	NA	3.40E-01		3.66E-14
Aldrin	5.78E-13	4.13E-14	1.70E+01	1.72E+01	3.40E-14	7.08E-13
Aroclor-1260			NA	NA		
Dieldrin		1.34E-13	NA	1.61E+01		2.16E-12
Endosulfan I			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide		0.00E+00	NA	9.10E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		4.62E-14	NA	1.86E+00		8.60E-14
delta-BHC			NA	NA		

TABLE 7-61

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic		1.64E-10	NA	1.51E+01		2.47E-09
Barium	5.23E-08		1.43E-04	NA	3.66E-04	
Cadmium		6.08E-11	NA	6.30E+00		3.83E-10
Copper			NA	NA		
Lead			NA	NA		
Mercury	4.87E-11		8.57E-05	NA	5.68E-07	
Selenium			NA	NA		
Silver			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
HERBICIDES						
MCPA			NA	NA		
Total HQ & CR					**3.67E-04**	**2.85E-09**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-7A

AMBIENT AIR EXPOSURE POINT CONCENTRATIONS
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

COMPOUND	SURFACE SOIL EPC Data mg/kg	AVERAGE TSP (ug/m^3)	CONVERSION FACTOR (kg/ug)	AIR CALCULATED EPC (mg/m^3)
VOLATILE ORGANICS				
Acetone	7.04E-03	3.80E+01	1.00E-09	2.67E-10
Benzene	2.00E-03	3.80E+01	1.00E-09	7.60E-11
Methylene Chloride	0.00E+00	3.80E+01	1.00E-09	0.00E+00
Toluene	6.62E-03	3.80E+01	1.00E-09	2.52E-10
SEMIVOLATILE ORGANICS				
2,4-Dinitrotoluene	2.86E-01	3.80E+01	1.00E-09	1.09E-08
2,6-Dinitrotoluene	0.00E+00	3.80E+01	1.00E-09	0.00E+00
2-Methylnaphthalene	1.30E-01	3.80E+01	1.00E-09	4.94E-09
2-Methylphenol	0.00E+00	3.80E+01	1.00E-09	0.00E+00
3,3'-Dichlorobenzidine	2.51E-01	3.80E+01	1.00E-09	9.54E-09
3-Nitroaniline	6.07E-01	3.80E+01	1.00E-09	2.31E-08
4-Nitroaniline	6.07E-01	3.80E+01	1.00E-09	2.31E-08
Acenaphthene	3.30E-02	3.80E+01	1.00E-09	1.25E-09
Acenaphthylene	9.60E-02	3.80E+01	1.00E-09	3.65E-09
Anthracene	1.30E-01	3.80E+01	1.00E-09	4.94E-09
Benzo(a)anthracene	3.58E-01	3.80E+01	1.00E-09	1.36E-08
Benzo(a)pyrene	3.99E-01	3.80E+01	1.00E-09	1.52E-08
Benzo(b)fluoranthene	3.91E-01	3.80E+01	1.00E-09	1.48E-08
Benzo(g,h,i)perylene	3.17E-01	3.80E+01	1.00E-09	1.20E-08
Benzo(k)fluoranthene	3.04E-01	3.80E+01	1.00E-09	1.15E-08
Butylbenzylphthalate	4.60E-02	3.80E+01	1.00E-09	1.75E-09
Carbazole	2.61E-01	3.80E+01	1.00E-09	9.91E-09
Chrysene	3.31E-01	3.80E+01	1.00E-09	1.26E-08
Di-n-butylphthalate	3.03E-01	3.80E+01	1.00E-09	1.15E-08
Dibenz(a,h)anthracene	2.92E-01	3.80E+01	1.00E-09	1.11E-08
Dibenzofuran	3.60E-02	3.80E+01	1.00E-09	1.37E-09
Fluoranthene	3.34E-01	3.80E+01	1.00E-09	1.27E-08
Fluorene	3.80E-02	3.80E+01	1.00E-09	1.44E-09
Indeno(1,2,3-cd)pyrene	3.42E-01	3.80E+01	1.00E-09	1.30E-08
N-Nitrosodiphenylamine (1)	9.50E-02	3.80E+01	1.00E-09	3.61E-09
Naphthalene	3.70E-02	3.80E+01	1.00E-09	1.41E-09
Pentachlorophenol	6.76E-01	3.80E+01	1.00E-09	2.57E-08
Phenanthrene	3.30E-01	3.80E+01	1.00E-09	1.25E-08
Pyrene	3.08E-01	3.80E+01	1.00E-09	1.17E-08
bis(2-Chloroisopropyl) ether	2.21E-01	3.80E+01	1.00E-09	8.41E-09
bis(2-Ethylhexyl)phthalate	3.23E-01	3.80E+01	1.00E-09	1.23E-08
PESTICIDES/PCB				
4,4'-DDD	3.09E-03	3.80E+01	1.00E-09	1.18E-10
4,4'-DDE	6.21E-03	3.80E+01	1.00E-09	2.36E-10
4,4'-DDT	3.63E-03	3.80E+01	1.00E-09	1.38E-10
Aldrin	1.39E-03	3.80E+01	1.00E-09	5.27E-11
Aroclor-1260	2.63E-02	3.80E+01	1.00E-09	1.00E-09
Dieldrin	4.51E-03	3.80E+01	1.00E-09	1.71E-10
Endosulfan I	4.43E-03	3.80E+01	1.00E-09	1.68E-10
Endosulfan sulfate	2.66E-03	3.80E+01	1.00E-09	1.01E-10
Endrin	3.26E-03	3.80E+01	1.00E-09	1.24E-10
Endrin ketone	3.59E-03	3.80E+01	1.00E-09	1.36E-10
Heptachlor epoxide	0.00E+00	3.80E+01	1.00E-09	0.00E+00
alpha-Chlordane	1.06E-03	3.80E+01	1.00E-09	4.04E-11
beta-BHC	1.55E-03	3.80E+01	1.00E-09	5.91E-11
delta-BHC	1.40E-03	3.80E+01	1.00E-09	5.32E-11

TABLE 7-7A

AMBIENT AIR EXPOSURE POINT CONCENTRATIONS
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

COMPOUND	SURFACE SOIL EPC Data mg/kg	AVERAGE TSP (ug/m³)	CONVERSION FACTOR (kg/ug)	AIR CALCULATED EPC (mg/m³)
METALS				
Arsenic	5.51E+00	3.80E+01	1.00E-09	2.09E-07
Barium	1.26E+02	3.80E+01	1.00E-09	4.77E-06
Cadmium	2.04E+00	3.80E+01	1.00E-09	7.76E-08
Copper	6.25E+01	3.80E+01	1.00E-09	2.37E-06
Lead	4.96E+02	3.80E+01	1.00E-09	1.88E-05
Mercury	1.17E-01	3.80E+01	1.00E-09	4.45E-09
Selenium	1.25E+00	3.80E+01	1.00E-09	4.75E-08
Silver	7.38E-01	3.80E+01	1.00E-09	2.80E-08
Thallium	6.56E-01	3.80E+01	1.00E-09	2.49E-08
Zinc	1.56E+02	3.80E+01	1.00E-09	5.92E-06
HERBICIDES				
MCPA	6.20E+00	3.80E+01	1.00E-09	2.36E-07

EQUATION: **Calculated Air EPC (mg/m3) = Soil EPC x TSP x CF**

Variables:	**Assumptions:**
TSP = Total Suspended Particulates	**Average value - 38 ug/m3**
CF = Conversion Factor	**10-9 kg/ug**

TABLE 7-8

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
VOLATILE ORGANICS									
Acetone			2.67E-10	20	20	25	70	9,125	25,550
Benzene		4.25E-13	7.60E-11	20	20	25	70	9,125	25,550
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
Toluene	3.94E-12		2.52E-10	20	20	25	70	9,125	25,550
SEMIVOLATILE ORGANICS									
2,4-Dinitrotoluene			1.09E-08	20	20	25	70	9,125	25,550
2,6-Dinitrotoluene			0.00E+00	20	20	25	70	9,125	25,550
2-Methylnaphthalene			4.94E-09	20	20	25	70	9,125	25,550
2-Methylphenol			0.00E+00	20	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine			9.54E-09	20	20	25	70	9,125	25,550
3-Nitroaniline			2.31E-08	20	20	25	70	9,125	25,550
4-Nitroaniline			2.31E-08	20	20	25	70	9,125	25,550
Acenaphthene			1.25E-09	20	20	25	70	9,125	25,550
Acenaphthylene			3.65E-09	20	20	25	70	9,125	25,550
Anthracene			4.94E-09	20	20	25	70	9,125	25,550
Benzo(a)anthracene			1.36E-08	20	20	25	70	9,125	25,550
Benzo(a)pyrene			1.52E-08	20	20	25	70	9,125	25,550
Benzo(b)fluoranthene			1.48E-08	20	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			1.20E-08	20	20	25	70	9,125	25,550
Benzo(k)fluoranthene			1.15E-08	20	20	25	70	9,125	25,550
Butylbenzylphthalate			1.75E-09	20	20	25	70	9,125	25,550
Carbazole			9.91E-09	20	20	25	70	9,125	25,550
Chrysene			1.26E-08	20	20	25	70	9,125	25,550
Di-n-butylphthalate			1.15E-08	20	20	25	70	9,125	25,550
Dibenz(a,h)anthracene			1.11E-08	20	20	25	70	9,125	25,550
Dibenzofuran			1.37E-09	20	20	25	70	9,125	25,550
Fluoranthene			1.27E-08	20	20	25	70	9,125	25,550
Fluorene			1.44E-09	20	20	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			1.30E-08	20	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			3.61E-09	20	20	25	70	9,125	25,550
Naphthalene			1.41E-09	20	20	25	70	9,125	25,550
Pentachlorophenol			2.57E-08	20	20	25	70	9,125	25,550
Phenanthrene			1.25E-08	20	20	25	70	9,125	25,550
Pyrene			1.17E-08	20	20	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether	1.32E-10		8.41E-09	20	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			1.23E-08	20	20	25	70	9,125	25,550
PESTICIDES/PCB									
4,4'-DDD			1.18E-10	20	20	25	70	9,125	25,550
4,4'-DDE			2.36E-10	20	20	25	70	9,125	25,550
4,4'-DDT		7.70E-13	1.38E-10	20	20	25	70	9,125	25,550
Aldrin	8.25E-13	2.95E-13	5.27E-11	20	20	25	70	9,125	25,550
Aroclor-1260			1.00E-09	20	20	25	70	9,125	25,550
Dieldrin		9.58E-13	1.71E-10	20	20	25	70	9,125	25,550
Endosulfan I			1.68E-10	20	20	25	70	9,125	25,550
Endosulfan sulfate			1.01E-10	20	20	25	70	9,125	25,550
Endrin			1.24E-10	20	20	25	70	9,125	25,550
Endrin ketone			1.36E-10	20	20	25	70	9,125	25,550
Heptachlor epoxide		0.00E+00	0.00E+00	20	20	25	70	9,125	25,550
alpha-Chlordane			4.04E-11	20	20	25	70	9,125	25,550
beta-BHC		3.30E-13	5.91E-11	20	20	25	70	9,125	25,550
delta-BHC			5.32E-11	20	20	25	70	9,125	25,550

TABLE 7-8

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
METALS									
Arsenic		1.17E-09	2.09E-07	20	20	25	70	9,125	25,550
Barium	7.47E-08		4.77E-06	20	20	25	70	9,125	25,550
Cadmium		4.34E-10	7.76E-08	20	20	25	70	9,125	25,550
Copper			2.37E-06	20	20	25	70	9,125	25,550
Lead			1.88E-05	20	20	25	70	9,125	25,550
Mercury	6.96E-11		4.45E-09	20	20	25	70	9,125	25,550
Selenium			4.75E-08	20	20	25	70	9,125	25,550
Silver			2.80E-08	20	20	25	70	9,125	25,550
Thallium			2.49E-08	20	20	25	70	9,125	25,550
Zinc			5.92E-06	20	20	25	70	9,125	25,550
HERBICIDES									
MCPA			2.36E-07	20	20	25	70	9,125	25,550

EQUATION: Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:

CA = Chemical Concentration in Air (mg/m³)
IR = Inhalation Rate (m³/day)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

Calculated EPC Air Data - RME
20 (RME All Receptors)
20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult Male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-43

**CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity**

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			NA	NA		
Benzene		4.25E-13	NA	2.91E-02		1.24E-14
Methylene Chloride	0.00E+00	0.00E+00	8.57E-01	1.65E-03	0.00E+00	0.00E+00
Toluene	3.94E-12		1.14E-01	NA	3.45E-11	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Butylbenzylphthalate			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Chloroisopropyl) ether	1.32E-10		1.00E-03	NA	1.32E-07	
bis(2-Ethylhexyl)phthalate			NA	NA		
PESTICIDES/PCB						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		7.70E-13	NA	3.40E-01		2.62E-13
Aldrin	8.25E-13	2.95E-13	1.70E+01	1.72E+01	4.85E-14	5.05E-12
Aroclor-1260			NA	NA		
Dieldrin		9.58E-13	NA	1.61E+01		1.54E-11
Endosulfan I			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide		0.00E+00	NA	9.10E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		3.30E-13	NA	1.86E+00		6.14E-13
delta-BHC			NA	NA		

TABLE 7-43

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic		1.17E-09	NA	1.51E+01		1.76E-08
Barium	7.47E-08		1.43E-04	NA	5.23E-04	
Cadmium		4.34E-10	NA	6.30E+00		2.73E-09
Copper			NA	NA		
Lead			NA	NA		
Mercury	6.96E-11		8.57E-05	NA	8.12E-07	
Selenium			NA	NA		
Silver			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
HERBICIDES						
MCPA			NA	NA		
Total HQ & CR					**5.24E-04**	**2.04E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-12

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
VOLATILE ORGANICS									
Acetone			2.67E-10	20	250	1	70	365	25,550
Benzene		2.12E-13	7.60E-11	20	250	1	70	365	25,550
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	20	250	1	70	365	25,550
Toluene	4.93E-11		2.52E-10	20	250	1	70	365	25,550
SEMIVOLATILE ORGANICS									
2,4-Dinitrotoluene			1.09E-08	20	250	1	70	365	25,550
2,6-Dinitrotoluene			0.00E+00	20	250	1	70	365	25,550
2-Methylnaphthalene			4.94E-09	20	250	1	70	365	25,550
2-Methylphenol			0.00E+00	20	250	1	70	365	25,550
3,3'-Dichlorobenzidine			9.54E-09	20	250	1	70	365	25,550
3-Nitroaniline			2.31E-08	20	250	1	70	365	25,550
4-Nitroaniline			2.31E-08	20	250	1	70	365	25,550
Acenaphthene			1.25E-09	20	250	1	70	365	25,550
Acenaphthylene			3.65E-09	20	250	1	70	365	25,550
Anthracene			4.94E-09	20	250	1	70	365	25,550
Benzo(a)anthracene			1.36E-08	20	250	1	70	365	25,550
Benzo(a)pyrene			1.52E-08	20	250	1	70	365	25,550
Benzo(b)fluoranthene			1.48E-08	20	250	1	70	365	25,550
Benzo(g,h,i)perylene			1.20E-08	20	250	1	70	365	25,550
Benzo(k)fluoranthene			1.15E-08	20	250	1	70	365	25,550
Butylbenzylphthalate			1.75E-09	20	250	1	70	365	25,550
Carbazole			9.91E-09	20	250	1	70	365	25,550
Chrysene			1.26E-08	20	250	1	70	365	25,550
Di-n-butylphthalate			1.15E-08	20	250	1	70	365	25,550
Dibenz(a,h)anthracene			1.11E-08	20	250	1	70	365	25,550
Dibenzofuran			1.37E-09	20	250	1	70	365	25,550
Fluoranthene			1.27E-08	20	250	1	70	365	25,550
Fluorene			1.44E-09	20	250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene			1.30E-08	20	250	1	70	365	25,550
N-Nitrosodiphenylamine (1)			3.61E-09	20	250	1	70	365	25,550
Naphthalene			1.41E-09	20	250	1	70	365	25,550
Pentachlorophenol			2.57E-08	20	250	1	70	365	25,550
Phenanthrene			1.25E-08	20	250	1	70	365	25,550
Pyrene			1.17E-08	20	250	1	70	365	25,550
bis(2-Chloroisopropyl) ether	1.65E-09		8.41E-09	20	250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate			1.23E-08	20	250	1	70	365	25,550
PESTICIDES/PCB									
4,4'-DDD			1.18E-10	20	250	1	70	365	25,550
4,4'-DDE			2.36E-10	20	250	1	70	365	25,550
4,4'-DDT		3.85E-13	1.38E-10	20	250	1	70	365	25,550
Aldrin	1.03E-11	1.47E-13	5.27E-11	20	250	1	70	365	25,550
Aroclor-1260			1.00E-09	20	250	1	70	365	25,550
Dieldrin		4.79E-13	1.71E-10	20	250	1	70	365	25,550
Endosulfan I			1.68E-10	20	250	1	70	365	25,550
Endosulfan sulfate			1.01E-10	20	250	1	70	365	25,550
Endrin			1.24E-10	20	250	1	70	365	25,550
Endrin ketone			1.36E-10	20	250	1	70	365	25,550
Heptachlor epoxide		0.00E+00	0.00E+00	20	250	1	70	365	25,550
alpha-Chlordane			4.04E-11	20	250	1	70	365	25,550
beta-BHC		1.65E-13	5.91E-11	20	250	1	70	365	25,550
delta-BHC			5.32E-11	20	250	1	70	365	25,550

TABLE 7-12

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m^3)	Inhalation Rate (m^3/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
METALS									
Arsenic		5.85E-10	2.09E-07	20	250	1	70	365	25,550
Barium	9.34E-07		4.77E-06	20	250	1	70	365	25,550
Cadmium		2.17E-10	7.76E-08	20	250	1	70	365	25,550
Copper			2.37E-06	20	250	1	70	365	25,550
Lead			1.88E-05	20	250	1	70	365	25,550
Mercury	8.70E-10		4.45E-09	20	250	1	70	365	25,550
Selenium			4.75E-08	20	250	1	70	365	25,550
Silver			2.80E-08	20	250	1	70	365	25,550
Thallium			2.49E-08	20	250	1	70	365	25,550
Zinc			5.92E-06	20	250	1	70	365	25,550
HERBICIDES									
MCPA			2.36E-07	20	250	1	70	365	25,550

EQUATION: **Intake (mg/kg-day) =** $\dfrac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables:

CA = Chemical Concentration in Air (mg/m^3)
IR = Inhalation Rate (m^3/day)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

Calculated EPC Air Data - RME
20 (all receptors)
250 (RME Construction Workers)
1 (Upper bound period of Construction Worker)
70 (Adult Male)
1 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-55

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			NA	NA		
Benzene		2.12E-13	NA	2.91E-02		6.18E-15
Methylene Chloride	0.00E+00	0.00E+00	8.57E-01	1.65E-03	0.00E+00	0.00E+00
Toluene	4.93E-11		1.14E-01	NA	4.31E-10	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Butylbenzylphthalate			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Chloroisopropyl) ether	1.65E-09		1.00E-03	NA	1.65E-06	
bis(2-Ethylhexyl)phthalate			NA	NA		
PESTICIDES/PCB						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		3.85E-13	NA	3.40E-01		1.31E-13
Aldrin	1.03E-11	1.47E-13	1.70E+01	1.72E+01	6.07E-13	2.53E-12
Aroclor-1260			NA	NA		
Dieldrin		4.79E-13	NA	1.61E+01		7.71E-12
Endosulfan I			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide		0.00E+00	NA	9.10E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		1.65E-13	NA	1.86E+00		3.07E-13
delta-BHC			NA	NA		

TABLE 7-55

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic		5.85E-10	NA	1.51E+01		8.80E-09
Barium	9.34E-07		1.43E-04	NA	6.54E-03	
Cadmium		2.17E-10	NA	6.30E+00		1.37E-09
Copper			NA	NA		
Lead			NA	NA		
Mercury	8.70E-10		8.57E-05	NA	1.02E-05	
Selenium			NA	NA		
Silver			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
HERBICIDES						
MCPA			NA	NA		
Total HQ & CR					**6.55E-03**	**1.02E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-10

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
VOLATILE ORGANICS									
Acetone			2.67E-10	20	250	25	70	9,125	25,550
Benzene		5.31E-12	7.60E-11	20	250	25	70	9,125	25,550
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	20	250	25	70	9,125	25,550
Toluene	4.93E-11		2.52E-10	20	250	25	70	9,125	25,550
SEMIVOLATILE ORGANICS									
2,4-Dinitrotoluene			1.09E-08	20	250	25	70	9,125	25,550
2,6-Dinitrotoluene			0.00E+00	20	250	25	70	9,125	25,550
2-Methylnaphthalene			4.94E-09	20	250	25	70	9,125	25,550
2-Methylphenol			0.00E+00	20	250	25	70	9,125	25,550
3,3'-Dichlorobenzidine			9.54E-09	20	250	25	70	9,125	25,550
3-Nitroaniline			2.31E-08	20	250	25	70	9,125	25,550
4-Nitroaniline			2.31E-08	20	250	25	70	9,125	25,550
Acenaphthene			1.25E-09	20	250	25	70	9,125	25,550
Acenaphthylene			3.65E-09	20	250	25	70	9,125	25,550
Anthracene			4.94E-09	20	250	25	70	9,125	25,550
Benzo(a)anthracene			1.36E-08	20	250	25	70	9,125	25,550
Benzo(a)pyrene			1.52E-08	20	250	25	70	9,125	25,550
Benzo(b)fluoranthene			1.48E-08	20	250	25	70	9,125	25,550
Benzo(g,h,i)perylene			1.20E-08	20	250	25	70	9,125	25,550
Benzo(k)fluoranthene			1.15E-08	20	250	25	70	9,125	25,550
Butylbenzylphthalate			1.75E-09	20	250	25	70	9,125	25,550
Carbazole			9.91E-09	20	250	25	70	9,125	25,550
Chrysene			1.26E-08	20	250	25	70	9,125	25,550
Di-n-butylphthalate			1.15E-08	20	250	25	70	9,125	25,550
Dibenz(a,h)anthracene			1.11E-08	20	250	25	70	9,125	25,550
Dibenzofuran			1.37E-09	20	250	25	70	9,125	25,550
Fluoranthene			1.27E-08	20	250	25	70	9,125	25,550
Fluorene			1.44E-09	20	250	25	70	9,125	25,550
Indeno(1,2,3-cd)pyrene			1.30E-08	20	250	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			3.61E-09	20	250	25	70	9,125	25,550
Naphthalene			1.41E-09	20	250	25	70	9,125	25,550
Pentachlorophenol			2.57E-08	20	250	25	70	9,125	25,550
Phenanthrene			1.25E-08	20	250	25	70	9,125	25,550
Pyrene			1.17E-08	20	250	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether	1.65E-09		8.41E-09	20	250	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			1.23E-08	20	250	25	70	9,125	25,550
PESTICIDES/PCB									
4,4'-DDD			1.18E-10	20	250	25	70	9,125	25,550
4,4'-DDE			2.36E-10	20	250	25	70	9,125	25,550
4,4'-DDT		9.63E-12	1.38E-10	20	250	25	70	9,125	25,550
Aldrin	1.03E-11	3.68E-12	5.27E-11	20	250	25	70	9,125	25,550
Aroclor-1260			1.00E-09	20	250	25	70	9,125	25,550
Dieldrin		1.20E-11	1.71E-10	20	250	25	70	9,125	25,550
Endosulfan I			1.68E-10	20	250	25	70	9,125	25,550
Endosulfan sulfate			1.01E-10	20	250	25	70	9,125	25,550
Endrin			1.24E-10	20	250	25	70	9,125	25,550
Endrin ketone			1.36E-10	20	250	25	70	9,125	25,550
Heptachlor epoxide		0.00E+00	0.00E+00	20	250	25	70	9,125	25,550
alpha-Chlordane			4.04E-11	20	250	25	70	9,125	25,550
beta-BHC		4.13E-12	5.91E-11	20	250	25	70	9,125	25,550
delta-BHC			5.32E-11	20	250	25	70	9,125	25,550

TABLE 7-10

CALCULATION OF INTAKE FROM INHALATION OF DUST IN AMBIENT AIR
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Air (mg/m³)	Inhalation Rate (m³/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
								Nc	Car
METALS									
Arsenic		1.46E-08	2.09E-07	20	250	25	70	9,125	25,550
Barium	9.34E-07		4.77E-06	20	250	25	70	9,125	25,550
Cadmium		5.43E-09	7.76E-08	20	250	25	70	9,125	25,550
Copper			2.37E-06	20	250	25	70	9,125	25,550
Lead			1.88E-05	20	250	25	70	9,125	25,550
Mercury	8.70E-10		4.45E-09	20	250	25	70	9,125	25,550
Selenium			4.75E-08	20	250	25	70	9,125	25,550
Silver			2.80E-08	20	250	25	70	9,125	25,550
Thallium			2.49E-08	20	250	25	70	9,125	25,550
Zinc			5.92E-06	20	250	25	70	9,125	25,550
HERBICIDES									
MCPA			2.36E-07	20	250	25	70	9,125	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CA \times IR \times EF \times ED}{BW \times AT}$$

Variables:

CA = Chemical Concentration in Air (mg/m³)
IR = Inhalation Rate (m³/day)
EF = Exposure Frequency (days/yr)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

Calculated EPC Air Data - RME
20 (all receptors)
250 (RME Industrial Workers)
5
70 (Adult Male)
5 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-49

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			NA	NA		
Benzene		5.31E-12	NA	2.91E-02		1.55E-13
Methylene Chloride	0.00E+00	0.00E+00	8.57E-01	1.65E-03	0.00E+00	0.00E+00
Toluene	4.93E-11		1.14E-01	NA	4.31E-10	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			NA	NA		
2,6-Dinitrotoluene			NA	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			NA	NA		
3,3'-Dichlorobenzidine			NA	NA		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			NA	NA		
Acenaphthylene			NA	NA		
Anthracene			NA	NA		
Benzo(a)anthracene			NA	NA		
Benzo(a)pyrene			NA	NA		
Benzo(b)fluoranthene			NA	NA		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	NA		
Butylbenzylphthalate			NA	NA		
Carbazole			NA	NA		
Chrysene			NA	NA		
Di-n-butylphthalate			NA	NA		
Dibenz(a,h)anthracene			NA	NA		
Dibenzofuran			NA	NA		
Fluoranthene			NA	NA		
Fluorene			NA	NA		
Indeno(1,2,3-cd)pyrene			NA	NA		
N-Nitrosodiphenylamine (1)			NA	NA		
Naphthalene			NA	NA		
Pentachlorophenol			NA	NA		
Phenanthrene			NA	NA		
Pyrene			NA	NA		
bis(2-Chloroisopropyl) ether	1.65E-09		1.00E-03	NA	1.65E-06	
bis(2-Ethylhexyl)phthalate			NA	NA		
PESTICIDES/PCB						
4,4'-DDD			NA	NA		
4,4'-DDE			NA	NA		
4,4'-DDT		9.63E-12	NA	3.40E-01		3.27E-12
Aldrin	1.03E-11	3.68E-12	1.70E+01	1.72E+01	6.07E-13	6.32E-11
Aroclor-1260			NA	NA		
Dieldrin		1.20E-11	NA	1.61E+01		1.93E-10
Endosulfan I			NA	NA		
Endosulfan sulfate			NA	NA		
Endrin			NA	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide		0.00E+00	NA	9.10E+00		0.00E+00
alpha-Chlordane			NA	NA		
beta-BHC		4.13E-12	NA	1.86E+00		7.68E-12
delta-BHC			NA	NA		

TABLE 7-49

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INHALATION OF DUST IN AMBIENT AIR
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfC (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic		1.46E-08	NA	1.51E+01		2.20E-07
Barium	9.34E-07		1.43E-04	NA	6.54E-03	
Cadmium		5.43E-09	NA	6.30E+00		3.42E-08
Copper			NA	NA		
Lead			NA	NA		
Mercury	8.70E-10		8.57E-05	NA	1.02E-05	
Selenium			NA	NA		
Silver			NA	NA		
Thallium			NA	NA		
Zinc			NA	NA		
HERBICIDES						
MCPA			NA	NA		
Total HQ & CR					**6.55E-03**	**2.55E-07**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic) / Reference Concentration
Cancer Risk = Chronic Daily Intake (Cancinogenic) x Inhalation Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-38

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg sed/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
											Child(Nc)	Car
Volatile Organics												
Acetone			1.44E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Toluene			8.00E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Semivolatile Organics												
2,4-Dimethylphenol			3.20E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
2,4-Dinitrotoluene			3.14E-01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(a)anthracene			2.50E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(a)pyrene			3.00E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(b)fluoranthene			4.30E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(g,h,i)perylene			3.10E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Benzo(k)fluoranthene			3.30E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Chrysene			4.80E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Fluoranthene			7.00E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene			2.40E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Phenanthrene			3.50E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Pyrene			4.70E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			7.70E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Pesticides												
4,4'-DDD			6.46E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
4,4'-DDE			4.82E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
4,4'-DDT			4.90E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Dieldrin			3.26E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Endosulfan I			1.43E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Endosulfan II			3.05E-03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550

TABLE 7-38

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg sed/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Child(Nc)	Averaging Time (days) Car
Metals												
Aluminum			1.83E+04	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Antimony			5.50E+00	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Arsenic			6.10E+00	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Barium			1.32E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Beryllium			7.64E-01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Cadmium	1.43E-07		2.40E+00	1.0E-06	2,170	1.0	0.01	25	5	25	1,825	25,550
Calcium			1.08E+04	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Chromium			2.47E+01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Cobalt			1.26E+01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Copper			1.33E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Iron			2.94E+04	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Lead			6.83E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Magnesium			5.54E+03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Manganese			5.32E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Mercury			8.11E-02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Nickel			3.16E+01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Potassium			2.18E+03	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Selenium			1.27E+00	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Sodium			4.27E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Thallium			8.24E-01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Vanadium			2.97E+01	1.0E-06	2,170	1.0		25	5	25	1,825	25,550
Zinc			1.88E+02	1.0E-06	2,170	1.0		25	5	25	1,825	25,550

EQUATION:

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

Variables:

CS = Chemical Concentration in Sediment (mg sediment/kg)
CF = Conversion Factor (10-6 kg/mg)
SA = Surface Area Contact (cm²)
AF = Sediment to Skin Adherence Factor (mg/cm²)
ABS = Absorption Factor (unitless)

Assumptions:

EPC - Sediment Data - RME
10-6
2,170 (RME Child)
1.0 (RME all receptors)
Compound Specific PCBs and Cd, (EPA, 1992b)
(Default Assumption 0% = 0.0)

Variables:

EF = Exposure Frequency (events/year)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

25 (RME)
5 (RME)
25 kg (child)
5 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-73

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Volatile Organics						
Acetone			1.00E-01	NA		
Toluene			1.20E-01	NA		
Semivolatile Organics						
2,4-Dimethylphenol			2.00E-02	NA		
2,4-Dinitrotoluene			2.00E-03	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Chrysene			NA	1.46E-01		
Fluoranthene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
Pesticides						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan II			NA	NA		
Metals						
Aluminum			NA	NA		
Antimony			4.00E-04	NA		
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Beryllium			5.00E-06	4.30E+03		
Cadmium	1.43E-07		3.00E-05	NA	4.76E-03	
Calcium			NA	NA		
Chromium			2.50E-04	NA		
Cobalt			NA	NA		
Copper			2.00E-02	NA		
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese			5.00E-03	NA		
Mercury			4.50E-05	NA		
Nickel			1.00E-03	NA		
Potassium			NA	NA		
Selenium			3.00E-03	NA		
Sodium			NA	NA		
Thallium			7.00E-05	NA		
Vanadium			7.00E-03	NA		
Zinc			1.50E-01	NA		
Totals - HQ & CR					**4.76E-03**	

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-36

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Child Ingestion Rate (mg sed/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Volatile Organics											
Acetone	7.88E-09		1.44E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Toluene	4.38E-09		8.00E-03	200	1.0E-06	1	25	5	25	1,825	25,550
Semivolatile Organics											
2,4-Dimethylphenol	1.75E-08		3.20E-02	200	1.0E-06	1	25	5	25	1,825	25,550
2,4-Dinitrotoluene	1.72E-07		3.14E-01	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(a)anthracene		9.78E-10	2.50E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(a)pyrene		1.17E-09	3.00E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(b)fluoranthene		1.68E-09	4.30E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(g,h,i)perylene			3.10E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Benzo(k)fluoranthene		1.29E-09	3.30E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Chrysene		1.88E-09	4.80E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Fluoranthene	3.84E-08		7.00E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene		9.39E-10	2.40E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Phenanthrene			3.50E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Pyrene	2.58E-08		4.70E-02	200	1.0E-06	1	25	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate	4.22E-08	3.01E-09	7.70E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Pesticides											
4,4'-DDD	3.54E-09	2.53E-10	6.46E-03	200	1.0E-06	1	25	5	25	1,825	25,550
4,4'-DDE			4.82E-02	200	1.0E-06	1	25	5	25	1,825	25,550
4,4'-DDT	2.68E-09	1.92E-10	4.90E-03	200	1.0E-06	1	25	5	25	1,825	25,550
Dieldrin	1.78E-09	1.27E-10	3.26E-03	200	1.0E-06	1	25	5	25	1,825	25,550
Endosulfan I	7.82E-10		1.43E-03	200	1.0E-06	1	25	5	25	1,825	25,550
Endosulfan II			3.05E-03	200	1.0E-06	1	25	5	25	1,825	25,550

TABLE 7-36

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Sediment (mg/kg)	Child Ingestion Rate (mg sed/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Metals											
Aluminum			1.83E+04	200	1.0E-06	1	25	5	25	1,825	25,550
Antimony	3.01E-06		5.50E+00	200	1.0E-06	1	25	5	25	1,825	25,550
Arsenic	3.34E-06	2.39E-07	6.10E+00	200	1.0E-06	1	25	5	25	1,825	25,550
Barium	7.21E-05		1.32E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Beryllium	4.19E-07	2.99E-08	7.64E-01	200	1.0E-06	1	25	5	25	1,825	25,550
Cadmium	1.32E-06		2.40E+00	200	1.0E-06	1	25	5	25	1,825	25,550
Calcium			1.08E+04	200	1.0E-06	1	25	5	25	1,825	25,550
Chromium	1.35E-05		2.47E+01	200	1.0E-06	1	25	5	25	1,825	25,550
Cobalt			1.26E+01	200	1.0E-06	1	25	5	25	1,825	25,550
Copper	7.31E-05		1.33E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Iron			2.94E+04	200	1.0E-06	1	25	5	25	1,825	25,550
Lead			6.83E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Magnesium			5.54E+03	200	1.0E-06	1	25	5	25	1,825	25,550
Manganese	2.92E-04		5.32E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Mercury	4.44E-08		8.11E-02	200	1.0E-06	1	25	5	25	1,825	25,550
Nickel	1.73E-05		3.16E+01	200	1.0E-06	1	25	5	25	1,825	25,550
Potassium			2.18E+03	200	1.0E-06	1	25	5	25	1,825	25,550
Selenium	6.94E-07		1.27E+00	200	1.0E-06	1	25	5	25	1,825	25,550
Sodium			4.27E+02	200	1.0E-06	1	25	5	25	1,825	25,550
Thallium	4.51E-07		8.24E-01	200	1.0E-06	1	25	5	25	1,825	25,550
Vanadium	1.63E-05		2.97E+01	200	1.0E-06	1	25	5	25	1,825	25,550
Zinc	1.03E-04		1.88E+02	200	1.0E-06	1	25	5	25	1,825	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Sediment (mg sediment/kg)
IR = Ingestion Rate (mg sediment/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC - Sediment Data - RME
200 (RME Child)
10-6
1
25 (RME)
5 (RME)
25 (Child)
5 x 365 (Nc), 70 x 365 (C)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-71

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SEDIMENT (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
Volatile Organics						
Acetone	7.88E-09		1.00E-01	NA	7.88E-08	
Toluene	4.38E-09		2.00E-01	NA	2.19E-08	
Semivolatile Organics						
2,4-Dimethylphenol	1.75E-08		2.00E-02	NA	8.77E-07	
2,4-Dinitrotoluene	1.72E-07		2.00E-03	NA	8.61E-05	
Benzo(a)anthracene		9.78E-10	NA	7.30E-01		7.14E-10
Benzo(a)pyrene		1.17E-09	NA	7.30E+00		8.57E-09
Benzo(b)fluoranthene		1.68E-09	NA	7.30E-01		1.23E-09
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		1.29E-09	NA	7.30E-01		9.43E-10
Chrysene		1.88E-09	NA	7.30E-02		1.37E-10
Fluoranthene	3.84E-08		4.00E-02	NA	9.59E-07	
Indeno(1,2,3-cd)pyrene		9.39E-10	NA	7.30E-01		6.86E-10
Phenanthrene			NA	NA		
Pyrene	2.58E-08		3.00E-02	NA	8.58E-07	
bis(2-Ethylhexyl)phthalate	4.22E-08	3.01E-09	2.00E-02	1.40E-02	2.11E-06	4.22E-11
Pesticides						
4,4'-DDD	3.54E-09	2.53E-10	5.00E-04	2.40E-01	7.08E-06	6.07E-11
4,4'-DDE			NA	NA		
4,4'-DDT	2.68E-09	1.92E-10	5.00E-04	3.40E-01	5.37E-06	6.52E-11
Dieldrin	1.78E-09	1.27E-10	5.00E-05	1.60E+01	3.57E-05	2.04E-09
Endosulfan I	7.82E-10		6.00E-03	NA	1.30E-07	
Endosulfan II			NA	NA		
Metals						
Aluminum			NA	NA		
Antimony	3.01E-06		4.00E-04	NA	7.53E-03	
Arsenic	3.34E-06	2.39E-07	3.00E-04	1.75E+00	1.11E-02	4.17E-07
Barium	7.21E-05		7.00E-02	NA	1.03E-03	
Beryllium	4.19E-07	2.99E-08	5.00E-03	4.30E+00	8.37E-05	1.29E-07
Cadmium	1.32E-06		5.00E-04	NA	2.63E-03	
Calcium			NA	NA		
Chromium	1.35E-05		5.00E-03	NA	2.70E-03	
Cobalt			NA	NA		
Copper	7.31E-05		4.00E-02	NA	1.83E-03	
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese	2.92E-04		5.00E-03	NA	5.83E-02	
Mercury	4.44E-08		3.00E-04	NA	1.48E-04	
Nickel	1.73E-05		2.00E-02	NA	8.66E-04	
Potassium			NA	NA		
Selenium	6.94E-07		5.00E-03	NA	1.39E-04	
Sodium			NA	NA		
Thallium	4.51E-07		7.00E-05	NA	6.45E-03	
Vanadium	1.63E-05		7.00E-03	NA	2.33E-03	
Zinc	1.03E-04		3.00E-01	NA	3.44E-04	
Totals - HQ & CR					**9.57E-02**	**5.61E-07**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-20

CALCULATION OF INTAKE FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
VOLATILE ORGANICS											
Acetone	3.31E-08		7.04E-03	480	1.00E-06	1	250	1	70	365	25,550
Benzene		1.34E-10	2.00E-03	480	1.00E-06	1	250	1	70	365	25,550
Methylene Chloride		0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
Toluene	3.11E-08	4.44E-10	6.62E-03	480	1.00E-06	1	250	1	70	365	25,550
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene	1.34E-06		2.86E-01	480	1.00E-06	1	250	1	70	365	25,550
2,6-Dinitrotoluene	0.00E+00		0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
2-Methylnaphthalene			1.30E-01	480	1.00E-06	1	250	1	70	365	25,550
2-Methylphenol	0.00E+00		0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
3,3'-Dichlorobenzidine		1.69E-08	2.51E-01	480	1.00E-06	1	250	1	70	365	25,550
3-Nitroaniline			6.07E-01	480	1.00E-06	1	250	1	70	365	25,550
4-Nitroaniline			6.07E-01	480	1.00E-06	1	250	1	70	365	25,550
Acenaphthene	1.55E-07		3.30E-02	480	1.00E-06	1	250	1	70	365	25,550
Acenaphthylene			9.60E-02	480	1.00E-06	1	250	1	70	365	25,550
Anthracene	6.11E-07		1.30E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(a)anthracene		2.40E-08	3.58E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(a)pyrene		2.68E-08	3.99E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(b)fluoranthene		2.62E-08	3.91E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(g,h,i)perylene			3.17E-01	480	1.00E-06	1	250	1	70	365	25,550
Benzo(k)fluoranthene		2.04E-08	3.04E-01	480	1.00E-06	1	250	1	70	365	25,550
Butylbenzylphthalate	2.16E-07		4.60E-02	480	1.00E-06	1	250	1	70	365	25,550
Carbazole		1.75E-08	2.61E-01	480	1.00E-06	1	250	1	70	365	25,550
Chrysene		2.22E-08	3.31E-01	480	1.00E-06	1	250	1	70	365	25,550
Di-n-butylphthalate	1.42E-06		3.03E-01	480	1.00E-06	1	250	1	70	365	25,550

TABLE 7-20

CALCULATION OF INTAKE FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Dibenz(a,h)anthracene		1.96E-08	2.92E-01	480	1.00E-06	1	250	1	70	365	25,550
Dibenzofuran			3.60E-02	480	1.00E-06	1	250	1	70	365	25,550
Fluoranthene	1.57E-06		3.34E-01	480	1.00E-06	1	250	1	70	365	25,550
Fluorene	1.78E-07		3.80E-02	480	1.00E-06	1	250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene		2.29E-08	3.42E-01	480	1.00E-06	1	250	1	70	365	25,550
N-Nitrosodiphenylamine (1)		6.37E-09	9.50E-02	480	1.00E-06	1	250	1	70	365	25,550
Naphthalene			3.70E-02	480	1.00E-06	1	250	1	70	365	25,550
Pentachlorophenol	3.17E-06	4.54E-08	6.76E-01	480	1.00E-06	1	250	1	70	365	25,550
Phenanthrene			3.30E-01	480	1.00E-06	1	250	1	70	365	25,550
Pyrene	1.45E-06		3.08E-01	480	1.00E-06	1	250	1	70	365	25,550
bis(2-Chloroisopropyl) ether	1.04E-06		2.21E-01	480	1.00E-06	1	250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate	1.52E-06	2.17E-08	3.23E-01	480	1.00E-06	1	250	1	70	365	25,550
PESTICIDES/PCB											
4,4'-DDD	1.45E-08	2.08E-10	3.09E-03	480	1.00E-06	1	250	1	70	365	25,550
4,4'-DDE			6.21E-03	480	1.00E-06	1	250	1	70	365	25,550
4,4'-DDT	1.70E-08	2.43E-10	3.63E-03	480	1.00E-06	1	250	1	70	365	25,550
Aldrin	6.52E-09	9.31E-11	1.39E-03	480	1.00E-06	1	250	1	70	365	25,550
Aroclor-1254	0.00E+00	0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
Aroclor-1260		1.77E-09	2.63E-02	480	1.00E-06	1	250	1	70	365	25,550
Dieldrin	2.12E-08	3.03E-10	4.51E-03	480	1.00E-06	1	250	1	70	365	25,550
Endosulfan I	2.08E-08		4.43E-03	480	1.00E-06	1	250	1	70	365	25,550
Endosulfan sulfate	1.25E-08		2.66E-03	480	1.00E-06	1	250	1	70	365	25,550
Endrin	1.53E-08		3.26E-03	480	1.00E-06	1	250	1	70	365	25,550
Endrin ketone			3.59E-03	480	1.00E-06	1	250	1	70	365	25,550
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00	480	1.00E-06	1	250	1	70	365	25,550
alpha-Chlordane	5.00E-09	7.14E-11	1.06E-03	480	1.00E-06	1	250	1	70	365	25,550
beta-BHC		1.04E-10	1.55E-03	480	1.00E-06	1	250	1	70	365	25,550
delta-BHC			1.40E-03	480	1.00E-06	1	250	1	70	365	25,550

TABLE 7-20

CALCULATION OF INTAKE FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
METALS											
Antimony	3.66E-05		7.79E+00	480	1.00E-06	1	250	1	70	365	25,550
Arsenic	2.59E-05	3.69E-07	5.51E+00	480	1.00E-06	1	250	1	70	365	25,550
Barium	5.90E-04		1.26E+02	480	1.00E-06	1	250	1	70	365	25,550
Cadmium	9.60E-06		2.04E+00	480	1.00E-06	1	250	1	70	365	25,550
Copper	2.93E-04		6.25E+01	480	1.00E-06	1	250	1	70	365	25,550
Lead			4.96E+02	480	1.00E-06	1	250	1	70	365	25,550
Mercury	5.50E-07		1.17E-01	480	1.00E-06	1	250	1	70	365	25,550
Selenium	5.87E-06		1.25E+00	480	1.00E-06	1	250	1	70	365	25,550
Silver	3.47E-06		7.38E-01	480	1.00E-06	1	250	1	70	365	25,550
Zinc	7.31E-04		1.56E+02	480	1.00E-06	1	250	1	70	365	25,550
HERBICIDES											
MCPA	2.91E-05		6.20E+00	480	1.00E-06	1	250	1	70	365	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC - Soil Data (RME)
480 (RME Construction Worker)
10-6
1 (All Receptors)
250 (RME Construction Worker)
1 (Upper bound limit for Construction Worker)
70 (Adult male)
1 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-57

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone	3.31E-08		1.00E-01	NA	3.31E-07	
Benzene		1.34E-10	NA	2.90E-02		3.89E-12
Methylene Chloride		0.00E+00	NA	2.90E-02		0.00E+00
Toluene	3.11E-08	4.44E-10	6.00E-02	7.50E-03	5.19E-07	3.33E-12
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene	1.34E-06		2.00E-03	NA	6.71E-04	
2,6-Dinitrotoluene	0.00E+00		1.00E-03	NA	0.00E+00	
2-Methylnaphthalene			NA	NA		
2-Methylphenol	0.00E+00		5.00E-02	NA	0.00E+00	
3,3'-Dichlorobenzidine		1.69E-08	NA	4.50E-01		7.58E-09
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene	1.55E-07		6.00E-02	NA	2.58E-06	
Acenaphthylene			NA	NA		
Anthracene	6.11E-07		3.00E-01	NA	2.04E-06	
Benzo(a)anthracene		2.40E-08	NA	7.30E-01		1.76E-08
Benzo(a)pyrene		2.68E-08	NA	7.30E+00		1.95E-07
Benzo(b)fluoranthene		2.62E-08	NA	7.30E-01		1.91E-08
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		2.04E-08	NA	7.30E-01		1.49E-08
Butylbenzylphthalate	2.16E-07		2.00E+00	NA	1.08E-07	
Carbazole		1.75E-08	NA	2.00E-02		3.50E-10
Chrysene		2.22E-08	NA	7.30E-02		1.62E-09
Di-n-butylphthalate	1.42E-06		1.00E-01	NA	1.42E-05	
Dibenz(a,h)anthracene		1.96E-08	NA	7.30E+00		1.43E-07
Dibenzofuran			NA	NA		
Fluoranthene	1.57E-06		4.00E-02	NA	3.92E-05	
Fluorene	1.78E-07		4.00E-02	NA	4.46E-06	
Indeno(1,2,3-cd)pyrene		2.29E-08	NA	7.30E-01		1.67E-08
N-Nitrosodiphenylamine (1)		6.37E-09	NA	4.90E-03		3.12E-11
Naphthalene			NA	NA		
Pentachlorophenol	3.17E-06	4.54E-08	3.00E-02	1.20E-01	1.06E-04	5.44E-09
Phenanthrene			NA	NA		
Pyrene	1.45E-06		3.00E-02	NA	4.82E-05	
bis(2-Chloroisopropyl) ether	1.04E-06		1.00E-03	NA	1.04E-03	
bis(2-Ethylhexyl)phthalate	1.52E-06	2.17E-08	2.00E-02	1.40E-02	7.60E-05	3.04E-10

TABLE 7-57

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
PESTICIDES/PCB						
4,4'-DDD	1.45E-08	2.08E-10	5.00E-04	2.40E-01	2.91E-05	4.98E-11
4,4'-DDE			NA	NA		
4,4'-DDT	1.70E-08	2.43E-10	5.00E-04	3.40E-01	3.41E-05	8.27E-11
Aldrin	6.52E-09	9.31E-11	3.00E-05	1.70E+01	2.17E-04	1.58E-09
Aroclor-1254	0.00E+00	0.00E+00	2.00E-05	2.00E+00	0.00E+00	0.00E+00
Aroclor-1260		1.77E-09	NA	7.70E+00		1.36E-08
Dieldrin	2.12E-08	3.03E-10	5.00E-05	1.60E+01	4.24E-04	4.84E-09
Endosulfan I	2.08E-08		6.00E-03	NA	3.47E-06	
Endosulfan sulfate	1.25E-08		5.00E-05	NA	2.50E-04	
Endrin	1.53E-08		3.00E-04	NA	5.11E-05	
Endrin ketone			NA	NA		
Heptachlor epoxide	0.00E+00	0.00E+00	1.30E-05	9.10E+00	0.00E+00	0.00E+00
alpha-Chlordane	5.00E-09	7.14E-11	6.00E-05	1.30E+00	8.33E-05	9.28E-11
beta-BHC		1.04E-10	NA	1.80E+00		1.88E-10
delta-BHC			NA	NA		
METALS						
Antimony	3.66E-05		4.00E-04	NA	9.15E-02	
Arsenic	2.59E-05	3.69E-07	3.00E-04	1.75E+00	8.62E-02	6.47E-07
Barium	5.90E-04		7.00E-02	NA	8.42E-03	
Cadmium	9.60E-06		5.00E-04	NA	1.92E-02	
Copper	2.93E-04		4.00E-02	NA	7.34E-03	
Lead			NA	NA		
Mercury	5.50E-07		3.00E-04	NA	1.83E-03	
Selenium	5.87E-06		5.00E-03	NA	1.17E-03	
Silver	3.47E-06		5.00E-03	NA	6.93E-04	
Zinc	7.31E-04		3.00E-01	NA	2.44E-03	
HERBICIDES						
MCPA	2.91E-05		5.00E-04	NA	5.83E-02	
Totals - HQ & CR					**2.80E-01**	**1.09E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-28

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
VOLATILE ORGANICS												
Acetone			7.04E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzene			2.00E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Methylene Chloride				1.00E-06	5,800	1.0		250	1	70	365	25,550
Toluene			6.62E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			2.86E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
2,6-Dinitrotoluene				1.00E-06	5,800	1.0		250	1	70	365	25,550
2-Methylnaphthalene			1.30E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
2-Methylphenol				1.00E-06	5,800	1.0		250	1	70	365	25,550
3,3'-Dichlorobenzidine			2.51E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
3-Nitroaniline			6.07E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
4-Nitroaniline			6.07E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Acenaphthene			3.30E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Acenaphthylene			9.60E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Anthracene			1.30E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(a)anthracene			3.58E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(a)pyrene			3.99E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(b)fluoranthene			3.91E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(g,h,i)perylene			3.17E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Benzo(k)fluoranthene			3.04E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Butylbenzylphthalate			4.60E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Carbazole			2.61E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Chrysene			3.31E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Di-n-butylphthalate			3.03E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550

TABLE 7-28

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm^2)	Adherence Factor (mg soil/cm^2)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
Dibenz(a,h)anthracene			2.92E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Dibenzofuran			3.60E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Fluoranthene			3.34E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Fluorene			3.80E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Indeno(1,2,3-cd)pyrene			3.42E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
N-Nitrosodiphenylamine (1)			9.50E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Naphthalene			3.70E-02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pentachlorophenol			6.76E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Phenanthrene			3.30E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Pyrene			3.08E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
bis(2-Chloroisopropyl) ether			2.21E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
bis(2-Ethylhexyl)phthalate			3.23E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
PESTICIDES/PCB												
4,4'-DDD			3.09E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
4,4'-DDE			6.21E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
4,4'-DDT			3.63E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Aldrin			1.39E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Aroclor-1254				1.00E-06	5,800	1.0		250	1	70	365	25,550
Aroclor-1260	8.964E-08	1.281E-09	2.63E-02	1.00E-06	5,800	1.0	0.06	250	1	70	365	25,550
Dieldrin			4.51E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan I			4.43E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endosulfan sulfate			2.66E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin			3.26E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Endrin ketone			3.59E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
Heptachlor epoxide				1.00E-06	5,800	1.0		250	1	70	365	25,550
alpha-Chlordane			1.06E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
beta-BHC			1.55E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550
delta-BHC			1.40E-03	1.00E-06	5,800	1.0		250	1	70	365	25,550

TABLE 7-28

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
METALS												
Antimony			7.79E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Arsenic			5.51E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Barium			1.26E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Cadmium			2.04E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Copper			6.25E+01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Lead			4.96E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
Mercury			1.17E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Selenium			1.25E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550
Silver			7.38E-01	1.00E-06	5,800	1.0		250	1	70	365	25,550
Zinc			1.56E+02	1.00E-06	5,800	1.0		250	1	70	365	25,550
HERBICIDES												
MCPA			6.20E+00	1.00E-06	5,800	1.0		250	1	70	365	25,550

EQUATION:

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

Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC - Soil Data (RME)
CF = Conversion Factor (10-6 kg/mg)	10-6
SA = Surface Area Contact (cm²)	5,800 (RME Adult Worker)
AF =Soil to Skin Adherence Factor (mg/cm²)	1.0 (RME - All Receptors)
ABS = Absorption Factor (unitless)	Applicable for PCBs and Cadmium (EPA, 1992b)
EF = Exposure Frequency (days/year)	250 (RME Construction Worker)
ED = Exposure Duration (years)	1 (Upper bound limit for CW)
BW = Bodyweight (kg)	70 (Adult Male)
AT = Averaging Time (days)	1 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-59

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Chloroisopropyl) ether			1.00E-03	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		

TABLE 7-59

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SURFACE & SUBSURFACE SOIL
CONSTRUCTION WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
PESTICIDES/PCB						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1254			1.90E-05	2.11E+00		
Aroclor-1260	8.96E-08	1.28E-09	NA	8.11E+00		1.04E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		
METALS						
Antimony			4.00E-04	NA		
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Cadmium			3.00E-05	NA		
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Zinc			1.50E-01	NA		
HERBICIDES						
MCPA			5.00E-04	NA		
Totals - HQ & CR						**1.04E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-67

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SURFACE WATER
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
SEMIVOLATILE ORGANICS						
bis(2-Ethylhexyl)phthalate	2.74E-07	1.96E-08	2.00E-02	1.40E-02	1.37E-05	2.74E-10
METALS						
Antimony	3.03E-06		4.00E-04	NA	7.57E-03	
Arsenic	5.84E-07	4.17E-08	3.00E-04	1.75E+00	1.95E-03	7.30E-08
Barium	9.89E-06		7.00E-02	NA	1.41E-04	
Cadmium	1.07E-07		5.00E-04	NA	2.14E-04	
Calcium			NA	NA		
Chromium	8.64E-08		5.00E-03	NA	1.73E-05	
Copper	2.64E-06		4.00E-02	NA	6.59E-05	
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese	1.64E-06		5.00E-03	NA	3.28E-04	
Nickel	1.42E-07		2.00E-02	NA	7.08E-06	
Potassium			NA	NA		
Selenium	4.42E-07		5.00E-03	NA	8.84E-05	
Sodium			NA	NA		
Vanadium	1.23E-07		7.00E-03	NA	1.76E-05	
Zinc	4.97E-06		3.00E-01	NA	1.66E-05	
Totals - HQ & CR					**1.04E-02**	**7.33E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-34

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SURFACE WATER (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	Absorbed Dose/Event (mg-cm²-event)	EPC Surface W. (mg/L)	Child Skin Surface Area Contact (cm²)	Kp Permeability Coefficient (cm/hr)	Exposure Time (hours/day)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Volumetric Conv. Factor (1 liter/1000 cm³)	B (unitless)	Tau (hours)	Child Body Weight (kg)	Averaging Time (days) Child (Nc)	Averaging Time (days) Car
SEMIVOLATILE ORGANICS															
bis(2-Ethylhexyl)phthalate	1.64E-07	1.17E-08	8.36E-04	2.00E-03	2,170	3.3E-02	1	25	5	1.0E-03	1.30E+01	2.10E+01	25	1,825	25,550
METALS															
Antimony	1.31E-10		2.21E-05	2.21E-02	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Arsenic	2.54E-11	1.81E-12	4.26E-06	4.26E-03	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Barium	4.29E-10		7.22E-05	7.22E-02	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Cadmium	4.65E-12		7.82E-07	7.82E-04	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Calcium			6.32E-02	6.32E+01	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Chromium	1.50E-11		1.26E-06	6.31E-04	2,170	2.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Copper				1.93E-02	2,170	NA	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Iron			1.93E-04	1.93E-01	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Lead			1.48E-07	3.71E-02	2,170	4.0E-06	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Magnesium			8.90E-03	8.90E+00	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Manganese	7.12E-11		1.20E-05	1.20E-02	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Nickel	6.14E-14		1.03E-07	1.03E-03	2,170	1.0E-04	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Potassium			3.52E-03	3.52E+00	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Selenium	1.92E-11		3.23E-06	3.23E-03	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Sodium			7.03E-03	7.03E+00	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Vanadium	5.35E-12		9.00E-07	9.00E-04	2,170	1.0E-03	1	25	5	1.0E-03	NA	NA	25	1,825	25,550
Zinc	7.76E-11		2.18E-05	3.63E-02	2,170	6.0E-04	1	25	5	1.0E-03	NA	NA	25	1,825	25,550

EQUATION:

$$\text{Absorbed Dose (mg/kg-day)} = \frac{DA \times SA \times Kp \times ET \times EF \times ED \times CF}{BW \times AT}$$

Variables:	Assumptions:	Variables:	Assumptions:
DA = Absorbed Dose per Event (mg-cm²/event)	Calculated from EPA, 1992	EF = Exposure Frequency (days/year)	25
SA = Surface Area Contact (cm²)	2,170 (RME Child)	ED = Exposure Duration (years)	5 (RME)
Kp = Permeability Coefficient (cm/hour)	Compound Specific, EPA, 1992	CF = Vol. Conv. Factor (1 L/1000 cm³)	0.001
ET = Exposure Time (hours/day)	1 (RME)	BW = Bodyweight (kg)	25 (Child)
Tao = Lag time (hours)	Compound Specific, EPA, 1992	B = Bunge Model Value	Compound Specific, EPA, 1992

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-69

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS FROM DERMAL CONTACT TO SURFACE WATER (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg)	Child CDI (Car) (mg/kg)	Dermal RfD (mg/kg/day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
SEMIVOLATILE ORGANICS						
bis(2-Ethylhexyl)phthalate	1.64E-07	1.17E-08	2.00E-02	1.40E-02	8.20E-06	2.30E-09
METALS						
Antimony	1.31E-10		4.00E-04	NA	3.28E-07	
Arsenic	2.54E-11	1.81E-12	2.94E-04	1.79E+00	8.62E-08	4.54E-11
Barium	4.29E-10		7.00E-03	NA	6.13E-08	
Cadmium	4.65E-12		3.00E-05	NA	1.55E-07	
Calcium			NA	NA		
Chromium	1.50E-11		2.50E-04	NA	6.00E-08	
Copper			2.00E-02	NA		
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese	7.12E-11		5.00E-03	NA	1.42E-08	
Nickel	6.14E-14		1.00E-03	NA	6.14E-11	
Potassium			NA	NA		
Selenium	1.92E-11		3.00E-03	NA	6.40E-09	
Sodium			NA	NA		
Vanadium	5.35E-12		7.00E-03	NA	7.64E-10	
Zinc	7.76E-11		1.50E-01	NA	5.17E-10	
Totals - HQ & CR					**8.91E-06**	**2.34E-09**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-32

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SURFACE WATER (while Wading)
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Surface W. (mg/L)	Contact Rate (L/hr)	Exposure Time (hr/day)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
									Child(Nc)	Car
SEMIVOLATILE ORGANICS										
bis(2-Ethylhexyl)phthalate	2.74E-07	1.96E-08	2.00E-03	0.05	1	25	5	25	1,825	25,550
METALS										
Antimony	3.03E-06		2.21E-02	0.05	1	25	5	25	1,825	25,550
Arsenic	5.84E-07	4.17E-08	4.26E-03	0.05	1	25	5	25	1,825	25,550
Barium	9.89E-06		7.22E-02	0.05	1	25	5	25	1,825	25,550
Cadmium	1.07E-07		7.82E-04	0.05	1	25	5	25	1,825	25,550
Calcium			6.32E+01	0.05	1	25	5	25	1,825	25,550
Chromium	8.64E-08		6.31E-04	0.05	1	25	5	25	1,825	25,550
Copper	2.64E-06		1.93E-02	0.05	1	25	5	25	1,825	25,550
Iron			1.93E-01	0.05	1	25	5	25	1,825	25,550
Lead			3.71E-02	0.05	1	25	5	25	1,825	25,550
Magnesium			8.90E+00	0.05	1	25	5	25	1,825	25,550
Manganese	1.64E-06		1.20E-02	0.05	1	25	5	25	1,825	25,550
Nickel	1.42E-07		1.03E-03	0.05	1	25	5	25	1,825	25,550
Potassium			3.52E+00	0.05	1	25	5	25	1,825	25,550
Selenium	4.42E-07		3.23E-03	0.05	1	25	5	25	1,825	25,550
Sodium			7.03E+00	0.05	1	25	5	25	1,825	25,550
Vanadium	1.23E-07		9.00E-04	0.05	1	25	5	25	1,825	25,550
Zinc	4.97E-06		3.63E-02	0.05	1	25	5	25	1,825	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times CR \times ET \times EF \times ED}{BW \times AT}$$

Variables:	Assumptions:
CS = Chemical Concentration in Surface Water (mg/L)	EPC - Surface Water Data - RME
CR = Contact Rate (Liters/hour)	0.05 (all recreators)
ET = Exposure Time (hours/day)	1 (RME - all recreators)
EF = Exposure Frequency (days/year)	25
ED = Exposure Duration (years)	5 (RME)
BW = Bodyweight (kg)	25 (Child)
AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-67

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SURFACE WATER
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
SEMIVOLATILE ORGANICS						
bis(2-Ethylhexyl)phthalate	2.74E-07	1.96E-08	2.00E-02	1.40E-02	1.37E-05	2.74E-10
METALS						
Antimony	3.03E-06		4.00E-04	NA	7.57E-03	
Arsenic	5.84E-07	4.17E-08	3.00E-04	1.75E+00	1.95E-03	7.30E-08
Barium	9.89E-06		7.00E-02	NA	1.41E-04	
Cadmium	1.07E-07		5.00E-04	NA	2.14E-04	
Calcium			NA	NA		
Chromium	8.64E-08		5.00E-03	NA	1.73E-05	
Copper	2.64E-06		4.00E-02	NA	6.59E-05	
Iron			NA	NA		
Lead			NA	NA		
Magnesium			NA	NA		
Manganese	1.64E-06		5.00E-03	NA	3.28E-04	
Nickel	1.42E-07		2.00E-02	NA	7.08E-06	
Potassium			NA	NA		
Selenium	4.42E-07		5.00E-03	NA	8.84E-05	
Sodium			NA	NA		
Vanadium	1.23E-07		7.00E-03	NA	1.76E-05	
Zinc	4.97E-06		3.00E-01	NA	1.66E-05	
Totals - HQ & CR					**1.04E-02**	**7.33E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-22

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
VOLATILE ORGANICS											
Acetone	7.71E-09		7.04E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Benzene		1.57E-10	2.00E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Methylene Chloride				200	1.0E-06	1	50	5	25	1,825	25,550
Toluene	7.26E-09		6.62E-03	200	1.0E-06	1	50	5	25	1,825	25,550
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene	3.13E-07		2.86E-01	200	1.0E-06	1	50	5	25	1,825	25,550
2,6-Dinitrotoluene				200	1.0E-06	1	50	5	25	1,825	25,550
2-Methylnaphthalene			1.30E-01	200	1.0E-06	1	50	5	25	1,825	25,550
2-Methylphenol				200	1.0E-06	1	50	5	25	1,825	25,550
3,3'-Dichlorobenzidine		1.97E-08	2.51E-01	200	1.0E-06	1	50	5	25	1,825	25,550
3-Nitroaniline			6.07E-01	200	1.0E-06	1	50	5	25	1,825	25,550
4-Nitroaniline			6.07E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Acenaphthene	3.62E-08		3.30E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Acenaphthylene			9.60E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Anthracene	1.42E-07		1.30E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(a)anthracene		2.81E-08	3.58E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(a)pyrene		3.12E-08	3.99E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(b)fluoranthene		3.06E-08	3.91E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(g,h,i)perylene			3.17E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Benzo(k)fluoranthene		2.38E-08	3.04E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Butylbenzylphthalate	5.04E-08		4.60E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Carbazole		2.04E-08	2.61E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Chrysene		2.59E-08	3.31E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Di-n-butylphthalate	3.32E-07		3.03E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Dibenz(a,h)anthracene		2.29E-08	2.92E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Dibenzofuran			3.60E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Fluoranthene	3.66E-07		3.34E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Fluorene	4.16E-08		3.80E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Indeno(1,2,3-cd)pyrene		2.68E-08	3.42E-01	200	1.0E-06	1	50	5	25	1,825	25,550

TABLE 7-22

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
N-Nitrosodiphenylamine (1)		7.44E-09	9.50E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Naphthalene			3.70E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Pentachlorophenol	7.41E-07	5.29E-08	6.76E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Phenanthrene			3.30E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Pyrene	3.37E-07		3.08E-01	200	1.0E-06	1	50	5	25	1,825	25,550
bis(2-Chloroisopropyl) ether	2.43E-07		2.21E-01	200	1.0E-06	1	50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate	3.54E-07	2.53E-08	3.23E-01	200	1.0E-06	1	50	5	25	1,825	25,550
PESTICIDES/PCB											
4,4'-DDD	3.39E-09	2.42E-10	3.09E-03	200	1.0E-06	1	50	5	25	1,825	25,550
4,4'-DDE			6.21E-03	200	1.0E-06	1	50	5	25	1,825	25,550
4,4'-DDT	3.97E-09	2.84E-10	3.63E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Aldrin	1.52E-09	1.09E-10	1.39E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Aroclor-1260		2.06E-09	2.63E-02	200	1.0E-06	1	50	5	25	1,825	25,550
Dieldrin	4.94E-09	3.53E-10	4.51E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Endosulfan I	4.86E-09		4.43E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Endosulfan sulfate	2.92E-09		2.66E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Endrin	3.58E-09		3.26E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Endrin ketone			3.59E-03	200	1.0E-06	1	50	5	25	1,825	25,550
Heptachlor epoxide				200	1.0E-06	1	50	5	25	1,825	25,550
alpha-Chlordane	1.17E-09	8.33E-11	1.06E-03	200	1.0E-06	1	50	5	25	1,825	25,550
beta-BHC		1.22E-10	1.55E-03	200	1.0E-06	1	50	5	25	1,825	25,550
delta-BHC			1.40E-03	200	1.0E-06	1	50	5	25	1,825	25,550

TABLE 7-22

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Intake (Nc) (mg/kg-day)	Child Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Child Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
										Nc	Car
METALS											
Arsenic	6.04E-06	4.31E-07	5.51E+00	200	1.0E-06	1	50	5	25	1,825	25,550
Barium	1.38E-04		1.26E+02	200	1.0E-06	1	50	5	25	1,825	25,550
Cadmium	2.24E-06		2.04E+00	200	1.0E-06	1	50	5	25	1,825	25,550
Copper	6.85E-05		6.25E+01	200	1.0E-06	1	50	5	25	1,825	25,550
Lead			4.96E+02	200	1.0E-06	1	50	5	25	1,825	25,550
Mercury	1.28E-07		1.17E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Selenium	1.37E-06		1.25E+00	200	1.0E-06	1	50	5	25	1,825	25,550
Silver	8.09E-07		7.38E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Thallium	7.19E-07		6.56E-01	200	1.0E-06	1	50	5	25	1,825	25,550
Zinc	1.71E-04		1.56E+02	200	1.0E-06	1	50	5	25	1,825	25,550
HERBICIDES											
MCPA	6.80E-06		6.20E+00	200	1.0E-06	1	50	5	25	1,825	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC Soil Data - RME
200 (RME Child)
10-6
1
50 (RME)
5 (RME)
25 (Child)
5 x 365 (Nc), 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-63

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone	7.71E-09		1.00E-01	NA	7.71E-08	
Benzene		1.57E-10	NA	2.90E-02		4.54E-12
Methylene Chloride			6.00E-02	7.50E-03		
Toluene	7.26E-09		2.00E-01	NA	3.63E-08	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene	3.13E-07		2.00E-03	NA	1.57E-04	
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine		1.97E-08	NA	4.50E-01		8.85E-09
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene	3.62E-08		6.00E-02	NA	6.03E-07	
Acenaphthylene			NA	NA		
Anthracene	1.42E-07		3.00E-01	NA	4.75E-07	
Benzo(a)anthracene		2.81E-08	NA	7.30E-01		2.05E-08
Benzo(a)pyrene		3.12E-08	NA	7.30E+00		2.28E-07
Benzo(b)fluoranthene		3.06E-08	NA	7.30E-01		2.23E-08
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		2.38E-08	NA	7.30E-01		1.74E-08
Butylbenzylphthalate	5.04E-08		2.00E+00	NA	2.52E-08	
Carbazole		2.04E-08	NA	2.00E-02		4.08E-10
Chrysene		2.59E-08	NA	7.30E-02		1.89E-09
Di-n-butylphthalate	3.32E-07		1.00E-01	NA	3.32E-06	
Dibenz(a,h)anthracene		2.29E-08	NA	7.30E+00		1.67E-07
Dibenzofuran			NA	NA		
Fluoranthene	3.66E-07		4.00E-02	NA	9.14E-06	
Fluorene	4.16E-08		4.00E-02	NA	1.04E-06	
Indeno(1,2,3-cd)pyrene		2.68E-08	NA	7.30E-01		1.95E-08
N-Nitrosodiphenylamine (1)		7.44E-09	NA	4.90E-03		3.64E-11
Naphthalene			NA	NA		
Pentachlorophenol	7.41E-07	5.29E-08	3.00E-02	1.20E-01	2.47E-05	6.35E-09
Phenanthrene			NA	NA		
Pyrene	3.37E-07		3.00E-02	NA	1.12E-05	
bis(2-Chloroisopropyl) ether	2.43E-07		1.00E-03	NA	2.43E-04	
bis(2-Ethylhexyl)phthalate	3.54E-07	2.53E-08	2.00E-02	1.40E-02	1.77E-05	3.54E-10
PESTICIDES/PCB						
4,4'-DDD	3.39E-09	2.42E-10	5.00E-04	2.40E-01	6.78E-06	5.81E-11
4,4'-DDE			NA	NA		
4,4'-DDT	3.97E-09	2.84E-10	5.00E-04	3.40E-01	7.95E-06	9.65E-11
Aldrin	1.52E-09	1.09E-10	3.00E-05	1.70E+01	5.07E-05	1.85E-09
Aroclor-1260		2.06E-09	NA	7.70E+00		1.59E-08
Dieldrin	4.94E-09	3.53E-10	5.00E-05	1.60E+01	9.88E-05	5.65E-09
Endosulfan I	4.86E-09		6.00E-03	NA	8.09E-07	
Endosulfan sulfate	2.92E-09		5.00E-05	NA	5.84E-05	
Endrin	3.58E-09		3.00E-04	NA	1.19E-05	
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane	1.17E-09	8.33E-11	6.00E-05	1.30E+00	1.94E-05	1.08E-10
beta-BHC		1.22E-10	NA	1.80E+00		2.19E-10
delta-BHC			NA	NA		
METALS						
Arsenic	6.04E-06	4.31E-07	3.00E-04	1.75E+00	2.01E-02	7.54E-07
Barium	1.38E-04		7.00E-02	NA	1.97E-03	
Cadmium	2.24E-06		5.00E-04	NA	4.48E-03	
Copper	6.85E-05		4.00E-02	NA	1.71E-03	
Lead			NA	NA		
Mercury	1.28E-07		3.00E-04	NA	4.27E-04	
Selenium	1.37E-06		5.00E-03	NA	2.74E-04	
Silver	8.09E-07		5.00E-03	NA	1.62E-04	
Thallium	7.19E-07		7.00E-05	NA	1.03E-02	
Zinc	1.71E-04		3.00E-01	NA	5.69E-04	
HERBICIDES						
MCPA	6.80E-06		5.00E-04	NA	1.36E-02	
Totals - HQ & CR					**5.43E-02**	**1.27E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-30

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days)	
											Nc	Car
VOLATILE ORGANICS												
Acetone			7.04E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzene			2.00E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Methylene Chloride				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Toluene			6.62E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			2.86E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2,6-Dinitrotoluene				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2-Methylnaphthalene			1.30E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
2-Methylphenol				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
3,3'-Dichlorobenzidine			2.51E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
3-Nitroaniline			6.07E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4-Nitroaniline			6.07E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acenaphthene			3.30E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Acenaphthylene			9.60E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Anthracene			1.30E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(a)anthracene			3.58E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(a)pyrene			3.99E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(b)fluoranthene			3.91E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(g,h,i)perylene			3.17E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Benzo(k)fluoranthene			3.04E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Butylbenzylphthalate			4.60E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Carbazole			2.61E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Chrysene			3.31E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Di-n-butylphthalate			3.03E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Dibenz(a,h)anthracene			2.92E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Dibenzofuran			3.60E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Fluoranthene			3.34E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Fluorene			3.80E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550

TABLE 7-30

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Indeno(1,2,3-cd)pyrene			3.42E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
N-Nitrosodiphenylamine (1)			9.50E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Naphthalene			3.70E-02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pentachlorophenol			6.76E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Phenanthrene			3.30E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Pyrene			3.08E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
bis(2-Chloroisopropyl) ether			2.21E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
bis(2-Ethylhexyl)phthalate			3.23E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
PESTICIDES/PCB												
4,4'-DDD			3.09E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4,4'-DDE			6.21E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
4,4'-DDT			3.63E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Aldrin			1.39E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Aroclor-1260		1.422E-09	2.63E-02	1.00E-06	2,300	1.0	0.06	50	5	25	1,825	25,550
Dieldrin			4.51E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan I			4.43E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endosulfan sulfate			2.66E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin			3.26E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Endrin ketone			3.59E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Heptachlor epoxide				1.00E-06	2,300	1.0		50	5	25	1,825	25,550
alpha-Chlordane			1.06E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
beta-BHC			1.55E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
delta-BHC			1.40E-03	1.00E-06	2,300	1.0		50	5	25	1,825	25,550

TABLE 7-30

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child Absorbed Dose (Nc) (mg/kg-day)	Child Absorbed Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Child Skin Surface Area Contact (cm^2/event)	Adherence Factor (mg soil/cm^2)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Child Exposure Duration (years)	Child Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
METALS												
Arsenic			5.51E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Barium			1.26E+02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Cadmium	2.57E-07		2.04E+00	1.00E-06	2,300	1.0	0.01	50	5	25	1,825	25,550
Copper			6.25E+01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Lead			4.96E+02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Mercury			1.17E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Selenium			1.25E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Silver			7.38E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Thallium			6.56E-01	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
Zinc			1.56E+02	1.00E-06	2,300	1.0		50	5	25	1,825	25,550
HERBICIDES												
MCPA			6.20E+00	1.00E-06	2,300	1.0		50	5	25	1,825	25,550

EQUATION:

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

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC Soil Data - RME	EF = Exposure Frequency (events/year)	50 (RME)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	5 (RME)
SA = Surface Area Contact (cm^2)	2,300 (RME Child)	BW = Bodyweight (kg)	25 kg (child)
AF =Soil to Skin Adherence Factor (mg/cm^2)	1.0 (RME all receptors)	AT = Averaging Time (days)	5 x 365 (Nc), 70 x 365 (Car)
ABS = Absorption Factor (unitless)	Compound Specific PCBs and Cd (EPA, 1992b) (Default Assumption 0% = 0.0)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-65

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Chloroisopropyl) ether			1.00E-03	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
PESTICIDES/PCB						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1260		1.42E-09	NA	8.11E+00		1.15E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		

TABLE 7-65

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
FUTURE TRESSPASSER (Child)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Child CDI (Nc) (mg/kg-day)	Child CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Child Hazard Quotient	Cancer Risk
METALS						
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Cadmium	2.57E-07		3.00E-05	NA	8.58E-03	
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			2.00E-02	NA		
HERBICIDES						
MCPA			5.00E-04	NA		
Totals - HQ & CR					**8.58E-03**	**1.15E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
VOLATILE ORGANICS											
Acetone	5.51E-10		7.04E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Benzene		5.59E-11	2.00E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Toluene	5.19E-10		6.62E-03	100	1.00E-06	1	20	25	70	9,125	25,550
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene	2.24E-08		2.86E-01	100	1.00E-06	1	20	25	70	9,125	25,550
2,6-Dinitrotoluene	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
2-Methylnaphthalene			1.30E-01	100	1.00E-06	1	20	25	70	9,125	25,550
2-Methylphenol	0.00E+00		0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
3,3'-Dichlorobenzidine		7.02E-09	2.51E-01	100	1.00E-06	1	20	25	70	9,125	25,550
3-Nitroaniline			6.07E-01	100	1.00E-06	1	20	25	70	9,125	25,550
4-Nitroaniline			6.07E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthene	2.58E-09		3.30E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Acenaphthylene			9.60E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Anthracene	1.02E-08		1.30E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)anthracene		1.00E-08	3.58E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(a)pyrene		1.11E-08	3.99E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(b)fluoranthene		1.09E-08	3.91E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(g,h,i)perylene			3.17E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Benzo(k)fluoranthene		8.49E-09	3.04E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Butylbenzylphthalate	3.60E-09		4.60E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Carbazole		7.29E-09	2.61E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Chrysene		9.24E-09	3.31E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Di-n-butylphthalate	2.37E-08		3.03E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenz(a,h)anthracene		8.17E-09	2.92E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Dibenzofuran			3.60E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Fluoranthene	2.61E-08		3.34E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Fluorene	2.97E-09		3.80E-02	100	1.00E-06	1	20	25	70	9,125	25,550

TABLE 7-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Indeno(1,2,3-cd)pyrene		9.56E-09	3.42E-01	100	1.00E-06	1	20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)		2.66E-09	9.50E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Naphthalene			3.70E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Pentachlorophenol	5.29E-08	1.89E-08	6.76E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Phenanthrene			3.30E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Pyrene	2.41E-08		3.08E-01	100	1.00E-06	1	20	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether	1.73E-08		2.21E-01	100	1.00E-06	1	20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate	2.53E-08	9.04E-09	3.23E-01	100	1.00E-06	1	20	25	70	9,125	25,550
PESTICIDES/PCB											
4,4'-DDD	2.42E-10	8.65E-11	3.09E-03	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDE			6.21E-03	100	1.00E-06	1	20	25	70	9,125	25,550
4,4'-DDT	2.84E-10	1.01E-10	3.63E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Aldrin	1.09E-10	3.88E-11	1.39E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Aroclor-1260		7.36E-10	2.63E-02	100	1.00E-06	1	20	25	70	9,125	25,550
Dieldrin	3.53E-10	1.26E-10	4.51E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan I	3.47E-10		4.43E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endosulfan sulfate	2.09E-10		2.66E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin	2.55E-10		3.26E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Endrin ketone			3.59E-03	100	1.00E-06	1	20	25	70	9,125	25,550
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	20	25	70	9,125	25,550
alpha-Chlordane	8.33E-11	2.97E-11	1.06E-03	100	1.00E-06	1	20	25	70	9,125	25,550
beta-BHC		4.35E-11	1.55E-03	100	1.00E-06	1	20	25	70	9,125	25,550
delta-BHC			1.40E-03	100	1.00E-06	1	20	25	70	9,125	25,550

TABLE 7-16

CALCULATION OF INTAKE FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Soil (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
METALS											
Arsenic	4.31E-07	1.54E-07	5.51E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Barium	9.83E-06		1.26E+02	100	1.00E-06	1	20	25	70	9,125	25,550
Cadmium	1.60E-07		2.04E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Copper	4.89E-06		6.25E+01	100	1.00E-06	1	20	25	70	9,125	25,550
Lead			4.96E+02	100	1.00E-06	1	20	25	70	9,125	25,550
Mercury	9.16E-09		1.17E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Selenium	9.78E-08		1.25E+00	100	1.00E-06	1	20	25	70	9,125	25,550
Silver	5.78E-08		7.38E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Thallium	5.14E-08		6.56E-01	100	1.00E-06	1	20	25	70	9,125	25,550
Zinc	1.22E-05		1.56E+02	100	1.00E-06	1	20	25	70	9,125	25,550
HERBICIDES											
MCPA	4.86E-07		6.20E+00	100	1.00E-06	1	20	25	70	9,125	25,550

EQUATION:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC Soil Data - RME
100 (RME Site Worker)
10-6
1 (All Receptors)
20 (RME Site Worker)
25 (RME Site Worker)
70 (Adult male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-45

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone	5.51E-10		1.00E-01	NA	5.51E-09	
Benzene		5.59E-11	NA	2.90E-02		1.62E-12
Methylene Chloride	0.00E+00	0.00E+00	6.00E-02	7.50E-03	0.00E+00	0.00E+00
Toluene	5.19E-10		2.00E-01	NA	2.59E-09	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene	2.24E-08		2.00E-03	NA	1.12E-05	
2,6-Dinitrotoluene	0.00E+00		1.00E-03	NA	0.00E+00	
2-Methylnaphthalene			NA	NA		
2-Methylphenol	0.00E+00		5.00E-02	NA	0.00E+00	
3,3'-Dichlorobenzidine		7.02E-09	NA	4.50E-01		3.16E-09
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene	2.58E-09		6.00E-02	NA	4.31E-08	
Acenaphthylene			NA	NA		
Anthracene	1.02E-08		3.00E-01	NA	3.39E-08	
Benzo(a)anthracene		1.00E-08	NA	7.30E-01		7.31E-09
Benzo(a)pyrene		1.11E-08	NA	7.30E+00		8.14E-08
Benzo(b)fluoranthene		1.09E-08	NA	7.30E-01		7.97E-09
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		8.49E-09	NA	7.30E-01		6.20E-09
Butylbenzylphthalate	3.60E-09		2.00E+00	NA	1.80E-09	
Carbazole		7.29E-09	NA	2.00E-02		1.46E-10
Chrysene		9.24E-09	NA	7.30E-02		6.75E-10
Di-n-butylphthalate	2.37E-08		1.00E-01	NA	2.37E-07	
Dibenz(a,h)anthracene		8.17E-09	NA	7.30E+00		5.97E-08
Dibenzofuran			NA	NA		
Fluoranthene	2.61E-08		4.00E-02	NA	6.53E-07	
Fluorene	2.97E-09		4.00E-02	NA	7.44E-08	
Indeno(1,2,3-cd)pyrene		9.56E-09	NA	7.30E-01		6.98E-09
N-Nitrosodiphenylamine (1)		2.66E-09	NA	4.90E-03		1.30E-11
Naphthalene			NA	NA		
Pentachlorophenol	5.29E-08	1.89E-08	3.00E-02	1.20E-01	1.76E-06	2.27E-09
Phenanthrene			NA	NA		
Pyrene	2.41E-08		3.00E-02	NA	8.03E-07	
bis(2-Chloroisopropyl) ether	1.73E-08		1.00E-03	NA	1.73E-05	
bis(2-Ethylhexyl)phthalate	2.53E-08	9.04E-09	2.00E-02	1.40E-02	1.27E-06	1.27E-10
PESTICIDES/PCB						
4,4'-DDD	2.42E-10	8.65E-11	5.00E-04	2.40E-01	4.84E-07	2.08E-11
4,4'-DDE			NA	NA		
4,4'-DDT	2.84E-10	1.01E-10	5.00E-04	3.40E-01	5.68E-07	3.45E-11
Aldrin	1.09E-10	3.88E-11	3.00E-05	1.70E+01	3.62E-06	6.59E-10
Aroclor-1260		7.36E-10	NA	7.70E+00		5.67E-09
Dieldrin	3.53E-10	1.26E-10	5.00E-05	1.60E+01	7.06E-06	2.02E-09
Endosulfan I	3.47E-10		6.00E-03	NA	5.78E-08	
Endosulfan sulfate	2.09E-10		5.00E-05	NA	4.17E-06	
Endrin	2.55E-10		3.00E-04	NA	8.51E-07	
Endrin ketone			NA	NA		
Heptachlor epoxide	0.00E+00	0.00E+00	1.30E-05	9.10E+00	0.00E+00	0.00E+00
alpha-Chlordane	8.33E-11	2.97E-11	6.00E-05	1.30E+00	1.39E-06	3.87E-11
beta-BHC		4.35E-11	NA	1.80E+00		7.82E-11
delta-BHC			NA	NA		

TABLE 7-45

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM THE INGESTION OF ONSITE SOILS
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic	4.31E-07	1.54E-07	3.00E-04	1.75E+00	1.44E-03	2.69E-07
Barium	9.83E-06		7.00E-02	NA	1.40E-04	
Cadmium	1.60E-07		5.00E-04	NA	3.20E-04	
Copper	4.89E-06		4.00E-02	NA	1.22E-04	
Lead			NA	NA		
Mercury	9.16E-09		3.00E-04	NA	3.05E-05	
Selenium	9.78E-08		5.00E-03	NA	1.96E-05	
Silver	5.78E-08		5.00E-03	NA	1.16E-05	
Thallium	5.14E-08		7.00E-05	NA	7.34E-04	
Zinc	1.22E-05		3.00E-01	NA	4.06E-05	
HERBICIDES						
MCPA	4.86E-07		5.00E-04	NA	9.71E-04	
Totals - HQ & CR					**3.88E-03**	**4.54E-07**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-24

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
VOLATILE ORGANICS												
Acetone			7.04E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzene			2.00E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Methylene Chloride				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Toluene			6.62E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			2.86E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2,6-Dinitrotoluene				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2-Methylnaphthalene			1.30E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
2-Methylphenol				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3,3'-Dichlorobenzidine			2.51E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
3-Nitroaniline			6.07E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4-Nitroaniline			6.07E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthene			3.30E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Acenaphthylene			9.60E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Anthracene			1.30E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)anthracene			3.58E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(a)pyrene			3.99E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(b)fluoranthene			3.91E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(g,h,i)perylene			3.17E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Benzo(k)fluoranthene			3.04E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Butylbenzylphthalate			4.60E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Carbazole			2.61E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Chrysene			3.31E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Di-n-butylphthalate			3.03E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenz(a,h)anthracene			2.92E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Dibenzofuran			3.60E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluoranthene			3.34E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Fluorene			3.80E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550

TABLE 7-24

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
Indeno(1,2,3-cd)pyrene			3.42E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			9.50E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Naphthalene			3.70E-02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pentachlorophenol			6.76E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Phenanthrene			3.30E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Pyrene			3.08E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether			2.21E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			3.23E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
PESTICIDES/PCB												
4,4'-DDD			3.09E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDE			6.21E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
4,4'-DDT			3.63E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aldrin			1.39E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Aroclor-1260		2.56E-09	2.63E-02	1.00E-06	5,800	1.0	0.06	20	25	70	9,125	25,550
Dieldrin			4.51E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan I			4.43E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endosulfan sulfate			2.66E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin			3.26E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Endrin ketone			3.59E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Heptachlor epoxide				1.00E-06	5,800	1.0		20	25	70	9,125	25,550
alpha-Chlordane			1.06E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
beta-BHC			1.55E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
delta-BHC			1.40E-03	1.00E-06	5,800	1.0		20	25	70	9,125	25,550

TABLE 7-24

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO ONSITE SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Soil (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²/event)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (events/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
METALS												
Arsenic			5.51E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Barium			1.26E+02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Cadmium	9.28E-08		2.04E+00	1.00E-06	5,800	1.0	0.01	20	25	70	9,125	25,550
Copper			6.25E+01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Lead			4.96E+02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Mercury			1.17E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Selenium			1.25E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Silver			7.38E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Thallium			6.56E-01	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
Zinc			1.56E+02	1.00E-06	5,800	1.0		20	25	70	9,125	25,550
HERBICIDES												
MCPA			6.20E+00	1.00E-06	5,800	1.0		20	25	70	9,125	25,550

EQUATION: Absorbed dose (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC Soil Data - RME	EF = Exposure Frequency (events/year)	20 (RME Site Worker)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	25 (RME Site Worker)
SA = Surface Area Contact (cm²)	5,800 cm² (RME Site Worker)	BW = Bodyweight (kg)	70 (Adult Male)
AF =Soil to Skin Adherence Factor (mg/cm²)	1.0 (RME all receptors)	AT = Averaging Time (days)	25 x 365 (Nc) 70 x 365 Adult (Car)
ABS = Absorption Factor (unitless)	Compound Specific for PCBs and Cd EPA, 1992b (Default Assumption 0% = 0.0)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-47

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Chloroisopropyl) ether			1.00E-03	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
PESTICIDES/PCB						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1260		2.56E-09	NA	8.11E+00		2.08E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		

TABLE 7-47

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO SOIL
SITE WORKER EXPOSURE (CURRENT LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Cadmium	9.28E-08		3.00E-05	NA	3.09E-03	
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			2.00E-02	NA		
HERBICIDES						
MCPA			5.00E-04	NA		
Totals - HQ & CR					**3.09E-03**	**2.08E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-18

CALCULATION OF INTAKE FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
VOLATILE ORGANICS											
Acetone	2.20E-09		7.04E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Benzene		2.24E-10	2.00E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Toluene	2.07E-09		6.62E-03	100	1.00E-06	1	80	25	70	9,125	25,550
SEMIVOLATILE ORGANICS											
2,4-Dinitrotoluene	8.95E-08		2.86E-01	100	1.00E-06	1	80	25	70	9,125	25,550
2,6-Dinitrotoluene	0.00E+00		0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
2-Methylnaphthalene			1.30E-01	100	1.00E-06	1	80	25	70	9,125	25,550
2-Methylphenol	0.00E+00		0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
3,3'-Dichlorobenzidine		2.81E-08	2.51E-01	100	1.00E-06	1	80	25	70	9,125	25,550
3-Nitroaniline			6.07E-01	100	1.00E-06	1	80	25	70	9,125	25,550
4-Nitroaniline			6.07E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Acenaphthene	1.03E-08		3.30E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Acenaphthylene			9.60E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Anthracene	4.07E-08		1.30E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(a)anthracene		4.01E-08	3.58E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(a)pyrene		4.46E-08	3.99E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(b)fluoranthene		4.37E-08	3.91E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(g,h,i)perylene			3.17E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Benzo(k)fluoranthene		3.40E-08	3.04E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Butylbenzylphthalate	1.44E-08		4.60E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Carbazole		2.92E-08	2.61E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Chrysene		3.70E-08	3.31E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Di-n-butylphthalate	9.50E-08		3.03E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Dibenz(a,h)anthracene		3.27E-08	2.92E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Dibenzofuran			3.60E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Fluoranthene	1.05E-07		3.34E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Fluorene	1.19E-08		3.80E-02	100	1.00E-06	1	80	25	70	9,125	25,550

TABLE 7-18

CALCULATION OF INTAKE FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
Indeno(1,2,3-cd)pyrene		3.82E-08	3.42E-01	100	1.00E-06	1	80	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)		1.06E-08	9.50E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Naphthalene			3.70E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Pentachlorophenol	2.12E-07	7.56E-08	6.76E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Phenanthrene			3.30E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Pyrene	9.64E-08		3.08E-01	100	1.00E-06	1	80	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether	6.93E-08		2.21E-01	100	1.00E-06	1	80	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate	1.01E-07	3.62E-08	3.23E-01	100	1.00E-06	1	80	25	70	9,125	25,550
PESTICIDES/PCB											
4,4'-DDD	9.68E-10	3.46E-10	3.09E-03	100	1.00E-06	1	80	25	70	9,125	25,550
4,4'-DDE			6.21E-03	100	1.00E-06	1	80	25	70	9,125	25,550
4,4'-DDT	1.14E-09	4.05E-10	3.63E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Aldrin	4.34E-10	1.55E-10	1.39E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Aroclor-1260		2.94E-09	2.63E-02	100	1.00E-06	1	80	25	70	9,125	25,550
Dieldrin	1.41E-09	5.04E-10	4.51E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Endosulfan I	1.39E-09		4.43E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Endosulfan sulfate	8.34E-10		2.66E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Endrin	1.02E-09		3.26E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Endrin ketone			3.59E-03	100	1.00E-06	1	80	25	70	9,125	25,550
Heptachlor epoxide	0.00E+00	0.00E+00	0.00E+00	100	1.00E-06	1	80	25	70	9,125	25,550
alpha-Chlordane	3.33E-10	1.19E-10	1.06E-03	100	1.00E-06	1	80	25	70	9,125	25,550
beta-BHC		1.74E-10	1.55E-03	100	1.00E-06	1	80	25	70	9,125	25,550
delta-BHC			1.40E-03	100	1.00E-06	1	80	25	70	9,125	25,550

TABLE 7-18

CALCULATION OF INTAKE FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Intake (Nc) (mg/kg-day)	Intake (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Ingestion Rate (mg soil/day)	Conv. Factor (kg/mg)	Fraction Ingested (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
										Nc	Car
METALS											
Arsenic	1.72E-06	6.16E-07	5.51E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Barium	3.93E-05		1.26E+02	100	1.00E-06	1	80	25	70	9,125	25,550
Cadmium	6.40E-07		2.04E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Copper	1.96E-05		6.25E+01	100	1.00E-06	1	80	25	70	9,125	25,550
Lead			4.96E+02	100	1.00E-06	1	80	25	70	9,125	25,550
Mercury	3.66E-08		1.17E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Selenium	3.91E-07		1.25E+00	100	1.00E-06	1	80	25	70	9,125	25,550
Silver	2.31E-07		7.38E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Thallium	2.05E-07		6.56E-01	100	1.00E-06	1	80	25	70	9,125	25,550
Zinc	4.87E-05		1.56E+02	100	1.00E-06	1	80	25	70	9,125	25,550
HERBICIDES											
MCPA	1.94E-06		6.20E+00	100	1.00E-06	1	80	25	70	9,125	25,550

EQUATION: **Intake (mg/kg-day) =**

$$\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables:

CS = Chemical Concentration in Soil (mg soil/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Bodyweight (kg)
AT = Averaging Time (days)

Assumptions:

EPC - Soil Data (RME)
100 (RME Adult Worker)
10-6
1 (All Receptors)
80 (RME Adult Industrial Worker)
25 (Upper bound limit)
70 (Adult male)
25 x 365 (Nc) 70 x 365 (Car)

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-51

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone	2.20E-09		1.00E-01	NA	2.20E-08	
Benzene		2.24E-10	NA	2.90E-02		6.49E-12
Methylene Chloride	0.00E+00	0.00E+00	6.00E-02	7.50E-03	0.00E+00	0.00E+00
Toluene	2.07E-09		2.00E-01	NA	1.04E-08	
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene	8.95E-08		2.00E-03	NA	4.47E-05	
2,6-Dinitrotoluene	0.00E+00		1.00E-03	NA	0.00E+00	
2-Methylnaphthalene			NA	NA		
2-Methylphenol	0.00E+00		5.00E-02	NA	0.00E+00	
3,3'-Dichlorobenzidine		2.81E-08	NA	4.50E-01		1.26E-08
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene	1.03E-08		6.00E-02	NA	1.72E-07	
Acenaphthylene			NA	NA		
Anthracene	4.07E-08		3.00E-01	NA	1.36E-07	
Benzo(a)anthracene		4.01E-08	NA	7.30E-01		2.93E-08
Benzo(a)pyrene		4.46E-08	NA	7.30E+00		3.25E-07
Benzo(b)fluoranthene		4.37E-08	NA	7.30E-01		3.19E-08
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene		3.40E-08	NA	7.30E-01		2.48E-08
Butylbenzylphthalate	1.44E-08		2.00E+00	NA	7.20E-09	
Carbazole		2.92E-08	NA	2.00E-02		5.83E-10
Chrysene		3.70E-08	NA	7.30E-02		2.70E-09
Di-n-butylphthalate	9.50E-08		1.00E-01	NA	9.50E-07	
Dibenz(a,h)anthracene		3.27E-08	NA	7.30E+00		2.39E-07
Dibenzofuran			NA	NA		
Fluoranthene	1.05E-07		4.00E-02	NA	2.61E-06	
Fluorene	1.19E-08		4.00E-02	NA	2.97E-07	
Indeno(1,2,3-cd)pyrene		3.82E-08	NA	7.30E-01		2.79E-08
N-Nitrosodiphenylamine (1)		1.06E-08	NA	4.90E-03		5.21E-11
Naphthalene			NA	NA		
Pentachlorophenol	2.12E-07	7.56E-08	3.00E-02	1.20E-01	7.05E-06	9.07E-09
Phenanthrene			NA	NA		
Pyrene	9.64E-08		3.00E-02	NA	3.21E-06	
bis(2-Chloroisopropyl) ether	6.93E-08		1.00E-03	NA	6.93E-05	
bis(2-Ethylhexyl)phthalate	1.01E-07	3.62E-08	2.00E-02	1.40E-02	5.06E-06	5.06E-10
PESTICIDES/PCB						
4,4'-DDD	9.68E-10	3.46E-10	5.00E-04	2.40E-01	1.94E-06	8.30E-11
4,4'-DDE			NA	NA		
4,4'-DDT	1.14E-09	4.05E-10	5.00E-04	3.40E-01	2.27E-06	1.38E-10
Aldrin	4.34E-10	1.55E-10	3.00E-05	1.70E+01	1.45E-05	2.64E-09
Aroclor-1260		2.94E-09	NA	7.70E+00		2.27E-08
Dieldrin	1.41E-09	5.04E-10	5.00E-05	1.60E+01	2.82E-05	8.07E-09
Endosulfan I	1.39E-09		6.00E-03	NA	2.31E-07	
Endosulfan sulfate	8.34E-10		5.00E-05	NA	1.67E-05	
Endrin	1.02E-09		3.00E-04	NA	3.41E-06	
Endrin ketone			NA	NA		
Heptachlor epoxide	0.00E+00	0.00E+00	1.30E-05	9.10E+00	0.00E+00	0.00E+00
alpha-Chlordane	3.33E-10	1.19E-10	6.00E-05	1.30E+00	5.55E-06	1.55E-10
beta-BHC		1.74E-10	NA	1.80E+00		3.13E-10
delta-BHC			NA	NA		

TABLE 7-51

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM INGESTION OF ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	RfD (mg/kg-day)	Oral Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic	1.72E-06	6.16E-07	3.00E-04	1.75E+00	5.75E-03	1.08E-06
Barium	3.93E-05		7.00E-02	NA	5.62E-04	
Cadmium	6.40E-07		5.00E-04	NA	1.28E-03	
Copper	1.96E-05		4.00E-02	NA	4.89E-04	
Lead			NA	NA		
Mercury	3.66E-08		3.00E-04	NA	1.22E-04	
Selenium	3.91E-07		5.00E-03	NA	7.83E-05	
Silver	2.31E-07		5.00E-03	NA	4.62E-05	
Thallium	2.05E-07		7.00E-05	NA	2.93E-03	
Zinc	4.87E-05		3.00E-01	NA	1.62E-04	
HERBICIDES						
MCPA	1.94E-06		5.00E-04	NA	3.88E-03	
Totals - HQ & CR					**1.55E-02**	**1.82E-06**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
VOLATILE ORGANICS												
Acetone			7.04E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzene			2.00E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Methylene Chloride				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Toluene			6.62E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
SEMIVOLATILE ORGANICS												
2,4-Dinitrotoluene			2.86E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
2,6-Dinitrotoluene				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
2-Methylnaphthalene			1.30E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
2-Methylphenol				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
3,3'-Dichlorobenzidine			2.51E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
3-Nitroaniline			6.07E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
4-Nitroaniline			6.07E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Acenaphthene			3.30E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Acenaphthylene			9.60E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Anthracene			1.30E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(a)anthracene			3.58E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(a)pyrene			3.99E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(b)fluoranthene			3.91E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(g,h,i)perylene			3.17E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Benzo(k)fluoranthene			3.04E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Butylbenzylphthalate			4.60E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Carbazole			2.61E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Chrysene			3.31E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Di-n-butylphthalate			3.03E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Dibenz(a,h)anthracene			2.92E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Dibenzofuran			3.60E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Fluoranthene			3.34E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Fluorene			3.80E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550

TABLE 7-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days) Nc	Averaging Time (days) Car
Indeno(1,2,3-cd)pyrene			3.42E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
N-Nitrosodiphenylamine (1)			9.50E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Naphthalene			3.70E-02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Pentachlorophenol			6.76E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Phenanthrene			3.30E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Pyrene			3.08E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
bis(2-Chloroisopropyl) ether			2.21E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
bis(2-Ethylhexyl)phthalate			3.23E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
PESTICIDES/PCB												
4,4'-DDD			3.09E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
4,4'-DDE			6.21E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
4,4'-DDT			3.63E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Aldrin			1.39E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Aroclor-1260		1.02E-08	2.63E-02	1.00E-06	5,800	1.0	0.06	80	25	70	9,125	25,550
Dieldrin			4.51E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Endosulfan I			4.43E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Endosulfan sulfate			2.66E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Endrin			3.26E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Endrin ketone			3.59E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Heptachlor epoxide				1.00E-06	5,800	1.0		80	25	70	9,125	25,550
alpha-Chlordane			1.06E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
beta-BHC			1.55E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
delta-BHC			1.40E-03	1.00E-06	5,800	1.0		80	25	70	9,125	25,550

TABLE 7-26

CALCULATION OF ABSORBED DOSE FROM DERMAL CONTACT TO SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	Dose (Nc) (mg/kg-day)	Dose (Car) (mg/kg-day)	EPC Total Soils (mg/kg)	Conv. Factor (kg/mg)	Skin Surface Area Contact (cm²)	Adherence Factor (mg soil/cm²)	Absorption Factor (unitless)	Exposure Frequency (days/year)	Exposure Duration (years)	Body Weight (kg)	Averaging Time (days)	
											Nc	Car
METALS												
Arsenic			5.51E+00	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Barium			1.26E+02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Cadmium	3.710E-07		2.04E+00	1.00E-06	5,800	1.0	0.01	80	25	70	9,125	25,550
Copper			6.25E+01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Lead			4.96E+02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Mercury			1.17E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Selenium			1.25E+00	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Silver			7.38E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Thallium			6.56E-01	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
Zinc			1.56E+02	1.00E-06	5,800	1.0		80	25	70	9,125	25,550
HERBICIDES												
MCPA			6.20E+00	1.00E-06	5,800	1.0		80	25	70	9,125	25,550

EQUATION:

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

Variables:	Assumptions:	Variables:	Assumptions:
CS = Chemical Concentration in Soil (mg soil/kg)	EPC - Soil Data (RME)	EF = Exposure Frequency (days/year)	80 (RME Industrial Worker)
CF = Conversion Factor (10-6 kg/mg)	10-6	ED = Exposure Duration (years)	25 (RME Industrial Worker)
SA = Surface Area Contact (cm²)	5,800 (RME Adult Worker)	BW = Bodyweight (kg)	70 (Adult Male)
AF =Soil to Skin Adherence Factor (mg/cm²)	1.0 (RME - All Receptors)	AT = Averaging Time (days)	25 x 365 (Nc), 70 x 365 (Car)
ABS = Absorption Factor (unitless)	Applicable for PCBs and Cadmium (EPA, 1992b)		

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

TABLE 7-53

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
VOLATILE ORGANICS						
Acetone			1.00E-01	NA		
Benzene			NA	2.90E-02		
Methylene Chloride			6.00E-02	6.00E-02		
Toluene			1.20E-01	NA		
SEMIVOLATILE ORGANICS						
2,4-Dinitrotoluene			2.00E-03	NA		
2,6-Dinitrotoluene			1.00E-03	NA		
2-Methylnaphthalene			NA	NA		
2-Methylphenol			5.00E-02	NA		
3,3'-Dichlorobenzidine			NA	4.50E-01		
3-Nitroaniline			NA	NA		
4-Nitroaniline			NA	NA		
Acenaphthene			6.00E-02	NA		
Acenaphthylene			NA	NA		
Anthracene			3.00E-01	NA		
Benzo(a)anthracene			NA	1.46E+00		
Benzo(a)pyrene			NA	1.46E+01		
Benzo(b)fluoranthene			NA	1.46E+00		
Benzo(g,h,i)perylene			NA	NA		
Benzo(k)fluoranthene			NA	1.46E+00		
Butylbenzylphthalate			2.00E+00	NA		
Carbazole			NA	2.00E-02		
Chrysene			NA	1.46E-01		
Di-n-butylphthalate			8.50E-02	NA		
Dibenz(a,h)anthracene			NA	1.46E+01		
Dibenzofuran			NA	NA		
Fluoranthene			4.00E-02	NA		
Fluorene			4.00E-02	NA		
Indeno(1,2,3-cd)pyrene			NA	1.46E+00		
N-Nitrosodiphenylamine (1)			NA	4.90E-03		
Naphthalene			NA	NA		
Pentachlorophenol			3.00E-02	1.20E-01		
Phenanthrene			NA	NA		
Pyrene			3.00E-02	NA		
bis(2-Chloroisopropyl) ether			1.00E-03	NA		
bis(2-Ethylhexyl)phthalate			2.00E-02	1.40E-02		
PESTICIDES/PCB						
4,4'-DDD			5.00E-04	2.40E-01		
4,4'-DDE			NA	NA		
4,4'-DDT			5.00E-04	3.40E-01		
Aldrin			3.00E-05	1.70E+01		
Aroclor-1260		1.02E-08	NA	8.11E+00		8.31E-08
Dieldrin			5.00E-05	1.60E+01		
Endosulfan I			6.00E-03	NA		
Endosulfan sulfate			5.00E-05	NA		
Endrin			3.00E-04	NA		
Endrin ketone			NA	NA		
Heptachlor epoxide			1.30E-05	9.10E+00		
alpha-Chlordane			6.00E-05	1.30E+00		
beta-BHC			NA	1.80E+00		
delta-BHC			NA	NA		

TABLE 7-53

CALCULATION OF NONCARCINOGENIC AND CARCINOGENIC RISKS
FROM DERMAL CONTACT TO ONSITE SOIL
INDUSTRIAL WORKER EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
CASE 3
SEAD-17 Remedial Investigation
Seneca Army Depot Activity

Analyte	CDI (Nc) (mg/kg-day)	CDI (Car) (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal Slope Factor (mg/kg-day)-1	Hazard Quotient	Cancer Risk
METALS						
Arsenic			2.94E-04	1.79E+00		
Barium			7.00E-03	NA		
Cadmium	3.71E-07		3.00E-05	NA	1.24E-02	
Copper			2.00E-02	NA		
Lead			NA	NA		
Mercury			4.50E-05	NA		
Selenium			3.00E-03	NA		
Silver			5.00E-03	NA		
Thallium			7.00E-05	NA		
Zinc			2.00E-02	NA		
HERBICIDES						
MCPA			5.00E-04	NA		
Totals - HQ & CR					**1.24E-02**	**8.31E-08**

Hazard Quotient = Chronic Daily Intake (Noncarcinogenic)/ Reference Dose
Cancer Risk = Chronic Daily Intake (Carcinogenic) x Slope Factor

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

APPENDIX C

COST ESTIMATES

Seneca Army Depot SEAD 16 & 17 RIFS
Cost Estimates
Table of Contents

section 1 Summary scope of work including assumptions made Pg 1-4

Seneca Army Depot
SEAD 16 & 17
RIFS Cost estimates

Introduction

The cost for the following remediation alternatives (4,5 and 6) have been developed:

- **excavate / off-site disposal**
- **excavate/stabilize-solidify/on-site disposal**
- **excavate/soil washing/ off site disposal**

The cost estimate was developed based on the scope of work as outlined below. The costs were based on quantity take off from the attached drawings and unit prices taken from the ECHOS estimating library. Some of the more important unit prices, such as landfill disposal costs, were updated with vendor quotation. These vendor quotes are attached to the detailed estimate for reference. The costs developed in the ECHOS detailed summary include the WBS numbers for each line item. Note that the WBS numbering system that is used by ECHOS is a different than the numbering system used in MCACES and the DOE HTRW RAW BS. ECHOS summarizes cost by task and the task is not assigned a WBS number. Summary tables have been provided that follow the WBS numbering system from MCACES. The cost developed by ECHOS for each task was assigned to the appropriate WBS number in the summary tables.

General Assumed Scope

In all three of the alternatives the first task is screening by a UXB team for unexploded ordinances. The site will then be surveyed to lay out the areas to be excavated and then the soils and sediments will be excavated. The screened soils will be placed into piles for sampling while the material removed during the screening process will be disposed of off-site. The material removed during the screening operation may include shell casing, bullets, rocks, and roots.

The second task is a sampling and analysis event. Both the piles and the excavations will be sampled. Each soil pile will be 150 cubic yards. One composite soil sample will be taken from each soil pile and analyzed to determine whether it is classified as a characteristic hazardous waste. It is estimated that about 2000 yards of material will be excavated, which will constitute about 13 piles that will need to be sampled. At the same time that the piles are sampled, the excavations will be sampled. The excavations will be analyzed to confirm that the remediation goals have been reached. In this case the remediation goals are to remove soils that have total lead levels above 500 ppm, and

sediments that have lead levels greater than 31 ppm. Therefore these confimatory samples will be analyzed for the TAL metals and the lead levels from the analysis will be compared to the targets. If the lead level in a sample is above the targets then additional soils/sediments in that area will be excavated and another confirmatory sample taken. The estimated number of the confirmatory samples is based on the following criteria. It is assumed for the cost estimate that two samples will be taken from each trench, one at each end, and five soil samples will be taken from SEAD 16, and five soil samples will be taken from SEAD 17. In addition the sampling event will include a trip blank and a duplicate.
For alternative 6 (soil washing) only the excavation will be sampled during this first sampling event because all the soil will be washed and replaced in piles. Once all the washing is done there will be another sampling event to demonstrate that a large fraction of soils can be backfilled (non hazardous and lead less than the clean up standard) and the fines will be analyzed (characteristic hazardous waste) to determine if the fines, which will be disposed of off-site, need to be transported as a non-hazardous or hazardous waste. Also in alternative 5 the stabilized material will also have to be tested to demonstrate that the stabilized material is not a characteristic hazardous waste. The estimate allows one TCLP RCRA sample per 150 cubic yards of stabilized material.

Detailed Scope

The **first alternative** in the cost estimate corresponds to alternative 4 as described in section 3.0 and 5.0 of the FS. It includes excavating the soils and sediments and placing them into piles. The piles will be sampled and the samples will be tested to determine whether they have TCLP levels that are below the regulatory limits for a characteristic hazardous waste. If the pile samples are not classified as hazardous then the pile will be disposed of off-site at a Subtitle D landfill. Piles of soils/sediments that had samples with TCLP levels over the regulatory limit for a characteristic hazardous waste will be transported as a hazardous waste to a facility off-site where the soils/sediments will be stabilized and disposed in a Subtitle d landfill.

The **second alternative** in the cost estimate corresponds to alternative 5 as described in section 3.0 and 5.0 of the FS. In this alternative the soils and sediments would be excavated and placed in piles and the piles would be sampled the same as in the first alternative. In this alternative all the soils and sediments would be disposed on-site in a new on-site landfill instead of off-site at an existing landfill. The new on-site landfill would have to meet the requirements of the New York State regulations for an industrial waste monofill per 6 NYCRR 360-2.14. These requirements include both construction requirements as well as O&M requirements. The construction requirements include the following features which have been included in the estimate:

- A bottom composite liner system with a two foot clay layer and a 60 mil HDPE liner

- A leachate collection layer with two feet of sand and 4 in. PVC collection pipes spaced at 20 ft.
- A filter layer consisting of a filter fabric to keep the leachate collection layer clean
- A top containment liner system consisting of a 6 in sand layer with a 60 mil HDPE liner with a two foot layer of soil on top of the membrane and 6 inches of topsoil.

Soils that are classified as non-hazardous would be placed directly into the new on-site landfill while soils that are classified as hazardous waste will be solidified on-site before being placed in the new on-site landfill. The solidification process used in this estimate consists of a batch treatment process. The soils are loaded into a batch mixer along with cement (other mixtures may be used depending on pilot testing that will be done later.) The mixture is dumped into a wooden one cubic yard box and the mixture is allowed to solidify like concrete. The wooden box is then removed and the solidified block is then disposed off-site at the new on-site industrial waste monofill.

The **third alternative** corresponds to alternative 6 as described inspection 3.0 and 5.0 of the FS. It includes soil washing as a way of reducing the volume of soils that will require stabilization-solidification and disposal. In this alternative the soils and sediments will be excavated, screened and placed into one pile. The pile will not be sampled, instead all the soils will be washed and physically separated. One fraction will consist of the silt and clay portion of the soils while a second fraction would consist of the sand and gravel portion of the soils. The silt and clay portion (the smaller fraction) of the soils will contain the majority of the lead. All the washed material will be placed into 150 cubic yard piles which will be sampled. These samples will be analyzed to determine whether the soil is a characteristic hazardous waste and the samples will be analyzed for TAL metals. Those piles containing soil that is classified as hazardous waste will be disposed off-site at a facility that will stabilize the soils and then place them in a Subtitle D landfill. Those piles that are not classified as hazardous waste but have total lead levels over 500 ppm will be disposed off-site as non-hazardous waste at a Subtitle D landfill. Those piles classified as non-hazardous but containing lead levels over 31 ppm will also be disposed off-site at a Subtitle D landfill. Those piles with soil that is not classified as a characteristic hazardous waste and have total lead levels below 500 will be backfilled into the areas excavated.

Assumptions

The following assumptions were used in developing the cost estimates:

1. The amount of soil/sediments that will require stabilization/solidification in alternative 1 and 2 was calculated based on the estimated volume of soils and sediments that have total lead concentrations higher than 2000 ppm. Based on past experience at this site it is

expected that soils with total lead levels less than 2000 ppm will have TCLP lead levels below the regulatory limit (5 ppm) set for a characteristic hazardous waste.

2. The on-site landfill requires a 5 foot clearance between the groundwater and the bottom layer of the landfill. Since the groundwater in the excavated areas is only 5 to 10 feet deep it is assumed that a suitable location can be found on-site that meets the requirements for an industrial waste monofill.

3. It is assumed that the lead contamination is contained in the silt/clay fraction of the soils. It is also assumed that the silt/clay fraction will be classified as a characteristic hazardous waste and that the sand/gravel fraction will be clean enough to be used as backfill. Volumes of washed soils that need to be stabilized and solidified are estimated based on the available grain size analysis from the site. Based on this data it is estimated that the silt/clay fraction of the soil represents about one third of the total volume of the soil/sediments.

4. The volumes of soil and sediments are based on the contoured areas shown on figures 3, 4, 5 and 6 which attempt to delineate areas by lead concentration. Soil volumes were estimated by measuring the areas with a planimeter and then multiplying by the soil depth. The sediment volumes were estimated by multiplying the length of the trench by the width (assumed to be 3 feet) by the depth of the sediment (assumed to be 3 feet). The remediation project will include a confirmatory sampling plan to analyze samples at the edge of the excavation to assure that the clean up standard is met. If the lead levels in the confirmatory samples do not meet the clean up standard then additional soils will be excavated and treated.

5. It is assumed that the existing railroad tracks next to the building at SEAD 16 will not be removed. During the RI, the samples in this area were taken from the drainage swales around the track, but no samples were taken from the ballast around the train tracks. Based on this it is assumed that the remediation around the train tracks will involve excavating soils from the drainage swales only.

6. The building at SEAD 16 is inactive. It is assumed that this building will be cleaned of any materials that contribute to elevated lead levels in the indoor air. The building will not be demolished as part of this remediation. Soils and debris will be removed from the building and the building will receive a good cleaning only. Soils from the building will be placed in piles similar to the soils and sediments and will be handled in the same manner. It is estimated that the building has about 100 cubic yards of soil in it.

7. O & M costs only include the sampling and analysis of monitoring wells. The estimate assumes that 4 wells will be monitored on a quarterly basis at SEAD 16 & 17

and that 4 monitoring wells will be monitored at the new on-site industrial waste monofill.

8. The cost for UXB clearance is not included in the estimate. However allowances have been made for the excavation of the soils and sediments which will probably be done by the UXB team. The UXB team will also be responsible for screening the soils for the removal of unexploded ordanances, the cost for the screening has not been included in the estimate nor has the cost for disposal of the screened material.

Contingency
A large contingency should be used on this project since the volumes of sediment and soil that will require excavation could increase significantly if the confirmatory samples have lead levels over the remediation goals of 500 ppm for soil and 31 ppm for sediment.

Paul Messelaar PE.

section 2 Tables

SENECA ARMY DEPOT SEAD 16 & 17 RIFS
COST ESTIMATE SUMMARY
ALTERNATIVE NO 1 EXCAVATE/OFF-SITE DISPOSAL

WBS number	description	cost
32xxx	**design and treatability study** (estimated at 10% of construction cost)	$30,709
331xx01	**mobilization and preparatory work** (includes decontamination facilities and fencing)	$7,621
331xx02	**monitoring, sampling,testing,and analysis** (includes soil sampling analysis)	$54,312
331xx03	**site work** (includes access roads, cleanup and landscaping, clear and grub)	$6,598
331xx06	**groundwater collection and control** (includes groundwater monitoring wells)	$11,372
331xx08	**solids collection and containment** (Excavation, buried waste)	$49,644
331xx19	**disposal commercial** (Includes landfill disposal)	$135,682
331xx22	**general requirements** (includes contractor costs/ General Conditions)	$28,520
332xx	**engineering during construction** (includes professional Labor)	$13,345
333xx	**construction management**	$10,000
	SUBTOTAL ESTIMATED CONSTRUCTION COST	$337,803
	location multiplier 0.85	$287,132
	escalation 10%	28,713
	overhead and profit 13%	$37,327
	contingencies 20%	$57,426
	TOTAL ESTIMATED CONSTRUCTION COST	$410,598
342XXX	**operation and maintenance (post construction)** (includes o&m costs)	$10,422 per sampling event
	Present worth at 30 years and i = 5%	$570,784

SENECA ARMY DEPOT SEAD 16 & 17 RIFS
COST ESTIMATE SUMMARY
ALTERNATIVE NO 2 EXCAVATE/STABILIZE/ON-SITE DISPOSAL

WBS number	description	cost
32xxx	**design and treatability study** (estimated at 15% of construction cost)	$86,118
331xx01	**mobilization and preparatory work** (includes decontamination facilities and fencing)	$15,787
331xx02	**monitoring, sampling,testing,and analysis** (includes soil sampling analysis)	$64,968
331xx03	**site work** (includes access roads, cleanup and landscaping, clear and grub)	$8,208
331xx06	**groundwater collection and control** (includes groundwater monitoring wells)	$25,408
331xx08	**solids collection and containment** (Excavation, buried waste and capping)	$166,440
331xx15	**stabilization/fixation/encapsulation** (includes solidification/stabilization)	$199,385
331xx22	**general requirements** (includes contractor costs/ General Conditions)	$48,800
332xx	**engineering during construction** (includes professional Labor)	$25,128
333xx	**construction management**	$20,000
	SUBTOTAL ESTIMATED CONSTRUCTION COST	$660,242
	location multiplier 0.85	$561,206
	escalation 10%	$56,120
	overhead and profit 13%	$72,956
	contingencies 20%	$112,241
	TOTAL ESTIMATED CONSTRUCTION COST	$802,523
342XXX	**operation and maintenance (post construction)** (includes o&m costs)	$20,422 per sampling event
	Present worth based on 30 years and i = 5%	$1,116,409

SENECA ARMY DEPOT SEAD 16 & 17 RIFS
COST ESTIMATE SUMMARY
ALTERNATIVE NO 3 EXCAVATE/SOIL WASHING/OFF-SITE DISPOSAL

WBS number	description	cost
32xxx	**design and treatability study** (estimated at 15% of construction cost)	$89,211
331xx01	**mobilization and preparatory work** (includes decontamination facilities and fencing)	$7,621
331xx02	**monitoring, sampling,testing,and analysis** (includes soil sampling analysis)	$58,900
331xx03	**site work** (includes access roads, cleanup and landscaping, clear and grub)	$6,727
331xx06	**groundwater collection and control** (includes groundwater monitoring wells)	$10,600
331xx08	**solids collection and containment** (Excavation, buried waste)	$43,863
331xx13	**physical treatment** (includes soil washing)	$278,532
331xx19	**disposal commercial** (Includes landfill disposal)	$104,925
331xx22	**general requirements** (includes contractor costs/ General Conditions)	$46,941
332xx	**engineering during construction** (includes professional Labor)	$16,634
333xx	**construction management**	$20,000
	SUBTOTAL ESTIMATED CONSTRUCTION COST	$683,954
	location multiplier 0.85	$581,361
	escalation 10%	$58,136
	overhead and profit 13%	$75,576
	contingencies 20%	$116,272
	TOTAL ESTIMATED CONSTRUCTION COST	$831,345
342XXX	**operation and maintenance (post construction)** (includes o&m costs)	$10,422 per sampling event
	Present worth based on 30 years and i = 5%	$991,531

section 3 Detailed cost estimate

DOC8.DOC

parsons engineering science
Prudential Center
Boston, Massachusetts, 02199
617 262 3200

o&m cost		
	Professional Labor	$1,963.83
	Sampling and Analysis	$10,422.04
	Site Total	**$12,385.87**
RA-4		
	Access Roads	$3,544.80
	Analyses: Soil, Sludge, and Sediment	$54,312.57
	Cleanup and Landscaping	$1,397.83
	Clear and Grub	$1,657.59
	Contractor Costs / General Conditions	$28,520.02
	Decontamination Facilities	$5,621.80
	Excavation, Buried Waste	$49,644.12
	Fencing	$2,000.25
	Groundwater Monitoring Wells	$11,372.16
	Landfill Disposal	$135,682.00
	Professional Labor	$13,345.87

RA-5

Access Roads	$5,064.00
Analyses: Soil, Sludge, and Sediment	$64,968.36
Capping	$117,529.66
Cleanup and Landscaping	$1,487.10
Clear and Grub	$1,657.59
Contractor Costs / General Conditions	$48,800.24
Decontamination Facilities	$5,621.80
Excavation, Buried Waste	$48,911.12
Fencing	$10,166.04
Groundwater Monitoring Wells	$25,408.13
Professional Labor	$25,128.85
Solidification/Stabilization	$199,385.92

RA-6

Access Roads	$3,544.80
Analyses: Soil, Sludge, and Sediment	$58,900.88
Cleanup and Landscaping	$1,526.82
Clear and Grub	$1,657.59
Contractor Costs / General Conditions	$46,941.06
Decontamination Facilities	$5,621.80
Excavation, Buried Waste	$43,863.09
Fencing	$2,000.25
Groundwater Monitoring Wells	$10,600.34
Landfill Disposal	$104,925.00
Professional Labor	$16,634.76
Soil Washing	$278,532.76

parsons engineering science
Prudential Center
Boston, Massachusetts, 02199
617 262 3200

o&m cost

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Professional Labor						
Project Manager	4.00 HOUR	D	$197.06	$0.00	$0.00	$197.06
Project Engineer	40.00 HOUR	D	$1,698.82	$0.00	$0.00	$1,698.82
Word Processing/Clerical	4.00 HOUR	D	$67.95	$0.00	$0.00	$67.95
	Professional Labor Total		$1,963.83	$0.00	$0.00	$1,963.83
Sampling and Analysis						
Van or Pickup Rental	2.00 DAY	D	$0.00	$0.00	$71.35	$71.35
Mobilize Crew, >= 500 Miles, per Person	2.00 EACH	D	$0.00	$0.00	$2,378.34	$2,378.34
Per Diem	4.00 DAY	D	$0.00	$0.00	$356.75	$356.75
Prefiltering Liquids	4.00 EACH	D	$0.00	$0.00	$59.46	$59.46
Acid Digestion	4.00 EACH	D	$0.00	$0.00	$95.13	$95.13
Repackage and Ship Sample	4.00 EACH	D	$0.00	$0.00	$142.70	$142.70
Organic Vapor Analyzer Rental, per Day	2.00 DAY	D	$0.00	$0.00	$237.84	$237.84
Disposable Materials per Sample	4.00 EACH	D	$0.00	$0.00	$26.98	$26.98
Decontamination Materials per Sample	4.00 EACH	D	$0.00	$0.00	$24.97	$24.97
Rinsate Analysis	1.00 EACH	D	$0.00	$0.00	$190.27	$190.27
Pesticides/PCBs (EPA 608)	4.00 EACH	D	$0.00	$0.00	$713.50	$713.50
Volatile Organic Analysis (EPA 624)	4.00 EACH	D	$0.00	$0.00	$1,070.25	$1,070.25
Base Neutral & Acid Extractable Organics (EPA 625)	4.00 EACH	D	$0.00	$0.00	$1,664.84	$1,664.84
Target Analyte List Metals (EPA 6010/7000S), Soil	4.00 EACH	D	$0.00	$0.00	$975.12	$975.12
1 Liter, 32 Oz, Clear Wide Mouth Jar, Case of 12	1.00 EACH	D	$0.00	$0.00	$44.80	$44.80
40 ml, Clear Vial, Case of 72	1.00 EACH	D	$0.00	$0.00	$104.77	$104.77
1 Liter, 32 oz, High-density Polyethylene Bottle, Case of 12	1.00 EACH	D	$0.00	$0.00	$34.78	$34.78
Custody Seals, Package of 10	1.00 EACH	D	$0.00	$0.00	$1.34	$1.34

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Safe Transport Can Filled with Vermiculite, 1 Gallon, Case of 4	1.00 EACH	D	$0.00	$0.00	$16.71	$16.71
Documentation Package for QA Verification, Data & Benchwork	4.00 EACH	D	$0.00	$0.00	$738.76	$738.76
Overnight Delivery, 21 - 50 Lb Package	25.00 LB	D	$0.00	$0.00	$47.57	$47.57
60 Quart Ice Chest	1.00 EACH	D	$0.00	$0.00	$53.10	$53.10
Blue Ice Soft Packs (Equivalent to 7 Lbs Ice)	1.00 EACH	D	$0.00	$0.00	$5.97	$5.97
Field Technician	32.00 HOUR	D	$652.34	$0.00	$0.00	$652.34
Teflon Bailer, 3/4" Outside Diameter x 1', 60 cc	4.00 EACH	D	$0.00	$0.00	$612.14	$612.14
Suspension Cable, Teflon Coated	100.00 FT	D	$0.00	$0.00	$102.27	$102.27
	Sampling and Analysis Total		$652.34	$0.00	$9,769.70	$10,422.04

Total o&m cost

	Labor	Equipment	Materials	Total
Total o&m cost	$2,616.17	$0.00	$9,769.70	$12,385.87

RA-4

Access Roads

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Rough Grading, 14G, 1 Pass	7,000.00 SY	D	$1,547.00	$1,997.80	$0.00	$3,544.80
	Access Roads Total		$1,547.00	$1,997.80	$0.00	$3,544.80

Analyses: Soil, Sludge, and Sediment

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Van or Pickup Rental	3.00 DAY	D	$0.00	$0.00	$107.03	$107.03
Mobilize Crew, >= 500 Miles, per Person	2.00 EACH	D	$0.00	$0.00	$2,378.34	$2,378.34
Per Diem	6.00 DAY	C	$0.00	$0.00	$535.13	$535.13
Repackage and Ship Sample	5.00 EACH	D	$0.00	$0.00	$178.38	$178.38
Organic Vapor Analyzer Rental, per Day	3.00 DAY	D	$0.00	$0.00	$356.75	$356.75
Disposable Materials per Sample	50.00 EACH	D	$0.00	$0.00	$337.24	$337.24
Decontamination Materials per Sample	50.00 EACH	D	$0.00	$0.00	$312.16	$312.16
TCLP (RCRA) (EPA 1311)	15.00 EACH	D	$0.00	$0.00	$27,915.77	$27,915.77
Target Analyte List Metals (EPA 6010/7000S), Soil	35.00 EACH	D	$0.00	$0.00	$8,532.30	$8,532.30
1 Liter, 32 Oz, Clear Wide Mouth Jar, Case of 12	5.00 EACH	D	$0.00	$0.00	$223.98	$223.98
1 Liter, 32 Oz, Boston Round Bottle, Case of 12	5.00 EACH	D	$0.00	$0.00	$170.59	$170.59
40 ml, Clear Vial, Case of 72	2.00 EACH	D	$0.00	$0.00	$209.53	$209.53
Custody Seals, Package of 10	5.00 EACH	D	$0.00	$0.00	$6.72	$6.72
Safe Transport Can Filled with Vermiculite, 1 Gallon, Case of 4	4.00 EACH	D	$0.00	$0.00	$66.83	$66.83

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Documentation Package for QA Verification, Data & Benchwork	50.00 EACH	D	$0.00	$0.00	$9,234.51	$9,234.51
Overnight Delivery, 21 - 50 Lb Package	200.00 LB	D	$0.00	$0.00	$380.54	$380.54
60 Quart Ice Chest	5.00 EACH	D	$0.00	$0.00	$265.48	$265.48
Blue Ice Soft Packs (Equivalent to 7 Lbs Ice)	5.00 EACH	D	$0.00	$0.00	$29.85	$29.85
Project Manager	8.00 HOUR	D	$394.12	$0.00	$0.00	$394.12
Project Engineer	40.00 HOUR	D	$1,698.82	$0.00	$0.00	$1,698.82
Field Technician	48.00 HOUR	D	$978.51	$0.00	$0.00	$978.51
Analyses: Soil, Sludge, and Sediment Total			$3,071.46	$0.00	$51,241.11	$54,312.57

Cleanup and Landscaping

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
General Area Cleanup	2.00 ACRE	D	$288.29	$190.73	$0.00	$479.02
Area Preparation, 67% Level & 33% Slope	2.00 ACRE	D	$41.44	$61.12	$0.00	$102.56
Seeding, 67% Level & 33% Slope, Hydroseeding	2.00 ACRE	D	$114.16	$131.28	$570.80	$816.25
Cleanup and Landscaping Total			$443.89	$383.14	$570.80	$1,397.83

Clear and Grub

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Light Brush without Grub, Chipping	2.00 ACRE	D	$954.32	$703.26	$0.00	$1,657.59
Clear and Grub Total			$954.32	$703.26	$0.00	$1,657.59

Contractor Costs / General Conditions

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Van or Pickup Rental	60.00 DAY	D	$0.00	$0.00	$2,140.51	$2,140.51
Mobilize Crew, >= 500 Miles, per Person	4.00 EACH	D	$0.00	$0.00	$4,756.68	$4,756.68
Per Diem	180.00 DAY	D	$0.00	$0.00	$16,053.80	$16,053.80
Disposable Boot Covers (Tyvek)	180.00 PAIR	D	$0.00	$0.00	$247.23	$247.23
Disposable Gloves (Latex)	180.00 PAIR	D	$0.00	$0.00	$40.97	$40.97
Disposable Coveralls (Tyvek)	180.00 EACH	D	$0.00	$0.00	$642.15	$642.15
Temporary Office 20' x 8'	3.00 MONTH	D	$0.00	$0.00	$673.65	$673.65
Portable Toilets - Chemical	3.00 MONTH	D	$0.00	$0.00	$356.75	$356.75
Construction Photographs	1.00 SET	D	$509.64	$0.00	$0.00	$509.64
Surveying - 2-man Crew	5.00 DAY	D	$2,123.52	$975.12	$0.00	$3,098.64
Contractor Costs / General Conditions Total			$2,633.16	$975.12	$24,911.74	$28,520.02

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Decontamination Facilities						
1,800 PSI Steam Cleaner Rental	3.00 MONTH	D	$0.00	$0.00	$3,506.86	$3,506.86
8' x 36' Decontamination Trailer with 2 Showers, Fans	3.00 MONTH	D	$0.00	$0.00	$1,605.38	$1,605.38
DOT Steel Drum, 55 Gallon	10.00 EACH	D	$0.00	$0.00	$509.56	$509.56
Decontamination Facilities Total			$0.00	$0.00	$5,621.80	$5,621.80
Excavation, Buried Waste						
D6 with A-blade Bulldozer	40.00 HOUR	D	$1,165.39	$1,731.43	$0.00	$2,896.82
Hand Excavation, Normal Soil	80.00 CY	D	$2,446.83	$20.49	$0.00	$2,467.32
950, 3.0 CY, Wheel Loader	160.00 HOUR	D	$4,626.22	$6,518.56	$0.00	$11,144.78
Crawler-mounted, 1 CY, 215 Hydraulic Excavator	40.00 HOUR	D	$1,440.57	$1,686.72	$0.00	$3,127.29
12 CY DUMP TRUCK	160.00 HOUR	D	$2,850.29	$4,710.40	$0.00	$7,560.69
Unclassified Fill, 6" Lifts, On-Site	1,500.00 CY	D	$2,199.86	$5,050.65	$356.70	$7,607.21
Organic Vapor Analyzer Rental, per Month	3.00 MONTH	D	$0.00	$0.00	$3,717.35	$3,717.35
Plastic Laminate Waste Pile Cover	60,000.00 SF	D	$900.00	$6.00	$7,854.00	$8,760.00
Sprayed Water Dust Suppressant	7,000.00 SY	D	$29.00	$32.20	$0.00	$61.20
Decontaminate Heavy Equipment	10.00 EACH	D	$2,046.39	$255.08	$0.00	$2,301.47
Excavation, Buried Waste Total			$17,704.55	$20,011.53	$11,928.05	$49,644.12
Fencing						
6' Galvanized Chain-link Fence	800.00 LF	D	$957.03	$8.80	$10,147.76	$1,942.86
Hazardous Waste Signing	1.00 EACH	D	$26.76	$0.23	$30.40	$57.40
Fencing Total			$983.79	$9.03	$10,178.16	$2,000.25
Groundwater Monitoring Wells						
Mobilization/Demobilization Drilling Rig & Crew	1.00 LS	D	$563.60	$837.56	$0.00	$0.00
Organic Vapor Analyzer Rental, per Day	2.00 DAY	D	$0.00	$0.00	$237.84	$237.84
Decontaminate Rig, Augers, Screen (Rental Equipment)	1.00 DAY	D	$0.00	$0.00	$161.73	$161.73
2" Stainless Steel, Well Casing	100.00 LF	D	$221.71	$329.45	$1,864.38	$2,415.54
2" Stainless Steel, Well Screen	12.00 LF	D	$22.55	$33.50	$579.13	$635.18
2" Stainless Steel, Well Plug	4.00 EACH	D	$22.55	$33.50	$120.65	$176.70
2" Submersible Pump Rental, Day	1.00 DAY	D	$0.00	$0.00	$59.46	$59.46
Hollow-stem Auger, 8" Outside Diameter Borehole for 2" Well	100.00 LF	D	$1,024.84	$1,522.87	$0.00	$2,547.71

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Split Spoon Sample, 2" x 24", During Drilling	50.00 EACH	D	$0.00	$0.00	$1,486.47	$1,486.47
Well Development Equipment Rental	1.00 WEEK	D	$39.28	$0.44	$452.56	$492.28
Standby for Drilling	1.00 EACH	D	$70.45	$104.69	$0.00	$0.00
Move Rig/Equipment Around Site	4.00 EACH	D	$70.45	$104.69	$0.00	$175.14
Furnish 55 Gallon Drum for Drill Cuttings & Development Water	8.00 EACH	D	$0.00	$0.00	$407.65	$407.65
2" Screen, Filter Pack	80.00 LF	D	$127.77	$189.85	$557.90	$875.52
Surface Pad, Concrete, 4' x 4' x 4"	4.00 EACH	D	$16.27	$0.76	$50.74	$67.77
2" Well, Portland Cement Grout	4.00 LF	D	$0.00	$0.00	$4.28	$4.28
2" Well, Bentonite Seal	4.00 EACH	D	$25.36	$37.69	$68.93	$131.98
5' Guard Posts, Cast Iron, Concrete Fill	12.00 EACH	D	$345.74	$5.28	$351.09	$702.10
Teflon Bailer, 3/4" Outside Diameter x 1', 60 cc	4.00 EACH	D	$0.00	$0.00	$612.14	$612.14
Suspension Cable, Teflon Coated	100.00 FT	D	$0.00	$0.00	$102.27	$102.27
Hand Reel	4.00 EACH	D	$0.00	$0.00	$80.39	$80.39
Groundwater Monitoring Wells Total			$2,550.58	$3,200.28	$7,197.60	$11,372.16

Landfill Disposal

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Transport Bulk Solid non-Hazardous Waste, 22 tons per trip (quote Earthwatch)	59.00 trip	D	$0.00	$0.00	$18,172.00	$18,172.00
Transport Bulk Solid Hazardous Waste, 22 tons per trip (quote from Earthwatch)	23.00 trip	D	$0.00	$0.00	$37,950.00	$37,950.00
Landfill Hazardous Solid Bulk Waste Requiring Stabilization (quote from Earthwatch)	805.00 TON	D	$0.00	$0.00	$60,375.00	$60,375.00
Landfill Nonhazardous Solid Bulk Waste by ton (quote Earthwatch)	1,279.00 ton	D	$0.00	$0.00	$19,185.00	$19,185.00
Landfill Disposal Total			$0.00	$0.00	$135,682.00	$135,682.00

Professional Labor

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Project Manager	40.00 HOUR	D	$1,970.62	$0.00	$0.00	$1,970.62
QA/QC Officer	8.00 HOUR	D	$231.04	$0.00	$0.00	$231.04
Project Engineer	100.00 HOUR	D	$4,247.04	$0.00	$0.00	$4,247.04
Health & Safety Officer	8.00 HOUR	D	$203.86	$0.00	$0.00	$203.86
Field Technician	320.00 HOUR	D	$6,523.43	$0.00	$0.00	$6,523.43
Word Processing/Clerical	10.00 HOUR	D	$169.88	$0.00	$0.00	$169.88
Professional Labor Total			$13,345.87	$0.00	$0.00	$13,345.87

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Total RA-4			$43,234.62	$27,280.16	$247,331.26	$307,099.01
RA-5						
Access Roads						
Rough Grading, 14G, 1 Pass	10,000.00 SY	D	$2,210.00	$2,854.00	$0.00	$5,064.00
	Access Roads Total		$2,210.00	$2,854.00	$0.00	$5,064.00
Analyses: Soil, Sludge, and Sediment						
Van or Pickup Rental	3.00 DAY	D	$0.00	$0.00	$107.03	$107.03
Mobilize Crew, >= 500 Miles, per Person	2.00 EACH	D	$0.00	$0.00	$2,378.34	$2,378.34
Per Diem	6.00 DAY	D	$0.00	$0.00	$535.13	$535.13
Organic Vapor Analyzer Rental, per Day	3.00 DAY	D	$0.00	$0.00	$356.75	$356.75
Disposable Materials per Sample	55.00 EACH	D	$0.00	$0.00	$370.96	$370.96
Decontamination Materials per Sample	55.00 EACH	D	$0.00	$0.00	$343.38	$343.38
TCLP (RCRA) (EPA 1311)	20.00 EACH	D	$0.00	$0.00	$37,221.02	$37,221.02
Target Analyte List Metals (EPA 6010/7000S), Soil	35.00 EACH	D	$0.00	$0.00	$8,532.30	$8,532.30
1 Liter, 32 Oz, Clear Wide Mouth Jar, Case of 12	6.00 EACH	D	$0.00	$0.00	$268.78	$268.78
1 Liter, 32 Oz, Boston Round Bottle, Case of 12	6.00 EACH	D	$0.00	$0.00	$204.70	$204.70
40 ml, Clear Vial, Case of 72	1.00 EACH	D	$0.00	$0.00	$104.77	$104.77
Custody Seals, Package of 10	6.00 EACH	D	$0.00	$0.00	$8.06	$8.06
Safe Transport Can Filled with Vermiculite, 1 Gallon, Case of 4	5.00 EACH	D	$0.00	$0.00	$83.54	$83.54
Documentation Package for QA Verification, Data & Benchwork	55.00 EACH	D	$0.00	$0.00	$10,157.96	$10,157.96
Overnight Delivery, 21 - 50 Lb Package	250.00 LB	D	$0.00	$0.00	$475.68	$475.68
60 Quart Ice Chest	6.00 EACH	D	$0.00	$0.00	$318.58	$318.58
Blue Ice Soft Packs (Equivalent to 7 Lbs Ice)	6.00 EACH	D	$0.00	$0.00	$35.82	$35.82
Project Manager	8.00 HOUR	D	$394.12	$0.00	$0.00	$394.12
Project Engineer	40.00 HOUR	D	$1,698.82	$0.00	$0.00	$1,698.82
Field Technician	64.00 HOUR	D	$1,304.69	$0.00	$0.00	$1,304.69
Word Processing/Clerical	4.00 HOUR	D	$67.95	$0.00	$0.00	$67.95
	Analyses: Soil, Sludge, and Sediment Total		$3,465.58	$0.00	$61,502.78	$64,968.36

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Capping						
950, 3.0 CY, Wheel Loader	160.00 HOUR	D	$4,626.22	$6,518.56	$0.00	$11,144.78
Crawler-mounted, 2 CY, 235 Hydraulic Excavator	160.00 HOUR	D	$5,762.29	$14,875.09	$0.00	$20,637.37
Sand, 6" Lifts, On-Site	1,100.00 CY	D	$1,614.17	$3,560.15	$261.58	$5,435.90
Gravel, 6" Lifts	900.00 CY	D	$2,061.90	$1,427.13	$10,113.84	$13,602.87
Topsoil, 6" Lifts, Off-Site	225.00 CY	D	$755.16	$686.23	$5,462.75	$6,904.14
Seeding, Vegetative Cover	1.00 ACRE	D	$51.37	$57.25	$1,654.73	$1,763.34
Watering with 3,000-Gallon Tank Truck, Per Pass	1.00 ACRE	D	$19.98	$22.27	$2.38	$44.63
Mowing	1.00 ACRE	D	$16.08	$3.78	$0.00	$19.86
10' Wide Grass Drainage Swale	500.00 LF	D	$363.43	$402.15	$1,153.70	$1,919.28
Clay 10E-7, 6" Lifts, Off-Site	900.00 CY	D	$3,578.01	$3,662.64	$4,174.02	$11,414.67
60 Mil Polymeric Liner, High-density Polyethylene	23,125.00 SF	D	$23,686.61	$2,735.69	$14,300.50	$40,722.79
4" Slotted PVC Pipe	1,100.00 LF	D	$1,575.36	$16.28	$2,328.37	$3,920.01
	Capping Total		$44,110.57	$33,967.21	$39,451.87	$117,529.66
Cleanup and Landscaping						
General Area Cleanup	2.00 ACRE	D	$288.29	$190.73	$0.00	$479.02
Area Preparation, 67% Level & 33% Slope	2.00 ACRE	D	$41.44	$61.12	$0.00	$102.56
Seeding, 67% Level & 33% Slope, Hydroseeding	2.00 ACRE	D	$114.16	$131.28	$570.80	$816.25
Watering with 3,000-Gallon Tank Truck, Per Pass	2.00 ACRE	D	$39.96	$44.55	$4.76	$89.27
	Cleanup and Landscaping Total		$483.85	$427.69	$575.56	$1,487.10
Clear and Grub						
Light Brush without Grub, Chipping	2.00 ACRE	D	$954.32	$703.26	$0.00	$1,657.59
	Clear and Grub Total		$954.32	$703.26	$0.00	$1,657.59
Contractor Costs / General Conditions						
Van or Pickup Rental	90.00 DAY	D	$0.00	$0.00	$3,210.76	$3,210.76
Mobilize Crew, >= 500 Miles, per Person	4.00 EACH	D	$0.00	$0.00	$4,756.68	$4,756.68
Per Diem	360.00 DAY	D	$0.00	$0.00	$32,107.61	$32,107.61
Disposable Boot Covers (Tyvek)	360.00 PAIR	D	$0.00	$0.00	$494.46	$494.46
Disposable Gloves (Latex)	360.00 PAIR	D	$0.00	$0.00	$81.94	$81.94
Disposable Coveralls (Tyvek)	360.00 EACH	D	$0.00	$0.00	$1,284.30	$1,284.30

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Temporary Office 20' x 8'	3.00 MONTH	D	$0.00	$0.00	$673.65	$673.65
Temporary Storage Trailer 28' x 10'	3.00 MONTH	D	$0.00	$0.00	$366.63	$366.63
Portable Toilets - Chemical	3.00 MONTH	D	$0.00	$0.00	$356.75	$356.75
Construction Photographs	1.00 SET	D	$509.64	$0.00	$0.00	$509.64
Surveying - 2-man Crew	8.00 DAY	D	$3,397.63	$1,560.19	$0.00	$4,957.82
Contractor Costs / General Conditions Total			$3,907.27	$1,560.19	$43,332.78	$48,800.24

Decontamination Facilities

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
1,800 PSI Steam Cleaner Rental	3.00 MONTH	D	$0.00	$0.00	$3,506.86	$3,506.86
8' x 36' Decontamination Trailer with 2 Showers, Fans	3.00 MONTH	D	$0.00	$0.00	$1,605.38	$1,605.38
DOT Steel Drum, 55 Gallon	10.00 EACH	D	$0.00	$0.00	$509.56	$509.56
Decontamination Facilities Total			$0.00	$0.00	$5,621.80	$5,621.80

Excavation, Buried Waste

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
D4 with A-blade Bulldozer	40.00 HOUR	D	$1,156.55	$979.40	$0.00	$2,135.96
Hand Excavation, Normal Soil	80.00 CY	D	$2,446.83	$20.49	$0.00	$2,467.32
950, 3.0 CY, Wheel Loader	160.00 HOUR	D	$4,626.22	$6,518.56	$0.00	$11,144.78
Crawler-mounted, 1 CY, 215 Hydraulic Excavator	40.00 HOUR	D	$1,440.57	$1,686.72	$0.00	$3,127.29
12 CY, Dump Truck	160.00 HOUR	D	$2,851.31	$4,711.01	$0.00	$7,562.32
Unclassified Fill, 6" Lifts, On-Site	1,500.00 CY	D	$2,199.86	$5,050.65	$356.70	$7,607.21
Organic Vapor Analyzer Rental, per Month	3.00 MONTH	D	$0.00	$0.00	$3,717.35	$3,717.35
Plastic Laminate Waste Pile Cover	60,000.00 SF	D	$900.00	$6.00	$7,854.00	$8,760.00
Sprayed Water Dust Suppressant	10,000.00 SY	D	$41.43	$46.00	$0.00	$87.43
Decontaminate Heavy Equipment	10.00 EACH	D	$2,046.39	$255.08	$0.00	$2,301.47
Excavation, Buried Waste Total			$17,709.17	$19,273.91	$11,928.05	$48,911.12

Fencing

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Silt Fencing	1,400.00 LF	D	$2,000.00	$0.00	$1,400.00	$3,400.00
6' Galvanized Chain-link Fence	450.00 LF	D	$538.33	$4.95	$5,708.12	$6,251.39
Swing Gates, Complete	1.00 EACH	D	$104.80	$61.37	$291.09	$457.25
Hazardous Waste Signing	1.00 EACH	D	$26.76	$0.23	$30.40	$57.40
Fencing Total			$2,669.89	$66.55	$7,429.60	$10,166.04

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Groundwater Monitoring Wells						
Mobilization/Demobilization Drilling Rig & Crew	1.00 LS	D	$563.60	$837.56	$0.00	$1,401.15
Organic Vapor Analyzer Rental, per Day	4.00 DAY	D	$0.00	$0.00	$475.67	$475.67
2" Stainless Steel, Well Casing	250.00 LF	D	$554.29	$823.63	$4,660.95	$6,038.86
2" Stainless Steel, Well Screen	24.00 LF	D	$45.09	$67.01	$1,158.27	$1,270.37
2" Stainless Steel, Well Plug	8.00 EACH	D	$45.09	$67.01	$241.31	$353.41
2" Submersible Pump Rental, Day	1.00 DAY	D	$0.00	$0.00	$59.46	$59.46
Hollow-stem Auger, 8" Outside Diameter Borehole for 2" Well	250.00 LF	D	$2,562.11	$3,807.18	$0.00	$6,369.28
Split Spoon Sample, 2" x 24", During Drilling	125.00 EACH	D	$0.00	$0.00	$3,716.16	$3,716.16
Well Development Equipment Rental	1.00 WEEK	D	$39.28	$0.44	$452.56	$492.28
Standby for Drilling	1.00 EACH	D	$70.45	$104.69	$0.00	$175.14
Move Rig/Equipment Around Site	8.00 EACH	D	$140.90	$209.39	$0.00	$350.29
Furnish 55 Gallon Drum for Drill Cuttings & Development Water	16.00 EACH	D	$0.00	$0.00	$815.30	$815.30
2" Screen, Filter Pack	40.00 LF	D	$63.89	$94.92	$278.95	$437.76
Surface Pad, Concrete, 4' x 4' x 4"	8.00 EACH	D	$32.55	$1.51	$101.48	$135.54
2" Well, Portland Cement Grout	8.00 LF	D	$0.00	$0.00	$8.56	$8.56
2" Well, Bentonite Seal	8.00 EACH	D	$50.73	$75.38	$137.86	$263.97
5' Guard Posts, Cast Iron, Concrete Fill	24.00 EACH	D	$691.48	$10.55	$702.18	$1,404.21
Teflon Bailer, 3/4" Outside Diameter x 1', 60 cc	8.00 EACH	D	$0.00	$0.00	$1,224.28	$1,224.28
Suspension Cable, Teflon Coated	250.00 FT	D	$0.00	$0.00	$255.68	$255.68
Hand Reel	8.00 EACH	D	$0.00	$0.00	$160.78	$160.78
	Groundwater Monitoring Wells Total		$4,859.45	$6,099.26	$14,449.42	$25,408.13
Professional Labor						
Project Manager	80.00 HOUR	D	$3,941.25	$0.00	$0.00	$3,941.25
QA/QC Officer	16.00 HOUR	D	$462.08	$0.00	$0.00	$462.08
Project Engineer	240.00 HOUR	D	$10,192.90	$0.00	$0.00	$10,192.90
Health & Safety Officer	16.00 HOUR	D	$407.72	$0.00	$0.00	$407.72
Field Technician	480.00 HOUR	D	$9,785.14	$0.00	$0.00	$9,785.14
Word Processing/Clerical	20.00 HOUR	D	$339.76	$0.00	$0.00	$339.76
	Professional Labor Total		$25,128.85	$0.00	$0.00	$25,128.85

Solidification/Stabilization

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
950, 3.0 CY, Wheel Loader	160.00 HOUR	D	$4,626.22	$6,518.56	$0.00	$11,144.78
12 CY, Dump Truck	160.00 HOUR	D	$2,851.31	$4,711.01	$0.00	$7,562.32
580K, 1CY, Backhoe with Front-end Loader	320.00 HOUR	D	$9,475.34	$4,448.48	$0.00	$13,923.82
4" Structural Slab on Grade	100.00 SF	D	$198.40	$16.77	$184.64	$399.81
550 Gallon, Stainless Steel Aboveground Wastewater Holding Tank, Rental	1.00 MONTH	D	$0.00	$0.00	$356.75	$356.75
Per Diem	360.00 DAY	D	$0.00	$0.00	$32,107.61	$32,107.61
Truck Scale Rental	2.00 MONTH	D	$0.00	$0.00	$8,324.19	$8,324.19
R60 Rough Terrain Forklift, 6,000 Lb @ 24" LC	320.00 HOUR	D	$9,268.75	$4,075.55	$0.00	$13,344.31
Portland Cement Type I (Bulk)	300.00 TON	D	$0.00	$0.00	$25,329.33	$25,329.33
Tank Truck Standby Time for Solidification/Stabilization Unit	320.00 HOUR	D	$0.00	$3,446.85	$0.00	$3,446.85
1 CY Plywood Boxes	100.00 EACH	D	$3,002.06	$81.88	$2,675.63	$5,759.57
Operational Labor for Process Equipment	640.00 HOUR	D	$33,160.87	$0.00	$0.00	$33,160.87
Bulk Chemical Transport (40,000 Lb Truckload)	15.00 EACH	D	$0.00	$0.00	$5,351.27	$5,351.27
10 CY Mixing System	2.00 MONTH	D	$0.00	$0.00	$9,930.76	$9,930.76
Solidification/Stabilization Ancillary Equipment	1.00 EACH	D	$0.00	$0.00	$7,135.02	$7,135.02
Mobilization/Demobilization of Solidification/Stabilization Equipment	1.00 LS	D	$16,839.50	$0.00	$0.00	$16,839.50
DOT Steel Drum, 55 Gallon	10.00 EACH	D	$0.00	$0.00	$509.56	$509.56
Diesel Fuel	2,000.00 GAL	D	$0.00	$0.00	$2,806.40	$2,806.40
Water	250.00 KGAL	D	$0.00	$0.00	$1,953.23	$1,953.23
Solidification/Stabilization Total			$79,422.45	$23,299.10	$96,664.38	$199,385.92
Total RA-5			$184,921.40	$88,251.18	$280,956.24	$554,128.81

RA-6

Access Roads

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Rough Grading, 14G, 1 Pass	7,000.00 SY	D	$1,547.00	$1,997.80	$0.00	$3,544.80
Access Roads Total			$1,547.00	$1,997.80	$0.00	$3,544.80

Analyses: Soil, Sludge, and Sediment

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Van or Pickup Rental	4.00 DAY	D	$0.00	$0.00	$142.70	$142.70

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Mobilize Crew, >= 500 Miles, per Person	4.00 EACH	D	$0.00	$0.00	$4,756.68	$4,756.68
Per Diem	8.00 DAY	D	$0.00	$0.00	$713.50	$713.50
Organic Vapor Analyzer Rental, per Day	4.00 DAY	D	$0.00	$0.00	$475.67	$475.67
Disposable Materials per Sample	61.00 EACH	D	$0.00	$0.00	$411.43	$411.43
Decontamination Materials per Sample	61.00 EACH	D	$0.00	$0.00	$380.84	$380.84
TCLP (RCRA) (EPA 1311)	13.00 EACH	D	$0.00	$0.00	$24,193.66	$24,193.66
Target Analyte List Metals (EPA 6010/7000S), Soil	48.00 EACH	D	$0.00	$0.00	$11,701.44	$11,701.44
1 Liter, 32 Oz, Clear Wide Mouth Jar, Case of 12	6.00 EACH	D	$0.00	$0.00	$268.78	$268.78
1 Liter, 32 Oz, Boston Round Bottle, Case of 12	6.00 EACH	D	$0.00	$0.00	$204.70	$204.70
40 ml, Clear Vial, Case of 72	1.00 EACH	D	$0.00	$0.00	$104.77	$104.77
Custody Seals, Package of 10	6.00 EACH	D	$0.00	$0.00	$8.06	$8.06
Safe Transport Can Filled with Vermiculite, 1 Gallon, Case of 4	5.00 EACH	D	$0.00	$0.00	$83.54	$83.54
Documentation Package for QA Verification, Data & Benchwork	61.00 EACH	D	$0.00	$0.00	$11,266.10	$11,266.10
Overnight Delivery, 21 - 50 Lb Package	225.00 LB	D	$0.00	$0.00	$428.11	$428.11
60 Quart Ice Chest	5.00 EACH	D	$0.00	$0.00	$265.48	$265.48
Blue Ice Soft Packs (Equivalent to 7 Lbs Ice)	5.00 EACH	D	$0.00	$0.00	$29.85	$29.85
Project Manager	8.00 HOUR	D	$394.12	$0.00	$0.00	$394.12
Project Engineer	40.00 HOUR	D	$1,698.82	$0.00	$0.00	$1,698.82
Field Technician	64.00 HOUR	D	$1,304.69	$0.00	$0.00	$1,304.69
Word Processing/Clerical	4.00 HOUR	D	$67.95	$0.00	$0.00	$67.95
Analyses: Soil, Sludge, and Sediment Total			$3,465.58	$0.00	$55,435.30	$58,900.88

Cleanup and Landscaping

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
General Area Cleanup	2.00 ACRE	D	$288.29	$190.73	$0.00	$479.02
Area Preparation, 67% Level & 33% Slope	2.00 ACRE	D	$41.44	$61.12	$0.00	$102.56
Seeding, 67% Level & 33% Slope, Hydroseeding	2.00 ACRE	D	$114.16	$131.28	$570.80	$816.25
Watering with 3,000-Gallon Tank Truck, Per Pass	2.00 ACRE	D	$39.96	$44.55	$4.76	$89.27
Mowing	2.00 ACRE	D	$32.16	$7.56	$0.00	$39.72
Cleanup and Landscaping Total			$516.01	$435.25	$575.56	$1,526.82

Clear and Grub

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Light Brush without Grub, Chipping	2.00 ACRE	D	$954.32	$703.26	$0.00	$1,657.59
Clear and Grub Total			$954.32	$703.26	$0.00	$1,657.59

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Contractor Costs / General Conditions						
Van or Pickup Rental	90.00 DAY	D	$0.00	$0.00	$3,210.76	$3,210.76
Mobilize Crew, >= 500 Miles, per Person	4.00 EACH	D	$0.00	$0.00	$4,756.68	$4,756.68
Per Diem	360.00 DAY	D	$0.00	$0.00	$32,107.61	$32,107.61
Disposable Boot Covers (Tyvek)	360.00 PAIR	D	$0.00	$0.00	$494.46	$494.46
Disposable Gloves (Latex)	360.00 PAIR	D	$0.00	$0.00	$81.94	$81.94
Disposable Coveralls (Tyvek)	360.00 EACH	D	$0.00	$0.00	$1,284.30	$1,284.30
Temporary Office 20' x 8'	3.00 MONTH	D	$0.00	$0.00	$673.65	$673.65
Temporary Storage Trailer 28' x 10'	3.00 MONTH	D	$0.00	$0.00	$366.63	$366.63
Portable Toilets - Chemical	3.00 MONTH	D	$0.00	$0.00	$356.75	$356.75
Construction Photographs	1.00 SET	D	$509.64	$0.00	$0.00	$509.64
Surveying - 2-man Crew	5.00 DAY	D	$2,123.52	$975.12	$0.00	$3,098.64
Contractor Costs / General Conditions Total			$2,633.16	$975.12	$43,332.78	$46,941.06
Decontamination Facilities						
1,800 PSI Steam Cleaner Rental	3.00 MONTH	D	$0.00	$0.00	$3,506.86	$3,506.86
8' x 36' Decontamination Trailer with 2 Showers, Fans	3.00 MONTH	D	$0.00	$0.00	$1,605.38	$1,605.38
DOT Steel Drum, 55 Gallon	10.00 EACH	D	$0.00	$0.00	$509.56	$509.56
Decontamination Facilities Total			$0.00	$0.00	$5,621.80	$5,621.80
Excavation, Buried Waste						
D5 with A-blade Bulldozer	40.00 HOUR	D	$1,156.55	$1,486.46	$0.00	$2,643.02
Hand Excavation, Normal Soil	80.00 CY	D	$2,446.83	$20.49	$0.00	$2,467.32
950, 3.0 CY, Wheel Loader	80.00 HOUR	D	$2,313.11	$3,259.28	$0.00	$5,572.39
Crawler-mounted, 1 CY, 215 Hydraulic Excavator	80.00 HOUR	D	$2,881.14	$3,373.44	$0.00	$6,254.58
12 CY, Dump Truck	160.00 HOUR	D	$2,851.31	$4,711.01	$0.00	$7,562.32
Backfill with Excavated Material	1,500.00 CY	D	$2,931.64	$1,235.10	$356.70	$4,523.44
Organic Vapor Analyzer Rental, per Month	3.00 MONTH	D	$0.00	$0.00	$3,717.35	$3,717.35
Plastic Laminate Waste Pile Cover	60,000.00 SF	D	$900.00	$6.00	$7,854.00	$8,760.00
Sprayed Water Dust Suppressant	7,000.00 SY	D	$29.00	$32.20	$0.00	$61.20
Decontaminate Heavy Equipment	10.00 EACH	D	$2,046.39	$255.08	$0.00	$2,301.47
Excavation, Buried Waste Total			$17,555.99	$14,379.06	$11,928.05	$43,863.09

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Fencing						
silt fencing	800.00 LF	D	$1,142.86	$0.00	$800.00	$1,942.86
Hazardous Waste Signing	1.00 EACH	D	$26.76	$0.23	$30.40	$57.40
	Fencing Total		$1,169.62	$0.23	$830.40	$2,000.25
Groundwater Monitoring Wells						
Mobilization/Demobilization Drilling Rig & Crew	1.00 LS	D	$563.60	$837.56	$0.00	$1,401.15
Organic Vapor Analyzer Rental, per Day	2.00 DAY	D	$0.00	$0.00	$237.84	$237.84
Decontaminate Rig, Augers, Screen (Rental Equipment)	1.00 DAY	D	$0.00	$0.00	$161.73	$161.73
2" Stainless Steel, Well Casing	100.00 LF	D	$221.71	$329.45	$1,864.38	$2,415.54
2" Stainless Steel, Well Screen	12.00 LF	D	$22.55	$33.50	$579.13	$635.18
2" Stainless Steel, Well Plug	4.00 EACH	D	$22.55	$33.50	$120.65	$176.70
2" Submersible Pump Rental, Day	1.00 DAY	D	$0.00	$0.00	$59.46	$59.46
Hollow-stem Auger, 8" Outside Diameter Borehole for 2" Well	100.00 LF	D	$1,024.84	$1,522.87	$0.00	$2,547.71
Well Development Equipment Rental	1.00 WEEK	D	$39.28	$0.44	$452.56	$492.28
Standby for Drilling	1.00 EACH	D	$70.45	$104.69	$0.00	$175.14
Move Rig/Equipment Around Site	4.00 EACH	D	$70.45	$104.69	$0.00	$175.14
Furnish 55 Gallon Drum for Drill Cuttings & Development Water	8.00 EACH	D	$0.00	$0.00	$407.65	$0.00
2" Screen, Filter Pack	20.00 LF	D	$31.94	$47.46	$139.48	$218.88
Surface Pad, Concrete, 4' x 4' x 4"	4.00 EACH	D	$16.27	$0.76	$50.74	$67.77
2" Well, Portland Cement Grout	4.00 LF	D	$0.00	$0.00	$4.28	$4.28
2" Well, Bentonite Seal	4.00 EACH	D	$25.36	$37.69	$68.93	$131.98
5' Guard Posts, Cast Iron, Concrete Fill	12.00 EACH	D	$345.74	$5.28	$351.09	$702.10
Teflon Bailer, 3/4" Outside Diameter x 3', 180 cc	4.00 EACH	D	$0.00	$0.00	$814.77	$814.77
Suspension Cable, Teflon Coated	100.00 FT	D	$0.00	$0.00	$102.27	$102.27
Hand Reel	4.00 EACH	D	$0.00	$0.00	$80.39	$80.39
	Groundwater Monitoring Wells Total		$2,454.75	$3,057.90	$5,495.34	$10,600.34
Landfill Disposal						
Transport Bulk Solid Hazardous Waste, 22 tons per trip (quote from earthwatch)	32.00 trip	D	$0.00	$0.00	$52,800.00	$52,800.00

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Landfill Hazardous Solid Bulk Waste Requiring Stabilization (quote from Earthwatch)	695.00 tons	D	$0.00	$0.00	$52,125.00	$52,125.00
	Landfill Disposal Total		$0.00	$0.00	$104,925.00	$104,925.00

Professional Labor

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Project Manager	80.00 HOUR	D	$3,941.25	$0.00	$0.00	$3,941.25
QA/QC Officer	16.00 HOUR	D	$462.08	$0.00	$0.00	$462.08
Project Hydrogeologist	40.00 HOUR	D	$1,698.82	$0.00	$0.00	$1,698.82
Health & Safety Officer	16.00 HOUR	D	$407.72	$0.00	$0.00	$407.72
Field Technician	480.00 HOUR	D	$9,785.14	$0.00	$0.00	$9,785.14
Word Processing/Clerical	20.00 HOUR	D	$339.76	$0.00	$0.00	$339.76
	Professional Labor Total		$16,634.76	$0.00	$0.00	$16,634.76

Soil Washing

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Treat 0 - 9,999 Tons of Soil, Including Residual Water	2,084.00 TON	D	$4,021.82	$1,905.61	$272,605.33	$278,532.76
	Soil Washing Total		$4,021.82	$1,905.61	$272,605.33	$278,532.76

Total RA-6

			Labor	Equipment	Materials	Total
Total RA-6			$50,953.02	$23,454.23	$500,749.56	$574,749.16

SEAD 16 & 17

Paul Messelaar

11/2/97

parsons engineering science
Prudential Center
Boston, Massachusetts, 02199
617 262 3200

Soil and sediment remediation at two small arms munitions deactivation furnaces, one active and one inactive. Remediation alternatives includes; RA-1 no action; RA-4 excavate/off-site landfill; RA-5 excavate/solidify/ on-site landfill ; and RA-6 excavate/soil washing/backfill clean soils/ off-site landfill dirty soils

o&m cost

SEAD 16 & 17 groundwater monitoring
groundwater/metals
groundwater monitoring
prepare monitoring report

Professional Labor

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Project Manager	4.00 HOUR		*$34.4859*	*$0.0000*	*$0.0000*	
33220101		D	70.00%	100.00%		
			$197.06	**$0.00**	**$0.00**	**$197.06**
Project Engineer	40.00 HOUR		*$29.7293*	*$0.0000*	*$0.0000*	
33220105		D	70.00%	100.00%		
			$1,698.82	**$0.00**	**$0.00**	**$1,698.82**
Word Processing/Clerical	4.00 HOUR		*$11.8917*	*$0.0000*	*$0.0000*	
33220119		D	70.00%	100.00%		
			$67.95	**$0.00**	**$0.00**	**$67.95**
Professional Labor Total			**$1,963.83**	**$0.00**	**$0.00**	**$1,963.83**

Sampling and Analysis

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Van or Pickup Rental	2.00 DAY		*$0.0000*	*$0.0000*	*$35.6751*	
33010102		D	70.00%	100.00%		
			$0.00	**$0.00**	**$71.35**	**$71.35**
Mobilize Crew, >= 500 Miles, per Person	2.00 EACH		*$0.0000*	*$0.0000*	*$1,189.1700*	
33010201		D	70.00%	100.00%		
			$0.00	**$0.00**	**$2,378.34**	**$2,378.34**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Per Diem	4.00 DAY		*$0.0000*	*$0.0000*	*$89.1878*	
33010202		D	70.00%	100.00%		
			$0.00	**$0.00**	**$356.75**	**$356.75**
Prefiltering Liquids	4.00 EACH		*$0.0000*	*$0.0000*	*$14.8646*	
33020206		D	70.00%	100.00%		
			$0.00	**$0.00**	**$59.46**	**$59.46**
Acid Digestion	4.00 EACH		*$0.0000*	*$0.0000*	*$23.7834*	
33020207		D	70.00%	100.00%		
			$0.00	**$0.00**	**$95.13**	**$95.13**
Repackage and Ship Sample	4.00 EACH		*$0.0000*	*$0.0000*	*$35.6751*	
33020225		D	70.00%	100.00%		
			$0.00	**$0.00**	**$142.70**	**$142.70**
Organic Vapor Analyzer Rental, per Day	2.00 DAY		*$0.0000*	*$0.0000*	*$118.9178*	
33020303		D	70.00%	100.00%		
			$0.00	**$0.00**	**$237.84**	**$237.84**
Disposable Materials per Sample	4.00 EACH		*$0.0000*	*$0.0000*	*$6.7448*	
33020401		D	70.00%	100.00%		
			$0.00	**$0.00**	**$26.98**	**$26.98**
Decontamination Materials per Sample	4.00 EACH		*$0.0000*	*$0.0000*	*$6.2432*	
33020402		D	70.00%	100.00%		
			$0.00	**$0.00**	**$24.97**	**$24.97**
Rinsate Analysis	1.00 EACH		*$0.0000*	*$0.0000*	*$190.2672*	
33020512		D	70.00%	100.00%		
			$0.00	**$0.00**	**$190.27**	**$190.27**
Pesticides/PCBs (EPA 608)	4.00 EACH		*$0.0000*	*$0.0000*	*$178.3755*	
33021617		D	70.00%	100.00%		
			$0.00	**$0.00**	**$713.50**	**$713.50**
Volatile Organic Analysis (EPA 624)	4.00 EACH		*$0.0000*	*$0.0000*	*$267.5633*	
33021618		D	70.00%	100.00%		
			$0.00	**$0.00**	**$1,070.25**	**$1,070.25**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Base Neutral & Acid Extractable Organics (EPA 625)	4.00 EACH		*$0.0000*	*$0.0000*	*$416.2095*	
33021619		D	70.00%	100.00%		
			$0.00	**$0.00**	**$1,664.84**	**$1,664.84**
Target Analyte List Metals (EPA 6010/7000S), Soil	4.00 EACH		*$0.0000*	*$0.0000*	*$243.7799*	
33021709		D	70.00%	100.00%		
			$0.00	**$0.00**	**$975.12**	**$975.12**
1 Liter, 32 Oz, Clear Wide Mouth Jar, Case of 12	1.00 EACH		*$0.0000*	*$0.0000*	*$44.7961*	
33022020		D	70.00%	100.00%		
			$0.00	**$0.00**	**$44.80**	**$44.80**
40 ml, Clear Vial, Case of 72	1.00 EACH		*$0.0000*	*$0.0000*	*$104.7659*	
33022026		D	70.00%	100.00%		
			$0.00	**$0.00**	**$104.77**	**$104.77**
1 Liter, 32 oz, High-density Polyethylene Bottle, Case of 12	1.00 EACH		*$0.0000*	*$0.0000*	*$34.7833*	
33022030		D	70.00%	100.00%		
			$0.00	**$0.00**	**$34.78**	**$34.78**
Custody Seals, Package of 10	1.00 EACH		*$0.0000*	*$0.0000*	*$1.3438*	
33022034		D	70.00%	100.00%		
			$0.00	**$0.00**	**$1.34**	**$1.34**
Safe Transport Can Filled with Vermiculite, 1 Gallon, Case of 4	1.00 EACH		*$0.0000*	*$0.0000*	*$16.7079*	
33022035		D	70.00%	100.00%		
			$0.00	**$0.00**	**$16.71**	**$16.71**
Documentation Package for QA Verification, Data & Benchwork	4.00 EACH		*$0.0000*	*$0.0000*	*$184.6901*	
33022036		D	70.00%	100.00%		
			$0.00	**$0.00**	**$738.76**	**$738.76**
Overnight Delivery, 21 - 50 Lb Package	25.00 LB		*$0.0000*	*$0.0000*	*$1.9027*	
33022042		D	70.00%	100.00%		
			$0.00	**$0.00**	**$47.57**	**$47.57**
60 Quart Ice Chest	1.00 EACH		*$0.0000*	*$0.0000*	*$53.0965*	
33022046		D	70.00%	100.00%		
			$0.00	**$0.00**	**$53.10**	**$53.10**

Item	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Blue Ice Soft Packs (Equivalent to 7 Lbs Ice)	1.00 EACH		*$0.0000*	*$0.0000*	*$5.9696*	
33022050		D	70.00%	100.00%		
			$0.00	**$0.00**	**$5.97**	**$5.97**
Field Technician	32.00 HOUR		*$14.2700*	*$0.0000*	*$0.0000*	
33220117		D	70.00%	100.00%		
			$652.34	**$0.00**	**$0.00**	**$652.34**
Teflon Bailer, 3/4" Outside Diameter x 1', 60 cc	4.00 EACH		*$0.0000*	*$0.0000*	*$153.0344*	
33232401		D	70.00%	100.00%		
			$0.00	**$0.00**	**$612.14**	**$612.14**
Suspension Cable, Teflon Coated	100.00 FT		*$0.0000*	*$0.0000*	*$1.0227*	
33232422		D	70.00%	100.00%		
			$0.00	**$0.00**	**$102.27**	**$102.27**
Sampling and Analysis Total			**$652.34**	**$0.00**	**$9,769.70**	**$10,422.04**

Site Total

	Labor	Equipment	Materials	Total
Site Total	**$2,616.17**	**$0.00**	**$9,769.70**	**$12,385.87**

RA-4

SEAD 16 has an inactive deactivation furnace that was used to destroy small arms munitions. Sead 17 is ajacent to SEAD 16 and has an active deactivation furnace that is used for the destruction of small arms munitions.

The primary media of concern are soils and sediments. THe primary cintaiminants of concern are metals such as lead and copper.

excavate/off-site lanfill disposal

groundwater monitoring

Access Roads

Item	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Rough Grading, 14G, 1 Pass	7,000.00 SY		*$0.1547*	*$0.2854*	*$0.0000*	
17030103		D	70.00%	100.00%		
			$1,547.00	**$1,997.80**	**$0.00**	**$3,544.80**
Access Roads Total			**$1,547.00**	**$1,997.80**	**$0.00**	**$3,544.80**

Analyses: Soil, Sludge, and Sediment

Item	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Van or Pickup Rental	3.00 DAY		*$0.0000*	*$0.0000*	*$35.6751*	
33010102		D	70.00%	100.00%		
			$0.00	**$0.00**	**$107.03**	**$107.03**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Mobilize Crew, >= 500 Miles, per Person	2.00 EACH		*$0.0000*	*$0.0000*	*$1,189.1700*	
33010201		D	70.00%	100.00%		
			$0.00	**$0.00**	**$2,378.34**	**$2,378.34**
Per Diem	6.00 DAY		*$0.0000*	*$0.0000*	*$89.1878*	
33010202		C	50.00%	75.00%		
			$0.00	**$0.00**	**$535.13**	**$535.13**
Repackage and Ship Sample	5.00 EACH		*$0.0000*	*$0.0000*	*$35.6751*	
33020225		D	70.00%	100.00%		
			$0.00	**$0.00**	**$178.38**	**$178.38**
Organic Vapor Analyzer Rental, per Day	3.00 DAY		*$0.0000*	*$0.0000*	*$118.9178*	
33020303		D	70.00%	100.00%		
			$0.00	**$0.00**	**$356.75**	**$356.75**
Disposable Materials per Sample	50.00 EACH		*$0.0000*	*$0.0000*	*$6.7448*	
33020401		D	70.00%	100.00%		
			$0.00	**$0.00**	**$337.24**	**$337.24**
Decontamination Materials per Sample	50.00 EACH		*$0.0000*	*$0.0000*	*$6.2432*	
33020402		D	70.00%	100.00%		
			$0.00	**$0.00**	**$312.16**	**$312.16**
TCLP (RCRA) (EPA 1311)	15.00 EACH		*$0.0000*	*$0.0000*	*$1,861.0511*	
33021702		D	70.00%	100.00%		
			$0.00	**$0.00**	**$27,915.77**	**$27,915.77**
Target Analyte List Metals (EPA 6010/7000S), Soil	35.00 EACH		*$0.0000*	*$0.0000*	*$243.7799*	
33021709		D	70.00%	100.00%		
			$0.00	**$0.00**	**$8,532.30**	**$8,532.30**
1 Liter, 32 Oz, Clear Wide Mouth Jar, Case of 12	5.00 EACH		*$0.0000*	*$0.0000*	*$44.7961*	
33022020		D	70.00%	100.00%		
			$0.00	**$0.00**	**$223.98**	**$223.98**
1 Liter, 32 Oz, Boston Round Bottle, Case of 12	5.00 EACH		*$0.0000*	*$0.0000*	*$34.1174*	
33022024		D	70.00%	100.00%		
			$0.00	**$0.00**	**$170.59**	**$170.59**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
40 ml, Clear Vial, Case of 72	2.00 EACH		*$0.0000*	*$0.0000*	*$104.7659*	
33022026		D	70.00%	100.00%		
			$0.00	**$0.00**	**$209.53**	**$209.53**
Custody Seals, Package of 10	5.00 EACH		*$0.0000*	*$0.0000*	*$1.3438*	
33022034		D	70.00%	100.00%		
			$0.00	**$0.00**	**$6.72**	**$6.72**
Safe Transport Can Filled with Vermiculite, 1 Gallon, Case of 4	4.00 EACH		*$0.0000*	*$0.0000*	*$16.7079*	
33022035		D	70.00%	100.00%		
			$0.00	**$0.00**	**$66.83**	**$66.83**
Documentation Package for QA Verification, Data & Benchwork	50.00 EACH		*$0.0000*	*$0.0000*	*$184.6901*	
33022036		D	70.00%	100.00%		
			$0.00	**$0.00**	**$9,234.51**	**$9,234.51**
Overnight Delivery, 21 - 50 Lb Package	200.00 LB		*$0.0000*	*$0.0000*	*$1.9027*	
33022042		D	70.00%	100.00%		
			$0.00	**$0.00**	**$380.54**	**$380.54**
60 Quart Ice Chest	5.00 EACH		*$0.0000*	*$0.0000*	*$53.0965*	
33022046		D	70.00%	100.00%		
			$0.00	**$0.00**	**$265.48**	**$265.48**
Blue Ice Soft Packs (Equivalent to 7 Lbs Ice)	5.00 EACH		*$0.0000*	*$0.0000*	*$5.9696*	
33022050		D	70.00%	100.00%		
			$0.00	**$0.00**	**$29.85**	**$29.85**
Project Manager	8.00 HOUR		*$34.4859*	*$0.0000*	*$0.0000*	
33220101		D	70.00%	100.00%		
			$394.12	**$0.00**	**$0.00**	**$394.12**
Project Engineer	40.00 HOUR		*$29.7293*	*$0.0000*	*$0.0000*	
33220105		D	70.00%	100.00%		
			$1,698.82	**$0.00**	**$0.00**	**$1,698.82**
Field Technician	48.00 HOUR		*$14.2700*	*$0.0000*	*$0.0000*	
33220117		D	70.00%	100.00%		
			$978.51	**$0.00**	**$0.00**	**$978.51**
Analyses: Soil, Sludge, and Sediment Total			**$3,071.46**	**$0.00**	**$51,241.11**	**$54,312.57**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Cleanup and Landscaping						
General Area Cleanup	2.00 ACRE		*$100.9011*	*$95.3650*	*$0.0000*	
17040101		D	70.00%	100.00%		
			$288.29	**$190.73**	**$0.00**	**$479.02**
Area Preparation, 67% Level & 33% Slope	2.00 ACRE		*$14.5041*	*$30.5622*	*$0.0000*	
18050101		D	70.00%	100.00%		
			$41.44	**$61.12**	**$0.00**	**$102.56**
Seeding, 67% Level & 33% Slope, Hydroseeding	2.00 ACRE		*$39.9561*	*$65.6422*	*$285.4008*	
18050401		D	70.00%	100.00%		
			$114.16	**$131.28**	**$570.80**	**$816.25**
Cleanup and Landscaping Total			**$443.89**	**$383.14**	**$570.80**	**$1,397.83**
Clear and Grub						
Light Brush without Grub, Chipping	2.00 ACRE		*$334.0125*	*$351.6323*	*$0.0000*	
17010401		D	70.00%	100.00%		
			$954.32	**$703.26**	**$0.00**	**$1,657.59**
Clear and Grub Total			**$954.32**	**$703.26**	**$0.00**	**$1,657.59**
Contractor Costs / General Conditions						
Van or Pickup Rental	60.00 DAY		*$0.0000*	*$0.0000*	*$35.6751*	
33010102		D	70.00%	100.00%		
			$0.00	**$0.00**	**$2,140.51**	**$2,140.51**
Mobilize Crew, >= 500 Miles, per Person	4.00 EACH		*$0.0000*	*$0.0000*	*$1,189.1700*	
33010201		D	70.00%	100.00%		
			$0.00	**$0.00**	**$4,756.68**	**$4,756.68**
Per Diem	180.00 DAY		*$0.0000*	*$0.0000*	*$89.1878*	
33010202		D	70.00%	100.00%		
			$0.00	**$0.00**	**$16,053.80**	**$16,053.80**
Disposable Boot Covers (Tyvek)	180.00 PAIR		*$0.0000*	*$0.0000*	*$1.3735*	
33010421		D	70.00%	100.00%		
			$0.00	**$0.00**	**$247.23**	**$247.23**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Disposable Gloves (Latex)	180.00 PAIR		*$0.0000*	*$0.0000*	*$0.2276*	
33010423		D	70.00%	100.00%		
			$0.00	**$0.00**	**$40.97**	**$40.97**
Disposable Coveralls (Tyvek)	180.00 EACH		*$0.0000*	*$0.0000*	*$3.5675*	
33010425		D	70.00%	100.00%		
			$0.00	**$0.00**	**$642.15**	**$642.15**
Temporary Office 20' x 8'	3.00 MONTH		*$0.0000*	*$0.0000*	*$224.5510*	
99040101		D	70.00%	100.00%		
			$0.00	**$0.00**	**$673.65**	**$673.65**
Portable Toilets - Chemical	3.00 MONTH		*$0.0000*	*$0.0000*	*$118.9170*	
99040501		D	70.00%	100.00%		
			$0.00	**$0.00**	**$356.75**	**$356.75**
Construction Photographs	1.00 SET		*$356.7510*	*$0.0000*	*$0.0000*	
99041101		D	70.00%	100.00%		
			$509.64	**$0.00**	**$0.00**	**$509.64**
Surveying - 2-man Crew	5.00 DAY		*$297.2925*	*$195.0239*	*$0.0000*	
99041201		D	70.00%	100.00%		
			$2,123.52	**$975.12**	**$0.00**	**$3,098.64**
Contractor Costs / General Conditions Total			**$2,633.16**	**$975.12**	**$24,911.74**	**$28,520.02**

Decontamination Facilities

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
1,800 PSI Steam Cleaner Rental	3.00 MONTH		*$0.0000*	*$0.0000*	*$1,168.9541*	
33170819		D	70.00%	100.00%		
			$0.00	**$0.00**	**$3,506.86**	**$3,506.86**
8' x 36' Decontamination Trailer with 2 Showers, Fans	3.00 MONTH		*$0.0000*	*$0.0000*	*$535.1265*	
33170822		D	70.00%	100.00%		
			$0.00	**$0.00**	**$1,605.38**	**$1,605.38**
DOT Steel Drum, 55 Gallon	10.00 EACH		*$0.0000*	*$0.0000*	*$50.9560*	
33199921		D	70.00%	100.00%		
			$0.00	**$0.00**	**$509.56**	**$509.56**
Decontamination Facilities Total			**$0.00**	**$0.00**	**$5,621.80**	**$5,621.80**

Excavation, Buried Waste

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
D6 with A-blade Bulldozer 17030209	40.00 HOUR	D	*$20.3943* 70.00% **$1,165.39**	*$43.2858* 100.00% **$1,731.43**	*$0.0000* **$0.00**	**$2,896.82**
Hand Excavation, Normal Soil 17030211	80.00 CY	D	*$21.4098* 70.00% **$2,446.83**	*$0.2561* 100.00% **$20.49**	*$0.0000* **$0.00**	**$2,467.32**
950, 3.0 CY, Wheel Loader 17030223	160.00 HOUR	D	*$20.2397* 70.00% **$4,626.22**	*$40.7410* 100.00% **$6,518.56**	*$0.0000* **$0.00**	**$11,144.78**
Crawler-mounted, 1 CY, 215 Hydraulic Excavator 17030230	40.00 HOUR	D	*$25.2100* 70.00% **$1,440.57**	*$42.1680* 100.00% **$1,686.72**	*$0.0000* **$0.00**	**$3,127.29**
12 CY DUMP TRUCK 17030236	160.00 HOUR	D	*$12.4700* 70.00% **$2,850.29**	*$29.4400* 100.00% **$4,710.40**	*$0.0000* **$0.00**	**$7,560.69**
Unclassified Fill, 6" Lifts, On-Site 17030422	1,500.00 CY	D	*$1.0266* 70.00% **$2,199.86**	*$3.3671* 100.00% **$5,050.65**	*$0.2378* **$356.70**	**$7,607.21**
Organic Vapor Analyzer Rental, per Month 33020302	3.00 MONTH	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$1,239.1151* **$3,717.35**	**$3,717.35**
Plastic Laminate Waste Pile Cover 33080584	60,000.00 SF	D	*$0.0105* 70.00% **$900.00**	*$0.0001* 100.00% **$6.00**	*$0.1309* **$7,854.00**	**$8,760.00**
Sprayed Water Dust Suppressant 33080585	7,000.00 SY	D	*$0.0029* 70.00% **$29.00**	*$0.0046* 100.00% **$32.20**	*$0.0000* **$0.00**	**$61.20**
Decontaminate Heavy Equipment 33170803	10.00 EACH	D	*$143.2474* 70.00% **$2,046.39**	*$25.5078* 100.00% **$255.08**	*$0.0000* **$0.00**	**$2,301.47**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Excavation, Buried Waste Total			**$17,704.55**	**$20,011.53**	**$11,928.05**	**$49,644.12**

Fencing

Item	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
6' Galvanized Chain-link Fence	800.00 LF		*$0.8374*	*$0.0110*	*$12.6847*	
18040107		D	70.00%	100.00%		
			$957.03	**$8.80**	**$10,147.76**	**$1,942.86**
Hazardous Waste Signing	1.00 EACH		*$18.7336*	*$0.2328*	*$30.4015*	
18040501		D	70.00%	100.00%		
			$26.76	**$0.23**	**$30.40**	**$57.40**
Fencing Total			**$983.79**	**$9.03**	**$10,178.16**	**$2,000.25**

Groundwater Monitoring Wells

Item	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Mobilization/Demobilization Drilling Rig & Crew	1.00 LS		*$394.5190*	*$837.5562*	*$0.0000*	
33010101		D	70.00%	100.00%		
			$563.60	**$837.56**	**$0.00**	**$0.00**
Organic Vapor Analyzer Rental, per Day	2.00 DAY		*$0.0000*	*$0.0000*	*$118.9178*	
33020303		D	70.00%	100.00%		
			$0.00	**$0.00**	**$237.84**	**$237.84**
Decontaminate Rig, Augers, Screen (Rental Equipment)	1.00 DAY		*$0.0000*	*$0.0000*	*$161.7271*	
33170808		D	70.00%	100.00%		
			$0.00	**$0.00**	**$161.73**	**$161.73**
2" Stainless Steel, Well Casing	100.00 LF		*$1.5520*	*$3.2945*	*$18.6438*	
33230121		D	70.00%	100.00%		
			$221.71	**$329.45**	**$1,864.38**	**$2,415.54**
2" Stainless Steel, Well Screen	12.00 LF		*$1.3152*	*$2.7920*	*$48.2611*	
33230221		D	70.00%	100.00%		
			$22.55	**$33.50**	**$579.13**	**$635.18**
2" Stainless Steel, Well Plug	4.00 EACH		*$3.9457*	*$8.3758*	*$30.1633*	
33230311		D	70.00%	100.00%		
			$22.55	**$33.50**	**$120.65**	**$176.70**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
2" Submersible Pump Rental, Day	1.00 DAY		*$0.0000*	*$0.0000*	*$59.4585*	
33230506		D	70.00%	100.00%		
			$0.00	**$0.00**	**$59.46**	**$59.46**
Hollow-stem Auger, 8" Outside Diameter Borehole for 2" Well	100.00 LF		*$7.1739*	*$15.2287*	*$0.0000*	
33231101		D	70.00%	100.00%		
			$1,024.84	**$1,522.87**	**$0.00**	**$2,547.71**
Split Spoon Sample, 2" x 24", During Drilling	50.00 EACH		*$0.0000*	*$0.0000*	*$29.7293*	
33231106		D	70.00%	100.00%		
			$0.00	**$0.00**	**$1,486.47**	**$1,486.47**
Well Development Equipment Rental	1.00 WEEK		*$27.4970*	*$0.4357*	*$452.5599*	
33231111		D	70.00%	100.00%		
			$39.28	**$0.44**	**$452.56**	**$492.28**
Standby for Drilling	1.00 EACH		*$49.3149*	*$104.6945*	*$0.0000*	
33231121		D	70.00%	100.00%		
			$70.45	**$104.69**	**$0.00**	**$0.00**
Move Rig/Equipment Around Site	4.00 EACH		*$12.3287*	*$26.1737*	*$0.0000*	
33231122		D	70.00%	100.00%		
			$70.45	**$104.69**	**$0.00**	**$175.14**
Furnish 55 Gallon Drum for Drill Cuttings & Development Water	8.00 EACH		*$0.0000*	*$0.0000*	*$50.9560*	
33231126		D	70.00%	100.00%		
			$0.00	**$0.00**	**$407.65**	**$407.65**
2" Screen, Filter Pack	80.00 LF		*$1.1180*	*$2.3731*	*$6.9738*	
33231401		D	70.00%	100.00%		
			$127.77	**$189.85**	**$557.90**	**$875.52**
Surface Pad, Concrete, 4' x 4' x 4"	4.00 EACH		*$2.8481*	*$0.1893*	*$12.6844*	
33231502		D	70.00%	100.00%		
			$16.27	**$0.76**	**$50.74**	**$67.77**
2" Well, Portland Cement Grout	4.00 LF		*$0.0000*	*$0.0000*	*$1.0703*	
33231811		D	70.00%	100.00%		
			$0.00	**$0.00**	**$4.28**	**$4.28**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
2" Well, Bentonite Seal	4.00 EACH		*$4.4388*	*$9.4228*	*$17.2319*	
33232101		D	70.00%	100.00%		
			$25.36	**$37.69**	**$68.93**	**$131.98**
5' Guard Posts, Cast Iron, Concrete Fill	12.00 EACH		*$20.1681*	*$0.4397*	*$29.2574*	
33232301		D	70.00%	100.00%		
			$345.74	**$5.28**	**$351.09**	**$702.10**
Teflon Bailer, 3/4" Outside Diameter x 1', 60 cc	4.00 EACH		*$0.0000*	*$0.0000*	*$153.0344*	
33232401		D	70.00%	100.00%		
			$0.00	**$0.00**	**$612.14**	**$612.14**
Suspension Cable, Teflon Coated	100.00 FT		*$0.0000*	*$0.0000*	*$1.0227*	
33232422		D	70.00%	100.00%		
			$0.00	**$0.00**	**$102.27**	**$102.27**
Hand Reel	4.00 EACH		*$0.0000*	*$0.0000*	*$20.0970*	
33232423		D	70.00%	100.00%		
			$0.00	**$0.00**	**$80.39**	**$80.39**
Groundwater Monitoring Wells Total			**$2,550.58**	**$3,200.28**	**$7,197.60**	**$11,372.16**

Landfill Disposal

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Transport Bulk Solid non-Hazardous Waste, 22 tons per trip (quote Earthwatch)	59.00 trip		*$0.0000*	*$0.0000*	*$308.0000*	
33190205		D	70.00%	100.00%		
1279 cy of non haz soil/sediments at one cy per ton			**$0.00**	**$0.00**	**$18,172.00**	**$18,172.00**
Transport Bulk Solid Hazardous Waste, 22 tons per trip (quote from Earthwatch)	23.00 trip		*$0.0000*	*$0.0000*	*$1,650.0000*	
33190206		D	70.00%	100.00%		
			$0.00	**$0.00**	**$37,950.00**	**$37,950.00**
Landfill Hazardous Solid Bulk Waste Requiring Stabilization (quote from Earthwatch)	805.00 TON		*$0.0000*	*$0.0000*	*$75.0000*	
33197265		D	70.00%	100.00%		
			$0.00	**$0.00**	**$60,375.00**	**$60,375.00**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Landfill Nonhazardous Solid Bulk Waste by ton (quote Earthwatch)	1,279.00 ton		*$0.0000*	*$0.0000*	*$15.0000*	
33197270		D	70.00%	100.00%		
			$0.00	**$0.00**	**$19,185.00**	**$19,185.00**
	Landfill Disposal Total		**$0.00**	**$0.00**	**$135,682.00**	**$135,682.00**

Professional Labor

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Project Manager	40.00 HOUR		*$34.4859*	*$0.0000*	*$0.0000*	
33220101		D	70.00%	100.00%		
			$1,970.62	**$0.00**	**$0.00**	**$1,970.62**
QA/QC Officer	8.00 HOUR		*$20.2159*	*$0.0000*	*$0.0000*	
33220104		D	70.00%	100.00%		
			$231.04	**$0.00**	**$0.00**	**$231.04**
Project Engineer	100.00 HOUR		*$29.7293*	*$0.0000*	*$0.0000*	
33220105		D	70.00%	100.00%		
			$4,247.04	**$0.00**	**$0.00**	**$4,247.04**
Health & Safety Officer	8.00 HOUR		*$17.8376*	*$0.0000*	*$0.0000*	
33220113		D	70.00%	100.00%		
			$203.86	**$0.00**	**$0.00**	**$203.86**
Field Technician	320.00 HOUR		*$14.2700*	*$0.0000*	*$0.0000*	
33220117		D	70.00%	100.00%		
			$6,523.43	**$0.00**	**$0.00**	**$6,523.43**
Word Processing/Clerical	10.00 HOUR		*$11.8917*	*$0.0000*	*$0.0000*	
33220119		D	70.00%	100.00%		
			$169.88	**$0.00**	**$0.00**	**$169.88**
	Professional Labor Total		**$13,345.87**	**$0.00**	**$0.00**	**$13,345.87**

	Labor	Equipment	Materials	Total
Site Total	$43,234.62	$27,280.16	$247,331.26	$307,099.01

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total

RA-5

SEAD 16 has an inactive deactivation furnace that was used to destroy small arms munitions. SEAD 17 is adjacent to SEAD 16 and has an active deactivation furnace that is used for the destruction of small arm munitions.

The primary media of concern are soils and sediments. The primary contaminants of concern are metals such as lead and copper.

excavate/solidify-stabilize/on-site landfill

groundwater monitoring

Access Roads

Item	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Rough Grading, 14G, 1 Pass	10,000.00 SY		*$0.1547*	*$0.2854*	*$0.0000*	
17030103		D	70.00%	100.00%		
			$2,210.00	**$2,854.00**	**$0.00**	**$5,064.00**
	Access Roads Total		**$2,210.00**	**$2,854.00**	**$0.00**	**$5,064.00**

Analyses: Soil, Sludge, and Sediment

Item	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Van or Pickup Rental	3.00 DAY		*$0.0000*	*$0.0000*	*$35.6751*	
33010102		D	70.00%	100.00%		
			$0.00	**$0.00**	**$107.03**	**$107.03**
Mobilize Crew, >= 500 Miles, per Person	2.00 EACH		*$0.0000*	*$0.0000*	*$1,189.1700*	
33010201		D	70.00%	100.00%		
			$0.00	**$0.00**	**$2,378.34**	**$2,378.34**
Per Diem	6.00 DAY		*$0.0000*	*$0.0000*	*$89.1878*	
33010202		D	70.00%	100.00%		
			$0.00	**$0.00**	**$535.13**	**$535.13**
Organic Vapor Analyzer Rental, per Day	3.00 DAY		*$0.0000*	*$0.0000*	*$118.9178*	
33020303		D	70.00%	100.00%		
			$0.00	**$0.00**	**$356.75**	**$356.75**
Disposable Materials per Sample	55.00 EACH		*$0.0000*	*$0.0000*	*$6.7448*	
33020401		D	70.00%	100.00%		
			$0.00	**$0.00**	**$370.96**	**$370.96**
Decontamination Materials per Sample	55.00 EACH		*$0.0000*	*$0.0000*	*$6.2432*	
33020402		D	70.00%	100.00%		
			$0.00	**$0.00**	**$343.38**	**$343.38**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
TCLP (RCRA) (EPA 1311)	20.00 EACH		*$0.0000*	*$0.0000*	*$1,861.0511*	
33021702		D	70.00%	100.00%		
			$0.00	**$0.00**	**$37,221.02**	**$37,221.02**
Target Analyte List Metals (EPA 6010/7000S), Soil	35.00 EACH		*$0.0000*	*$0.0000*	*$243.7799*	
33021709		D	70.00%	100.00%		
			$0.00	**$0.00**	**$8,532.30**	**$8,532.30**
1 Liter, 32 Oz, Clear Wide Mouth Jar, Case of 12	6.00 EACH		*$0.0000*	*$0.0000*	*$44.7961*	
33022020		D	70.00%	100.00%		
			$0.00	**$0.00**	**$268.78**	**$268.78**
1 Liter, 32 Oz, Boston Round Bottle, Case of 12	6.00 EACH		*$0.0000*	*$0.0000*	*$34.1174*	
33022024		D	70.00%	100.00%		
			$0.00	**$0.00**	**$204.70**	**$204.70**
40 ml, Clear Vial, Case of 72	1.00 EACH		*$0.0000*	*$0.0000*	*$104.7659*	
33022026		D	70.00%	100.00%		
			$0.00	**$0.00**	**$104.77**	**$104.77**
Custody Seals, Package of 10	6.00 EACH		*$0.0000*	*$0.0000*	*$1.3438*	
33022034		D	70.00%	100.00%		
			$0.00	**$0.00**	**$8.06**	**$8.06**
Safe Transport Can Filled with Vermiculite, 1 Gallon, Case of 4	5.00 EACH		*$0.0000*	*$0.0000*	*$16.7079*	
33022035		D	70.00%	100.00%		
			$0.00	**$0.00**	**$83.54**	**$83.54**
Documentation Package for QA Verification, Data & Benchwork	55.00 EACH		*$0.0000*	*$0.0000*	*$184.6901*	
33022036		D	70.00%	100.00%		
			$0.00	**$0.00**	**$10,157.96**	**$10,157.96**
Overnight Delivery, 21 - 50 Lb Package	250.00 LB		*$0.0000*	*$0.0000*	*$1.9027*	
33022042		D	70.00%	100.00%		
			$0.00	**$0.00**	**$475.68**	**$475.68**
60 Quart Ice Chest	6.00 EACH		*$0.0000*	*$0.0000*	*$53.0965*	
33022046		D	70.00%	100.00%		
			$0.00	**$0.00**	**$318.58**	**$318.58**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Blue Ice Soft Packs (Equivalent to 7 Lbs Ice)	6.00 EACH		*$0.0000*	*$0.0000*	*$5.9696*	
33022050		D	70.00%	100.00%		
			$0.00	**$0.00**	**$35.82**	$35.82
Project Manager	8.00 HOUR		*$34.4859*	*$0.0000*	*$0.0000*	
33220101		D	70.00%	100.00%		
			$394.12	**$0.00**	**$0.00**	$394.12
Project Engineer	40.00 HOUR		*$29.7293*	*$0.0000*	*$0.0000*	
33220105		D	70.00%	100.00%		
			$1,698.82	**$0.00**	**$0.00**	$1,698.82
Field Technician	64.00 HOUR		*$14.2700*	*$0.0000*	*$0.0000*	
33220117		D	70.00%	100.00%		
			$1,304.69	**$0.00**	**$0.00**	$1,304.69
Word Processing/Clerical	4.00 HOUR		*$11.8917*	*$0.0000*	*$0.0000*	
33220119		D	70.00%	100.00%		
			$67.95	**$0.00**	**$0.00**	$67.95
Analyses: Soil, Sludge, and Sediment Total			**$3,465.58**	**$0.00**	**$61,502.78**	**$64,968.36**

Capping

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
950, 3.0 CY, Wheel Loader	160.00 HOUR		*$20.2397*	*$40.7410*	*$0.0000*	
17030223		D	70.00%	100.00%		
			$4,626.22	**$6,518.56**	**$0.00**	$11,144.78
Crawler-mounted, 2 CY, 235 Hydraulic Excavator	160.00 HOUR		*$25.2100*	*$92.9693*	*$0.0000*	
17030232		D	70.00%	100.00%		
			$5,762.29	**$14,875.09**	**$0.00**	$20,637.37
Sand, 6" Lifts, On-Site	1,100.00 CY		*$1.0272*	*$3.2365*	*$0.2378*	
17030425		D	70.00%	100.00%		
			$1,614.17	**$3,560.15**	**$261.58**	$5,435.90
Gravel, 6" Lifts	900.00 CY		*$1.6037*	*$1.5857*	*$11.2376*	
17030430		D	70.00%	100.00%		
			$2,061.90	**$1,427.13**	**$10,113.84**	$13,602.87

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Topsoil, 6" Lifts, Off-Site	225.00 CY		*$2.3494*	*$3.0499*	*$24.2789*	
18050301		D	70.00%	100.00%		
			$755.16	**$686.23**	**$5,462.75**	**$6,904.14**
Seeding, Vegetative Cover	1.00 ACRE		*$35.9559*	*$57.2455*	*$1,654.7301*	
18050402		D	70.00%	100.00%		
			$51.37	**$57.25**	**$1,654.73**	**$1,763.34**
Watering with 3,000-Gallon Tank Truck, Per Pass	1.00 ACRE		*$13.9861*	*$22.2741*	*$2.3783*	
18050413		D	70.00%	100.00%		
			$19.98	**$22.27**	**$2.38**	**$44.63**
Mowing	1.00 ACRE		*$11.2562*	*$3.7814*	*$0.0000*	
18050415		D	70.00%	100.00%		
			$16.08	**$3.78**	**$0.00**	**$19.86**
10' Wide Grass Drainage Swale	500.00 LF		*$0.5088*	*$0.8043*	*$2.3074*	
33050801		D	70.00%	100.00%		
			$363.43	**$402.15**	**$1,153.70**	**$1,919.28**
Clay 10E-7, 6" Lifts, Off-Site	900.00 CY		*$2.7829*	*$4.0696*	*$4.6378*	
33080507		D	70.00%	100.00%		
			$3,578.01	**$3,662.64**	**$4,174.02**	**$11,414.67**
60 Mil Polymeric Liner, High-density Polyethylene	23,125.00 SF		*$0.7170*	*$0.1183*	*$0.6184*	
33080572		D	70.00%	100.00%		
			$23,686.61	**$2,735.69**	**$14,300.50**	**$40,722.79**
4" Slotted PVC Pipe	1,100.00 LF		*$1.0025*	*$0.0148*	*$2.1167*	
33260802		D	70.00%	100.00%		
			$1,575.36	**$16.28**	**$2,328.37**	**$3,920.01**
	Capping Total		**$44,110.57**	**$33,967.21**	**$39,451.87**	**$117,529.66**

Cleanup and Landscaping

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
General Area Cleanup	2.00 ACRE		*$100.9011*	*$95.3650*	*$0.0000*	
17040101		D	70.00%	100.00%		
			$288.29	**$190.73**	**$0.00**	**$479.02**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Area Preparation, 67% Level & 33% Slope	2.00 ACRE		*$14.5041*	*$30.5622*	*$0.0000*	
18050101		D	70.00%	100.00%		
			$41.44	**$61.12**	**$0.00**	**$102.56**
Seeding, 67% Level & 33% Slope, Hydroseeding	2.00 ACRE		*$39.9561*	*$65.6422*	*$285.4008*	
18050401		D	70.00%	100.00%		
			$114.16	**$131.28**	**$570.80**	**$816.25**
Watering with 3,000-Gallon Tank Truck, Per Pass	2.00 ACRE		*$13.9861*	*$22.2741*	*$2.3783*	
18050413		D	70.00%	100.00%		
			$39.96	**$44.55**	**$4.76**	**$89.27**
Cleanup and Landscaping Total			**$483.85**	**$427.69**	**$575.56**	**$1,487.10**

Clear and Grub

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Light Brush without Grub, Chipping	2.00 ACRE		*$334.0125*	*$351.6323*	*$0.0000*	
17010401		D	70.00%	100.00%		
			$954.32	**$703.26**	**$0.00**	**$1,657.59**
Clear and Grub Total			**$954.32**	**$703.26**	**$0.00**	**$1,657.59**

Contractor Costs / General Conditions

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Van or Pickup Rental	90.00 DAY		*$0.0000*	*$0.0000*	*$35.6751*	
33010102		D	70.00%	100.00%		
			$0.00	**$0.00**	**$3,210.76**	**$3,210.76**
Mobilize Crew, >= 500 Miles, per Person	4.00 EACH		*$0.0000*	*$0.0000*	*$1,189.1700*	
33010201		D	70.00%	100.00%		
			$0.00	**$0.00**	**$4,756.68**	**$4,756.68**
Per Diem	360.00 DAY		*$0.0000*	*$0.0000*	*$89.1878*	
33010202		D	70.00%	100.00%		
			$0.00	**$0.00**	**$32,107.61**	**$32,107.61**
Disposable Boot Covers (Tyvek)	360.00 PAIR		*$0.0000*	*$0.0000*	*$1.3735*	
33010421		D	70.00%	100.00%		
			$0.00	**$0.00**	**$494.46**	**$494.46**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Disposable Gloves (Latex)	360.00 PAIR		*$0.0000*	*$0.0000*	*$0.2276*	
33010423		D	70.00%	100.00%		
			$0.00	**$0.00**	**$81.94**	**$81.94**
Disposable Coveralls (Tyvek)	360.00 EACH		*$0.0000*	*$0.0000*	*$3.5675*	
33010425		D	70.00%	100.00%		
			$0.00	**$0.00**	**$1,284.30**	**$1,284.30**
Temporary Office 20' x 8'	3.00 MONTH		*$0.0000*	*$0.0000*	*$224.5510*	
99040101		D	70.00%	100.00%		
			$0.00	**$0.00**	**$673.65**	**$673.65**
Temporary Storage Trailer 28' x 10'	3.00 MONTH		*$0.0000*	*$0.0000*	*$122.2111*	
99040202		D	70.00%	100.00%		
			$0.00	**$0.00**	**$366.63**	**$366.63**
Portable Toilets - Chemical	3.00 MONTH		*$0.0000*	*$0.0000*	*$118.9170*	
99040501		D	70.00%	100.00%		
			$0.00	**$0.00**	**$356.75**	**$356.75**
Construction Photographs	1.00 SET		*$356.7510*	*$0.0000*	*$0.0000*	
99041101		D	70.00%	100.00%		
			$509.64	**$0.00**	**$0.00**	**$509.64**
Surveying - 2-man Crew	8.00 DAY		*$297.2925*	*$195.0239*	*$0.0000*	
99041201		D	70.00%	100.00%		
			$3,397.63	**$1,560.19**	**$0.00**	**$4,957.82**
Contractor Costs / General Conditions Total			**$3,907.27**	**$1,560.19**	**$43,332.78**	**$48,800.24**

Decontamination Facilities

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
1,800 PSI Steam Cleaner Rental	3.00 MONTH		*$0.0000*	*$0.0000*	*$1,168.9541*	
33170819		D	70.00%	100.00%		
			$0.00	**$0.00**	**$3,506.86**	**$3,506.86**
8' x 36' Decontamination Trailer with 2 Showers, Fans	3.00 MONTH		*$0.0000*	*$0.0000*	*$535.1265*	
33170822		D	70.00%	100.00%		
			$0.00	**$0.00**	**$1,605.38**	**$1,605.38**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
DOT Steel Drum, 55 Gallon	10.00 EACH		*$0.0000*	*$0.0000*	*$50.9560*	
33199921		D	70.00%	100.00%		
			$0.00	**$0.00**	**$509.56**	**$509.56**
Decontamination Facilities Total			**$0.00**	**$0.00**	**$5,621.80**	**$5,621.80**

Excavation, Buried Waste

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
D4 with A-blade Bulldozer	40.00 HOUR		*$20.2397*	*$24.4851*	*$0.0000*	
17030207		D	70.00%	100.00%		
			$1,156.55	**$979.40**	**$0.00**	**$2,135.96**
Hand Excavation, Normal Soil	80.00 CY		*$21.4098*	*$0.2561*	*$0.0000*	
17030211		D	70.00%	100.00%		
			$2,446.83	**$20.49**	**$0.00**	**$2,467.32**
950, 3.0 CY, Wheel Loader	160.00 HOUR		*$20.2397*	*$40.7410*	*$0.0000*	
17030223		D	70.00%	100.00%		
			$4,626.22	**$6,518.56**	**$0.00**	**$11,144.78**
Crawler-mounted, 1 CY, 215 Hydraulic Excavator	40.00 HOUR		*$25.2100*	*$42.1680*	*$0.0000*	
17030230		D	70.00%	100.00%		
			$1,440.57	**$1,686.72**	**$0.00**	**$3,127.29**
12 CY, Dump Truck	160.00 HOUR		*$12.4745*	*$29.4438*	*$0.0000*	
17030285		D	70.00%	100.00%		
			$2,851.31	**$4,711.01**	**$0.00**	**$7,562.32**
Unclassified Fill, 6" Lifts, On-Site	1,500.00 CY		*$1.0266*	*$3.3671*	*$0.2378*	
17030422		D	70.00%	100.00%		
			$2,199.86	**$5,050.65**	**$356.70**	**$7,607.21**
Organic Vapor Analyzer Rental, per Month	3.00 MONTH		*$0.0000*	*$0.0000*	*$1,239.1151*	
33020302		D	70.00%	100.00%		
			$0.00	**$0.00**	**$3,717.35**	**$3,717.35**
Plastic Laminate Waste Pile Cover	60,000.00 SF		*$0.0105*	*$0.0001*	*$0.1309*	
33080584		D	70.00%	100.00%		
			$900.00	**$6.00**	**$7,854.00**	**$8,760.00**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Sprayed Water Dust Suppressant	10,000.00 SY		*$0.0029*	*$0.0046*	*$0.0000*	
33080585		D	70.00%	100.00%		
			$41.43	**$46.00**	**$0.00**	**$87.43**
Decontaminate Heavy Equipment	10.00 EACH		*$143.2474*	*$25.5078*	*$0.0000*	
33170803		D	70.00%	100.00%		
			$2,046.39	**$255.08**	**$0.00**	**$2,301.47**
Excavation, Buried Waste Total			**$17,709.17**	**$19,273.91**	**$11,928.05**	**$48,911.12**

Fencing

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Silt Fencing	1,400.00 LF		*$1.0000*	*$0.0000*	*$1.0000*	
18040105		D	70.00%	100.00%		
			$2,000.00	**$0.00**	**$1,400.00**	**$3,400.00**
6' Galvanized Chain-link Fence	450.00 LF		*$0.8374*	*$0.0110*	*$12.6847*	
18040107		D	70.00%	100.00%		
			$538.33	**$4.95**	**$5,708.12**	**$6,251.39**
Swing Gates, Complete	1.00 EACH		*$73.3583*	*$61.3664*	*$291.0877*	
18040115		D	70.00%	100.00%		
			$104.80	**$61.37**	**$291.09**	**$457.25**
Hazardous Waste Signing	1.00 EACH		*$18.7336*	*$0.2328*	*$30.4015*	
18040501		D	70.00%	100.00%		
			$26.76	**$0.23**	**$30.40**	**$57.40**
Fencing Total			**$2,669.89**	**$66.55**	**$7,429.60**	**$10,166.04**

Groundwater Monitoring Wells

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Mobilization/Demobilization Drilling Rig & Crew	1.00 LS		*$394.5190*	*$837.5562*	*$0.0000*	
33010101		D	70.00%	100.00%		
			$563.60	**$837.56**	**$0.00**	**$1,401.15**
Organic Vapor Analyzer Rental, per Day	4.00 DAY		*$0.0000*	*$0.0000*	*$118.9178*	
33020303		D	70.00%	100.00%		
			$0.00	**$0.00**	**$475.67**	**$475.67**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
2" Stainless Steel, Well Casing 33230121	250.00 LF	D	*$1.5520* 70.00% **$554.29**	*$3.2945* 100.00% **$823.63**	*$18.6438* **$4,660.95**	**$6,038.86**
2" Stainless Steel, Well Screen 33230221	24.00 LF	D	*$1.3152* 70.00% **$45.09**	*$2.7920* 100.00% **$67.01**	*$48.2611* **$1,158.27**	**$1,270.37**
2" Stainless Steel, Well Plug 33230311	8.00 EACH	D	*$3.9457* 70.00% **$45.09**	*$8.3758* 100.00% **$67.01**	*$30.1633* **$241.31**	**$353.41**
2" Submersible Pump Rental, Day 33230506	1.00 DAY	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$59.4585* **$59.46**	**$59.46**
Hollow-stem Auger, 8" Outside Diameter Borehole for 2" Well 33231101	250.00 LF	D	*$7.1739* 70.00% **$2,562.11**	*$15.2287* 100.00% **$3,807.18**	*$0.0000* **$0.00**	**$6,369.28**
Split Spoon Sample, 2" x 24", During Drilling 33231106	125.00 EACH	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$29.7293* **$3,716.16**	**$3,716.16**
Well Development Equipment Rental 33231111	1.00 WEEK	D	*$27.4970* 70.00% **$39.28**	*$0.4357* 100.00% **$0.44**	*$452.5599* **$452.56**	**$492.28**
Standby for Drilling 33231121	1.00 EACH	D	*$49.3149* 70.00% **$70.45**	*$104.6945* 100.00% **$104.69**	*$0.0000* **$0.00**	**$175.14**
Move Rig/Equipment Around Site 33231122	8.00 EACH	D	*$12.3287* 70.00% **$140.90**	*$26.1737* 100.00% **$209.39**	*$0.0000* **$0.00**	**$350.29**
Furnish 55 Gallon Drum for Drill Cuttings & Development Water 33231126	16.00 EACH	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$50.9560* **$815.30**	**$815.30**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
2" Screen, Filter Pack	40.00 LF		*$1.1180*	*$2.3731*	*$6.9738*	
33231401		D	70.00%	100.00%		
			$63.89	**$94.92**	**$278.95**	**$437.76**
Surface Pad, Concrete, 4' x 4' x 4"	8.00 EACH		*$2.8481*	*$0.1893*	*$12.6844*	
33231502		D	70.00%	100.00%		
			$32.55	**$1.51**	**$101.48**	**$135.54**
2" Well, Portland Cement Grout	8.00 LF		*$0.0000*	*$0.0000*	*$1.0703*	
33231811		D	70.00%	100.00%		
			$0.00	**$0.00**	**$8.56**	**$8.56**
2" Well, Bentonite Seal	8.00 EACH		*$4.4388*	*$9.4228*	*$17.2319*	
33232101		D	70.00%	100.00%		
			$50.73	**$75.38**	**$137.86**	**$263.97**
5' Guard Posts, Cast Iron, Concrete Fill	24.00 EACH		*$20.1681*	*$0.4397*	*$29.2574*	
33232301		D	70.00%	100.00%		
			$691.48	**$10.55**	**$702.18**	**$1,404.21**
Teflon Bailer, 3/4" Outside Diameter x 1', 60 cc	8.00 EACH		*$0.0000*	*$0.0000*	*$153.0344*	
33232401		D	70.00%	100.00%		
			$0.00	**$0.00**	**$1,224.28**	**$1,224.28**
Suspension Cable, Teflon Coated	250.00 FT		*$0.0000*	*$0.0000*	*$1.0227*	
33232422		D	70.00%	100.00%		
			$0.00	**$0.00**	**$255.68**	**$255.68**
Hand Reel	8.00 EACH		*$0.0000*	*$0.0000*	*$20.0970*	
33232423		D	70.00%	100.00%		
			$0.00	**$0.00**	**$160.78**	**$160.78**
Groundwater Monitoring Wells Total			**$4,859.45**	**$6,099.26**	**$14,449.42**	**$25,408.13**

Professional Labor

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Project Manager	80.00 HOUR		*$34.4859*	*$0.0000*	*$0.0000*	
33220101		D	70.00%	100.00%		
			$3,941.25	**$0.00**	**$0.00**	**$3,941.25**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
QA/QC Officer	16.00 HOUR		*$20.2159*	*$0.0000*	*$0.0000*	
33220104		D	70.00%	100.00%		
			$462.08	**$0.00**	**$0.00**	**$462.08**
Project Engineer	240.00 HOUR		*$29.7293*	*$0.0000*	*$0.0000*	
33220105		D	70.00%	100.00%		
			$10,192.90	**$0.00**	**$0.00**	**$10,192.90**
Health & Safety Officer	16.00 HOUR		*$17.8376*	*$0.0000*	*$0.0000*	
33220113		D	70.00%	100.00%		
			$407.72	**$0.00**	**$0.00**	**$407.72**
Field Technician	480.00 HOUR		*$14.2700*	*$0.0000*	*$0.0000*	
33220117		D	70.00%	100.00%		
			$9,785.14	**$0.00**	**$0.00**	**$9,785.14**
Word Processing/Clerical	20.00 HOUR		*$11.8917*	*$0.0000*	*$0.0000*	
33220119		D	70.00%	100.00%		
			$339.76	**$0.00**	**$0.00**	**$339.76**
	Professional Labor Total		**$25,128.85**	**$0.00**	**$0.00**	**$25,128.85**

Solidification/Stabilization

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
950, 3.0 CY, Wheel Loader	160.00 HOUR		*$20.2397*	*$40.7410*	*$0.0000*	
17030223		D	70.00%	100.00%		
			$4,626.22	**$6,518.56**	**$0.00**	**$11,144.78**
12 CY, Dump Truck	160.00 HOUR		*$12.4745*	*$29.4438*	*$0.0000*	
17030285		D	70.00%	100.00%		
			$2,851.31	**$4,711.01**	**$0.00**	**$7,562.32**
580K, 1CY, Backhoe with Front-end Loader	320.00 HOUR		*$20.7273*	*$13.9015*	*$0.0000*	
17030431		D	70.00%	100.00%		
			$9,475.34	**$4,448.48**	**$0.00**	**$13,923.82**
4" Structural Slab on Grade	100.00 SF		*$1.3888*	*$0.1677*	*$1.8464*	
18020320		D	70.00%	100.00%		
			$198.40	**$16.77**	**$184.64**	**$399.81**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
550 Gallon, Stainless Steel Aboveground Wastewater Holding Tank, Rental	1.00 MONTH		*$0.0000*	*$0.0000*	*$356.7510*	
19040401		D	70.00%	100.00%		
			$0.00	**$0.00**	**$356.75**	**$356.75**
Per Diem	360.00 DAY		*$0.0000*	*$0.0000*	*$89.1878*	
33010202		D	70.00%	100.00%		
			$0.00	**$0.00**	**$32,107.61**	**$32,107.61**
Truck Scale Rental	2.00 MONTH		*$0.0000*	*$0.0000*	*$4,162.0950*	
33010462		D	70.00%	100.00%		
			$0.00	**$0.00**	**$8,324.19**	**$8,324.19**
R60 Rough Terrain Forklift, 6,000 Lb @ 24" LC	320.00 HOUR		*$20.2754*	*$12.7361*	*$0.0000*	
33100118		D	70.00%	100.00%		
			$9,268.75	**$4,075.55**	**$0.00**	**$13,344.31**
Portland Cement Type I (Bulk)	300.00 TON		*$0.0000*	*$0.0000*	*$84.4311*	
33150405		D	70.00%	100.00%		
			$0.00	**$0.00**	**$25,329.33**	**$25,329.33**
Tank Truck Standby Time for Solidification/Stabilization Unit	320.00 HOUR		*$0.0000*	*$10.7714*	*$0.0000*	
33150415		D	70.00%	100.00%		
			$0.00	**$3,446.85**	**$0.00**	**$3,446.85**
1 CY Plywood Boxes	100.00 EACH		*$21.0144*	*$0.8188*	*$26.7563*	
33150418		D	70.00%	100.00%		
			$3,002.06	**$81.88**	**$2,675.63**	**$5,759.57**
Operational Labor for Process Equipment	640.00 HOUR		*$36.2697*	*$0.0000*	*$0.0000*	
33150420		D	70.00%	100.00%		
			$33,160.87	**$0.00**	**$0.00**	**$33,160.87**
Bulk Chemical Transport (40,000 Lb Truckload)	15.00 EACH		*$0.0000*	*$0.0000*	*$356.7510*	
33150421		D	70.00%	100.00%		
			$0.00	**$0.00**	**$5,351.27**	**$5,351.27**
10 CY Mixing System	2.00 MONTH		*$0.0000*	*$0.0000*	*$4,965.3788*	
33150423		D	70.00%	100.00%		
			$0.00	**$0.00**	**$9,930.76**	**$9,930.76**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Solidification/Stabilization Ancillary Equipment	1.00 EACH		*$0.0000*	*$0.0000*	*$7,135.0200*	
33150435		D	70.00%	100.00%		
			$0.00	**$0.00**	**$7,135.02**	**$7,135.02**
Mobilization/Demobilization of Solidification/Stabilization Equipment	1.00 LS		*$11,787.6476*	*$0.0000*	*$0.0000*	
33150436		D	70.00%	100.00%		
			$16,839.50	**$0.00**	**$0.00**	**$16,839.50**
DOT Steel Drum, 55 Gallon	10.00 EACH		*$0.0000*	*$0.0000*	*$50.9560*	
33199921		D	70.00%	100.00%		
			$0.00	**$0.00**	**$509.56**	**$509.56**
Diesel Fuel	2,000.00 GAL		*$0.0000*	*$0.0000*	*$1.4032*	
33420201		D	70.00%	100.00%		
			$0.00	**$0.00**	**$2,806.40**	**$2,806.40**
Water	250.00 KGAL		*$0.0000*	*$0.0000*	*$7.8129*	
33420301		D	70.00%	100.00%		
			$0.00	**$0.00**	**$1,953.23**	**$1,953.23**
Solidification/Stabilization Total			**$79,422.45**	**$23,299.10**	**$96,664.38**	**$199,385.92**
Site Total			**$184,921.40**	**$88,251.18**	**$280,956.24**	**$554,128.81**

RA-6

SEAD 16 has an inactive deactivation furnace that was used to destroy small arms munitions. SEAD 17 is adjacent to SEAD 16 and has an active deactivation furnace that is used for the destruction of small arms munitions.

The primary media of concern are soils and sediments. The primary contaminants of concern are metals such as lead and copper.

excavate/soil washing/ clean soil is backfilled and waste is disposed of at an off-site landfill

groundwater monitoring

Access Roads

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Rough Grading, 14G, 1 Pass	7,000.00 SY		*$0.1547*	*$0.2854*	*$0.0000*	
17030103		D	70.00%	100.00%		
			$1,547.00	**$1,997.80**	**$0.00**	**$3,544.80**
Access Roads Total			**$1,547.00**	**$1,997.80**	**$0.00**	**$3,544.80**

Analyses: Soil, Sludge, and Sediment

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Van or Pickup Rental 33010102	4.00 DAY	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$35.6751* **$142.70**	**$142.70**
Mobilize Crew, >= 500 Miles, per Person 33010201	4.00 EACH	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$1,189.1700* **$4,756.68**	**$4,756.68**
Per Diem 33010202	8.00 DAY	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$89.1878* **$713.50**	**$713.50**
Organic Vapor Analyzer Rental, per Day 33020303	4.00 DAY	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$118.9178* **$475.67**	**$475.67**
Disposable Materials per Sample 33020401	61.00 EACH	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$6.7448* **$411.43**	**$411.43**
Decontamination Materials per Sample 33020402	61.00 EACH	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$6.2432* **$380.84**	**$380.84**
TCLP (RCRA) (EPA 1311) 33021702	13.00 EACH	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$1,861.0511* **$24,193.66**	**$24,193.66**
Target Analyte List Metals (EPA 6010/7000S), Soil 33021709	48.00 EACH	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$243.7799* **$11,701.44**	**$11,701.44**
1 Liter, 32 Oz, Clear Wide Mouth Jar, Case of 12 33022020	6.00 EACH	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$44.7961* **$268.78**	**$268.78**
1 Liter, 32 Oz, Boston Round Bottle, Case of 12 33022024	6.00 EACH	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$34.1174* **$204.70**	**$204.70**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
40 ml, Clear Vial, Case of 72	1.00 EACH		*$0.0000*	*$0.0000*	*$104.7659*	
33022026		D	70.00%	100.00%		
			$0.00	**$0.00**	**$104.77**	**$104.77**
Custody Seals, Package of 10	6.00 EACH		*$0.0000*	*$0.0000*	*$1.3438*	
33022034		D	70.00%	100.00%		
			$0.00	**$0.00**	**$8.06**	**$8.06**
Safe Transport Can Filled with Vermiculite, 1 Gallon, Case of 4	5.00 EACH		*$0.0000*	*$0.0000*	*$16.7079*	
33022035		D	70.00%	100.00%		
			$0.00	**$0.00**	**$83.54**	**$83.54**
Documentation Package for QA Verification, Data & Benchwork	61.00 EACH		*$0.0000*	*$0.0000*	*$184.6901*	
33022036		D	70.00%	100.00%		
			$0.00	**$0.00**	**$11,266.10**	**$11,266.10**
Overnight Delivery, 21 - 50 Lb Package	225.00 LB		*$0.0000*	*$0.0000*	*$1.9027*	
33022042		D	70.00%	100.00%		
			$0.00	**$0.00**	**$428.11**	**$428.11**
60 Quart Ice Chest	5.00 EACH		*$0.0000*	*$0.0000*	*$53.0965*	
33022046		D	70.00%	100.00%		
			$0.00	**$0.00**	**$265.48**	**$265.48**
Blue Ice Soft Packs (Equivalent to 7 Lbs Ice)	5.00 EACH		*$0.0000*	*$0.0000*	*$5.9696*	
33022050		D	70.00%	100.00%		
			$0.00	**$0.00**	**$29.85**	**$29.85**
Project Manager	8.00 HOUR		*$34.4859*	*$0.0000*	*$0.0000*	
33220101		D	70.00%	100.00%		
			$394.12	**$0.00**	**$0.00**	**$394.12**
Project Engineer	40.00 HOUR		*$29.7293*	*$0.0000*	*$0.0000*	
33220105		D	70.00%	100.00%		
			$1,698.82	**$0.00**	**$0.00**	**$1,698.82**
Field Technician	64.00 HOUR		*$14.2700*	*$0.0000*	*$0.0000*	
33220117		D	70.00%	100.00%		
			$1,304.69	**$0.00**	**$0.00**	**$1,304.69**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Word Processing/Clerical	4.00 HOUR		*$11.8917*	*$0.0000*	*$0.0000*	
33220119		D	70.00%	100.00%		
			$67.95	**$0.00**	**$0.00**	**$67.95**
Analyses: Soil, Sludge, and Sediment Total			**$3,465.58**	**$0.00**	**$55,435.30**	**$58,900.88**

Cleanup and Landscaping

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
General Area Cleanup	2.00 ACRE		*$100.9011*	*$95.3650*	*$0.0000*	
17040101		D	70.00%	100.00%		
			$288.29	**$190.73**	**$0.00**	**$479.02**
Area Preparation, 67% Level & 33% Slope	2.00 ACRE		*$14.5041*	*$30.5622*	*$0.0000*	
18050101		D	70.00%	100.00%		
			$41.44	**$61.12**	**$0.00**	**$102.56**
Seeding, 67% Level & 33% Slope, Hydroseeding	2.00 ACRE		*$39.9561*	*$65.6422*	*$285.4008*	
18050401		D	70.00%	100.00%		
			$114.16	**$131.28**	**$570.80**	**$816.25**
Watering with 3,000-Gallon Tank Truck, Per Pass	2.00 ACRE		*$13.9861*	*$22.2741*	*$2.3783*	
18050413		D	70.00%	100.00%		
			$39.96	**$44.55**	**$4.76**	**$89.27**
Mowing	2.00 ACRE		*$11.2562*	*$3.7814*	*$0.0000*	
18050415		D	70.00%	100.00%		
			$32.16	**$7.56**	**$0.00**	**$39.72**
Cleanup and Landscaping Total			**$516.01**	**$435.25**	**$575.56**	**$1,526.82**

Clear and Grub

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Light Brush without Grub, Chipping	2.00 ACRE		*$334.0125*	*$351.6323*	*$0.0000*	
17010401		D	70.00%	100.00%		
			$954.32	**$703.26**	**$0.00**	**$1,657.59**
Clear and Grub Total			**$954.32**	**$703.26**	**$0.00**	**$1,657.59**

Contractor Costs / General Conditions

Item	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Van or Pickup Rental 33010102	90.00 DAY	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$35.6751* **$3,210.76**	**$3,210.76**
Mobilize Crew, >= 500 Miles, per Person 33010201	4.00 EACH	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$1,189.1700* **$4,756.68**	**$4,756.68**
Per Diem 33010202	360.00 DAY	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$89.1878* **$32,107.61**	**$32,107.61**
Disposable Boot Covers (Tyvek) 33010421	360.00 PAIR	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$1.3735* **$494.46**	**$494.46**
Disposable Gloves (Latex) 33010423	360.00 PAIR	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$0.2276* **$81.94**	**$81.94**
Disposable Coveralls (Tyvek) 33010425	360.00 EACH	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$3.5675* **$1,284.30**	**$1,284.30**
Temporary Office 20' x 8' 99040101	3.00 MONTH	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$224.5510* **$673.65**	**$673.65**
Temporary Storage Trailer 28' x 10' 99040202	3.00 MONTH	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$122.2111* **$366.63**	**$366.63**
Portable Toilets - Chemical 99040501	3.00 MONTH	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$118.9170* **$356.75**	**$356.75**
Construction Photographs 99041101	1.00 SET	D	*$356.7510* 70.00% **$509.64**	*$0.0000* 100.00% **$0.00**	*$0.0000* **$0.00**	**$509.64**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Surveying - 2-man Crew	5.00 DAY		*$297.2925*	*$195.0239*	*$0.0000*	
99041201		D	70.00%	100.00%		
			$2,123.52	**$975.12**	**$0.00**	**$3,098.64**
Contractor Costs / General Conditions Total			**$2,633.16**	**$975.12**	**$43,332.78**	**$46,941.06**

Decontamination Facilities

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
1,800 PSI Steam Cleaner Rental	3.00 MONTH		*$0.0000*	*$0.0000*	*$1,168.9541*	
33170819		D	70.00%	100.00%		
			$0.00	**$0.00**	**$3,506.86**	**$3,506.86**
8' x 36' Decontamination Trailer with 2 Showers, Fans	3.00 MONTH		*$0.0000*	*$0.0000*	*$535.1265*	
33170822		D	70.00%	100.00%		
			$0.00	**$0.00**	**$1,605.38**	**$1,605.38**
DOT Steel Drum, 55 Gallon	10.00 EACH		*$0.0000*	*$0.0000*	*$50.9560*	
33199921		D	70.00%	100.00%		
			$0.00	**$0.00**	**$509.56**	**$509.56**
Decontamination Facilities Total			**$0.00**	**$0.00**	**$5,621.80**	**$5,621.80**

Excavation, Buried Waste

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
D5 with A-blade Bulldozer	40.00 HOUR		*$20.2397*	*$37.1616*	*$0.0000*	
17030208		D	70.00%	100.00%		
			$1,156.55	**$1,486.46**	**$0.00**	**$2,643.02**
Hand Excavation, Normal Soil	80.00 CY		*$21.4098*	*$0.2561*	*$0.0000*	
17030211		D	70.00%	100.00%		
			$2,446.83	**$20.49**	**$0.00**	**$2,467.32**
950, 3.0 CY, Wheel Loader	80.00 HOUR		*$20.2397*	*$40.7410*	*$0.0000*	
17030223		D	70.00%	100.00%		
			$2,313.11	**$3,259.28**	**$0.00**	**$5,572.39**
Crawler-mounted, 1 CY, 215 Hydraulic Excavator	80.00 HOUR		*$25.2100*	*$42.1680*	*$0.0000*	
17030230		D	70.00%	100.00%		
			$2,881.14	**$3,373.44**	**$0.00**	**$6,254.58**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
12 CY, Dump Truck	160.00 HOUR		*$12.4745*	*$29.4438*	*$0.0000*	
17030285		D	70.00%	100.00%		
			$2,851.31	**$4,711.01**	**$0.00**	**$7,562.32**
Backfill with Excavated Material	1,500.00 CY		*$1.3681*	*$0.8234*	*$0.2378*	
17030415		D	70.00%	100.00%		
			$2,931.64	**$1,235.10**	**$356.70**	**$4,523.44**
Organic Vapor Analyzer Rental, per Month	3.00 MONTH		*$0.0000*	*$0.0000*	*$1,239.1151*	
33020302		D	70.00%	100.00%		
			$0.00	**$0.00**	**$3,717.35**	**$3,717.35**
Plastic Laminate Waste Pile Cover	60,000.00 SF		*$0.0105*	*$0.0001*	*$0.1309*	
33080584		D	70.00%	100.00%		
			$900.00	**$6.00**	**$7,854.00**	**$8,760.00**
Sprayed Water Dust Suppressant	7,000.00 SY		*$0.0029*	*$0.0046*	*$0.0000*	
33080585		D	70.00%	100.00%		
			$29.00	**$32.20**	**$0.00**	**$61.20**
Decontaminate Heavy Equipment	10.00 EACH		*$143.2474*	*$25.5078*	*$0.0000*	
33170803		D	70.00%	100.00%		
			$2,046.39	**$255.08**	**$0.00**	**$2,301.47**
Excavation, Buried Waste Total			**$17,555.99**	**$14,379.06**	**$11,928.05**	**$43,863.09**

Fencing

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
silt fencing	800.00 LF		*$1.0000*	*$0.0000*	*$1.0000*	
18040103		D	70.00%	100.00%		
			$1,142.86	**$0.00**	**$800.00**	**$1,942.86**
Hazardous Waste Signing	1.00 EACH		*$18.7336*	*$0.2328*	*$30.4015*	
18040501		D	70.00%	100.00%		
			$26.76	**$0.23**	**$30.40**	**$57.40**
Fencing Total			**$1,169.62**	**$0.23**	**$830.40**	**$2,000.25**

Groundwater Monitoring Wells

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Mobilization/Demobilization Drilling Rig & Crew	1.00 LS		*$394.5190*	*$837.5562*	*$0.0000*	
33010101		D	70.00%	100.00%		
			$563.60	**$837.56**	**$0.00**	**$1,401.15**
Organic Vapor Analyzer Rental, per Day	2.00 DAY		*$0.0000*	*$0.0000*	*$118.9178*	
33020303		D	70.00%	100.00%		
			$0.00	**$0.00**	**$237.84**	**$237.84**
Decontaminate Rig, Augers, Screen (Rental Equipment)	1.00 DAY		*$0.0000*	*$0.0000*	*$161.7271*	
33170808		D	70.00%	100.00%		
			$0.00	**$0.00**	**$161.73**	**$161.73**
2" Stainless Steel, Well Casing	100.00 LF		*$1.5520*	*$3.2945*	*$18.6438*	
33230121		D	70.00%	100.00%		
			$221.71	**$329.45**	**$1,864.38**	**$2,415.54**
2" Stainless Steel, Well Screen	12.00 LF		*$1.3152*	*$2.7920*	*$48.2611*	
33230221		D	70.00%	100.00%		
			$22.55	**$33.50**	**$579.13**	**$635.18**
2" Stainless Steel, Well Plug	4.00 EACH		*$3.9457*	*$8.3758*	*$30.1633*	
33230311		D	70.00%	100.00%		
			$22.55	**$33.50**	**$120.65**	**$176.70**
2" Submersible Pump Rental, Day	1.00 DAY		*$0.0000*	*$0.0000*	*$59.4585*	
33230506		D	70.00%	100.00%		
			$0.00	**$0.00**	**$59.46**	**$59.46**
Hollow-stem Auger, 8" Outside Diameter Borehole for 2" Well	100.00 LF		*$7.1739*	*$15.2287*	*$0.0000*	
33231101		D	70.00%	100.00%		
			$1,024.84	**$1,522.87**	**$0.00**	**$2,547.71**
Well Development Equipment Rental	1.00 WEEK		*$27.4970*	*$0.4357*	*$452.5599*	
33231111		D	70.00%	100.00%		
			$39.28	**$0.44**	**$452.56**	**$492.28**
Standby for Drilling	1.00 EACH		*$49.3149*	*$104.6945*	*$0.0000*	
33231121		D	70.00%	100.00%		
			$70.45	**$104.69**	**$0.00**	**$175.14**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Move Rig/Equipment Around Site 33231122	4.00 EACH	D	*$12.3287* 70.00% **$70.45**	*$26.1737* 100.00% **$104.69**	*$0.0000* **$0.00**	**$175.14**
Furnish 55 Gallon Drum for Drill Cuttings & Development Water 33231126	8.00 EACH	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$50.9560* **$407.65**	**$0.00**
2" Screen, Filter Pack 33231401	20.00 LF	D	*$1.1180* 70.00% **$31.94**	*$2.3731* 100.00% **$47.46**	*$6.9738* **$139.48**	**$218.88**
Surface Pad, Concrete, 4' x 4' x 4" 33231502	4.00 EACH	D	*$2.8481* 70.00% **$16.27**	*$0.1893* 100.00% **$0.76**	*$12.6844* **$50.74**	**$67.77**
2" Well, Portland Cement Grout 33231811	4.00 LF	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$1.0703* **$4.28**	**$4.28**
2" Well, Bentonite Seal 33232101	4.00 EACH	D	*$4.4388* 70.00% **$25.36**	*$9.4228* 100.00% **$37.69**	*$17.2319* **$68.93**	**$131.98**
5' Guard Posts, Cast Iron, Concrete Fill 33232301	12.00 EACH	D	*$20.1681* 70.00% **$345.74**	*$0.4397* 100.00% **$5.28**	*$29.2574* **$351.09**	**$702.10**
Teflon Bailer, 3/4" Outside Diameter x 3', 180 cc 33232402	4.00 EACH	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$203.6930* **$814.77**	**$814.77**
Suspension Cable, Teflon Coated 33232422	100.00 FT	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$1.0227* **$102.27**	**$102.27**
Hand Reel 33232423	4.00 EACH	D	*$0.0000* 70.00% **$0.00**	*$0.0000* 100.00% **$0.00**	*$20.0970* **$80.39**	**$80.39**
Groundwater Monitoring Wells Total			**$2,454.75**	**$3,057.90**	**$5,495.34**	**$10,600.34**

Landfill Disposal

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Transport Bulk Solid Hazardous Waste, 22 tons per trip (quote from earthwatch)	32.00 trip		*$0.0000*	*$0.0000*	*$1,650.0000*	
33190205		D	70.00%	100.00%		
695 cy of clay/silt at one ton per cy			**$0.00**	**$0.00**	**$52,800.00**	**$52,800.00**
Landfill Hazardous Solid Bulk Waste Requiring Stabilization (quote from Earthwatch)	695.00 tons		*$0.0000*	*$0.0000*	*$75.0000*	
33197265		D	70.00%	100.00%		
			$0.00	**$0.00**	**$52,125.00**	**$52,125.00**
Landfill Disposal Total			**$0.00**	**$0.00**	**$104,925.00**	**$104,925.00**

Professional Labor

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Project Manager	80.00 HOUR		*$34.4859*	*$0.0000*	*$0.0000*	
33220101		D	70.00%	100.00%		
			$3,941.25	**$0.00**	**$0.00**	**$3,941.25**
QA/QC Officer	16.00 HOUR		*$20.2159*	*$0.0000*	*$0.0000*	
33220104		D	70.00%	100.00%		
			$462.08	**$0.00**	**$0.00**	**$462.08**
Project Hydrogeologist	40.00 HOUR		*$29.7293*	*$0.0000*	*$0.0000*	
33220106		D	70.00%	100.00%		
			$1,698.82	**$0.00**	**$0.00**	**$1,698.82**
Health & Safety Officer	16.00 HOUR		*$17.8376*	*$0.0000*	*$0.0000*	
33220113		D	70.00%	100.00%		
			$407.72	**$0.00**	**$0.00**	**$407.72**
Field Technician	480.00 HOUR		*$14.2700*	*$0.0000*	*$0.0000*	
33220117		D	70.00%	100.00%		
			$9,785.14	**$0.00**	**$0.00**	**$9,785.14**
Word Processing/Clerical	20.00 HOUR		*$11.8917*	*$0.0000*	*$0.0000*	
33220119		D	70.00%	100.00%		
			$339.76	**$0.00**	**$0.00**	**$339.76**
Professional Labor Total			**$16,634.76**	**$0.00**	**$0.00**	**$16,634.76**

Soil Washing	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Treat 0 - 9,999 Tons of Soil, Including Residual Water	2,084.00 TON		*$1.3509*	*$0.9144*	*$130.8087*	
33130901		D	70.00%	100.00%		
assume ont ton equals one cy			**$4,021.82**	**$1,905.61**	**$272,605.33**	**$278,532.76**
	Soil Washing Total		**$4,021.82**	**$1,905.61**	**$272,605.33**	**$278,532.76**
Site Total			**$50,953.02**	**$23,454.23**	**$500,749.56**	**$574,749.16**

The three data items in the labor and equipment columns are: unit cost, productivity, and total cost. The two data items in the materials column are: unit cost and total cost.

section 4 figures

PARSONS MAIN, INC.

Figure No. 1
Seneca Army Depot - SEAD 16 & 17 RIFS
Cost Estimate Backup
On-site Monofill details and Quanity takeoffs

PARSONS

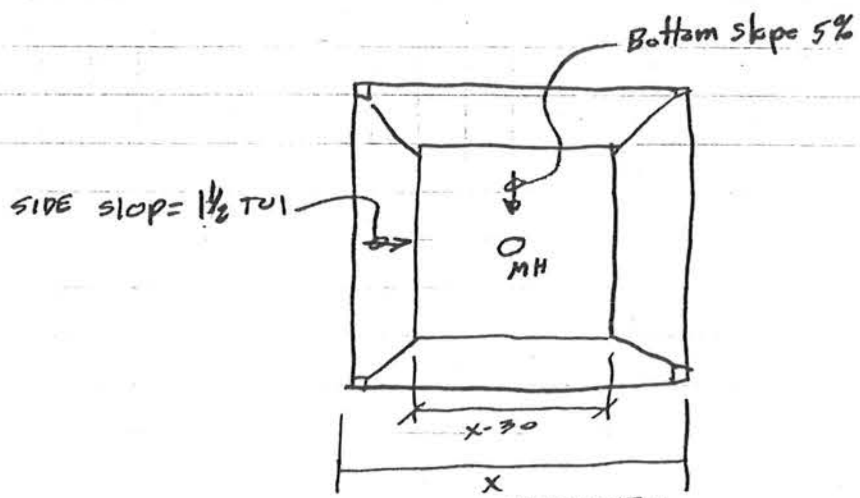
CLIENT: SENECA ARMY DEPOT
SUBJECT: SEAD 16 & 17 RIFS COST ESTIMATE ON-SITE LANDFILL.

JOB NO. ______ SHEET 1 OF 1
BY PDM DATE NOV 5, 1997
CKD. ______ REVISION ______

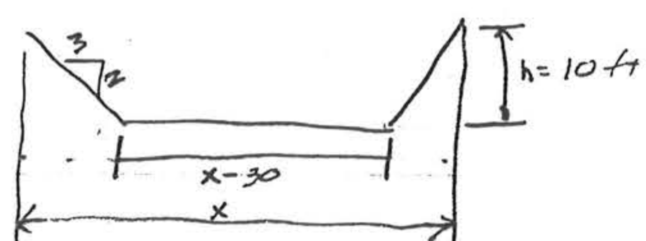
① Volume of soil to be landfilled = 2375 cy

② Assume 1 composite liner per 6 NYCRR 360-2.14 for industrial waste monofill.

③ use depth in monofill = 10 ft.



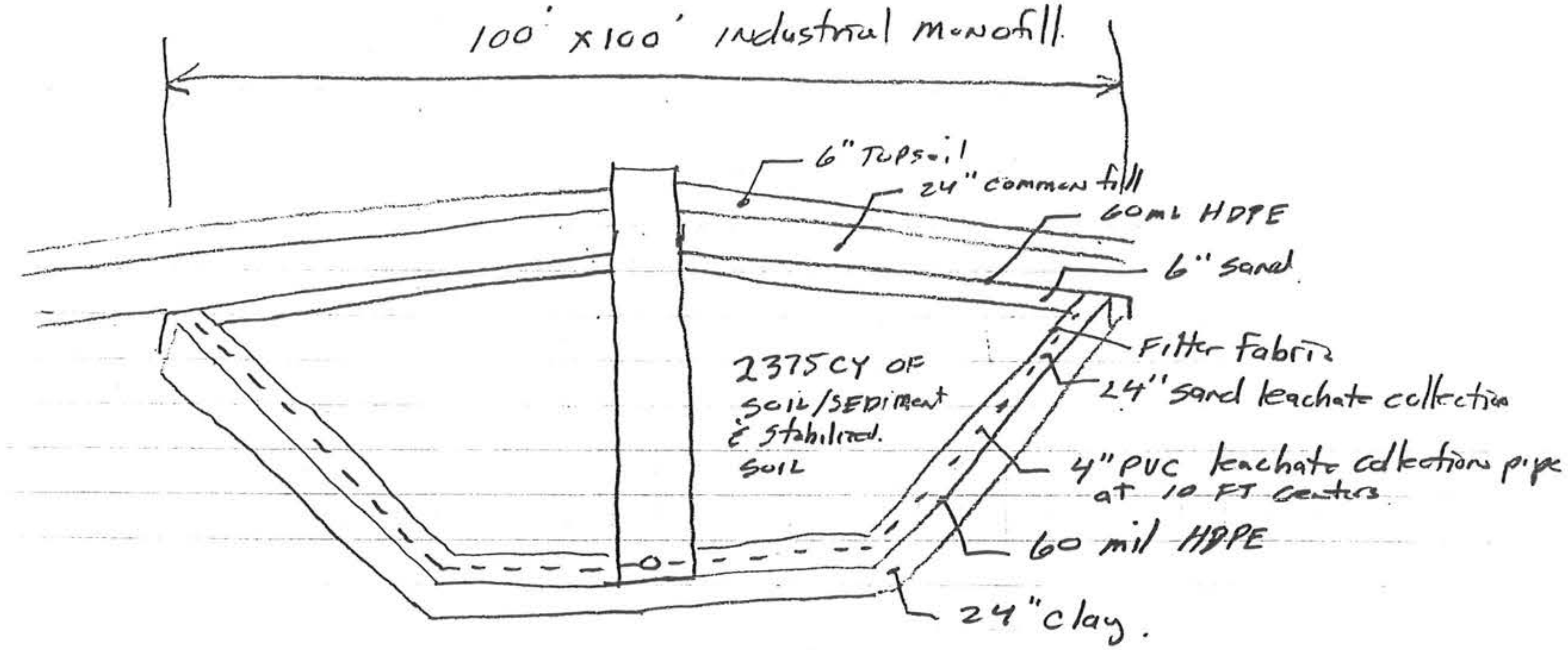
PLAN VIEW



SECTION

$$\text{volume} = \left[\left(\frac{(x)^2 + (x-30)^2}{2}\right) 10\right] \div 27 = 2375 \text{ cy}$$

$x \approx 100$ FT



SF of liner 60 ml HDPE = (105 x 105) = 11 025
(110 x 110) = 12 100
23 125 SF of 60 ml HDPE

CLAY (2 FT x 110 x 110) ÷ 27 = 900 cy.

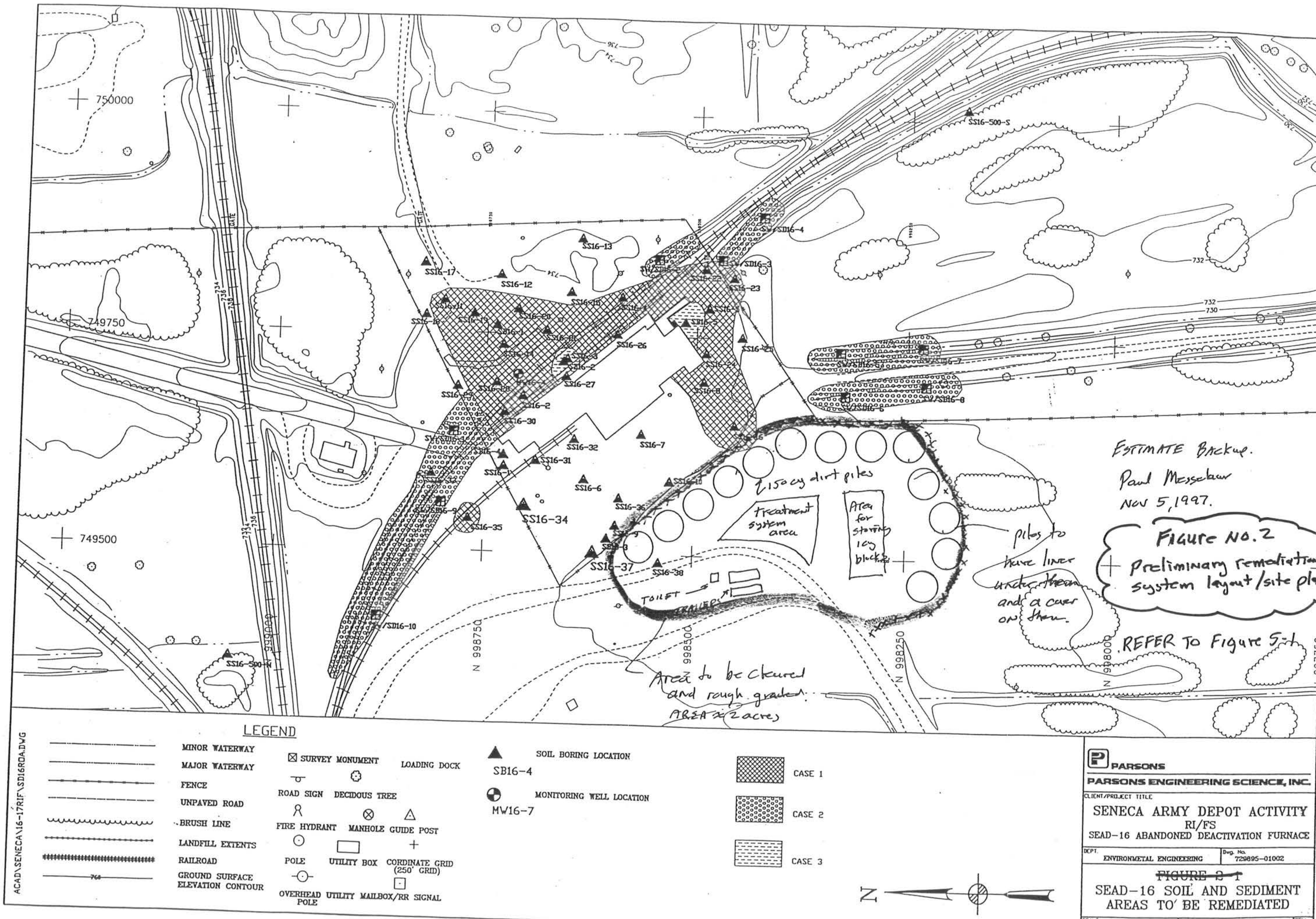
SAND $\frac{(.5 \text{ FT} \times 105 \times 105) + (2 \text{ FT} \times 110 \times 110)}{27} = 1100$ cy

topsoil $\frac{(.5 \times 110 \times 110)}{27} = 225$ cy

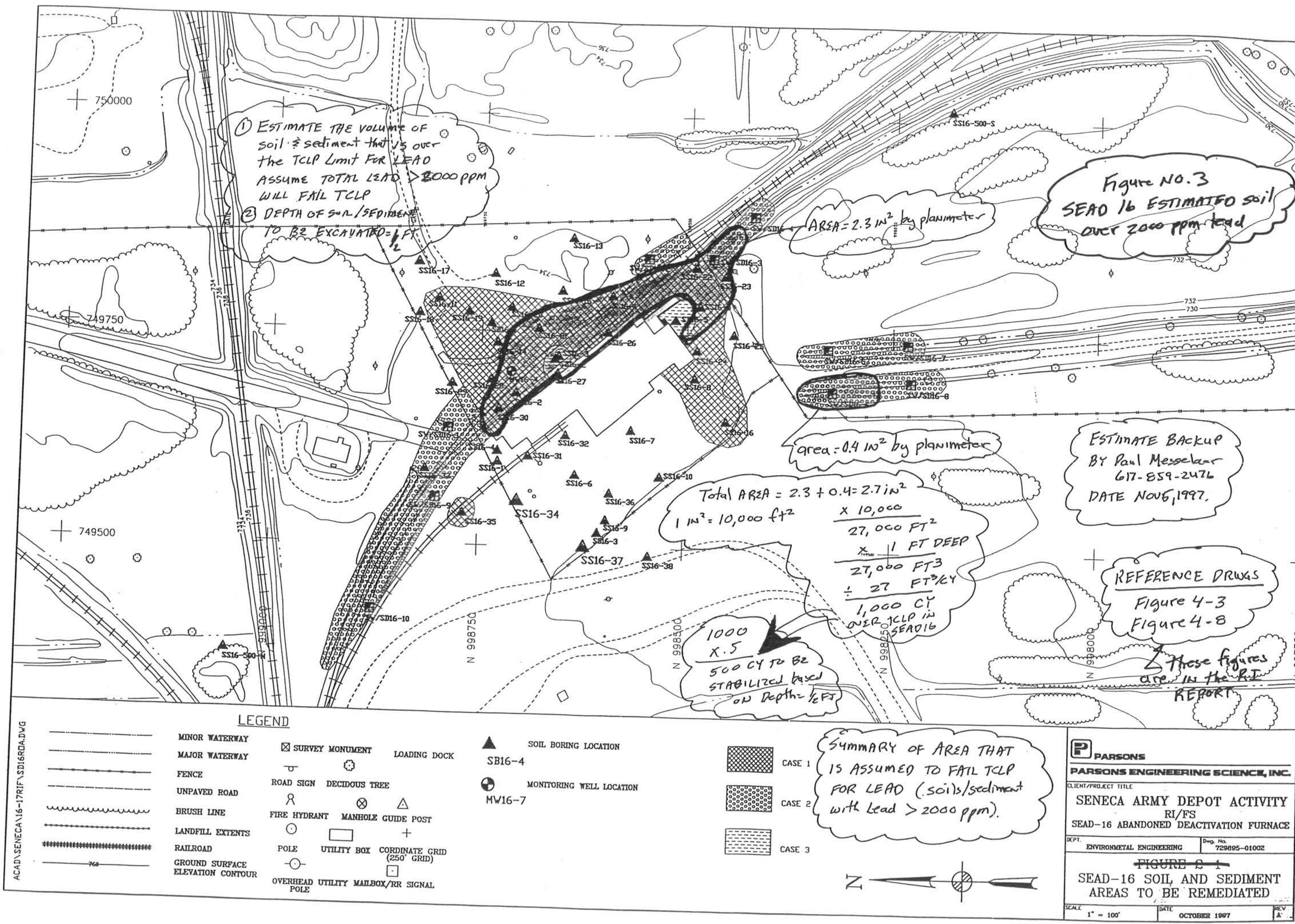
Common fill $\frac{110 \times 110 \times 2}{27} = 900$ cy

pipe = (100 x 10) + 100 = 1100 FT of 4 inch PVC.

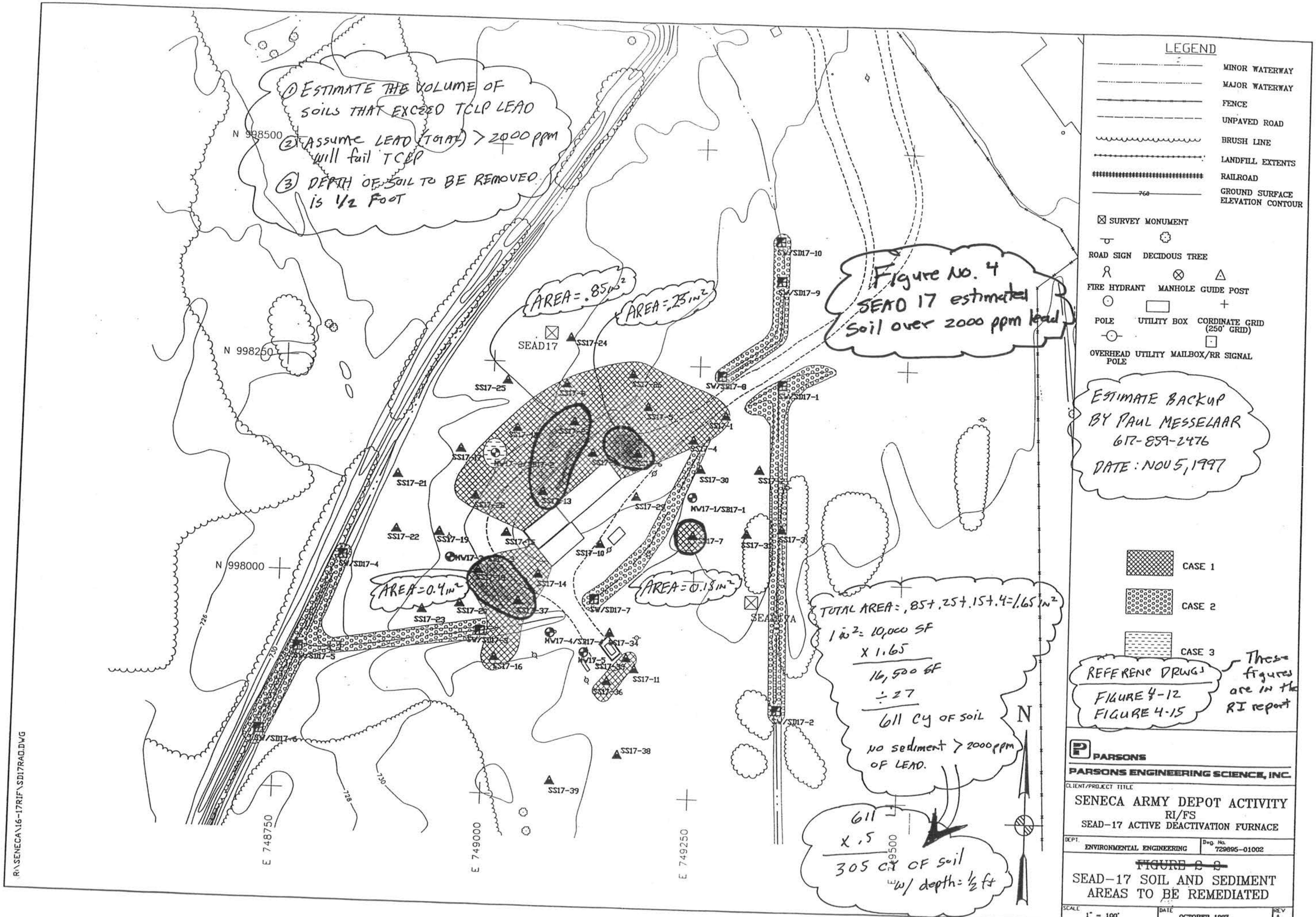
manhole 16 Foot deep.



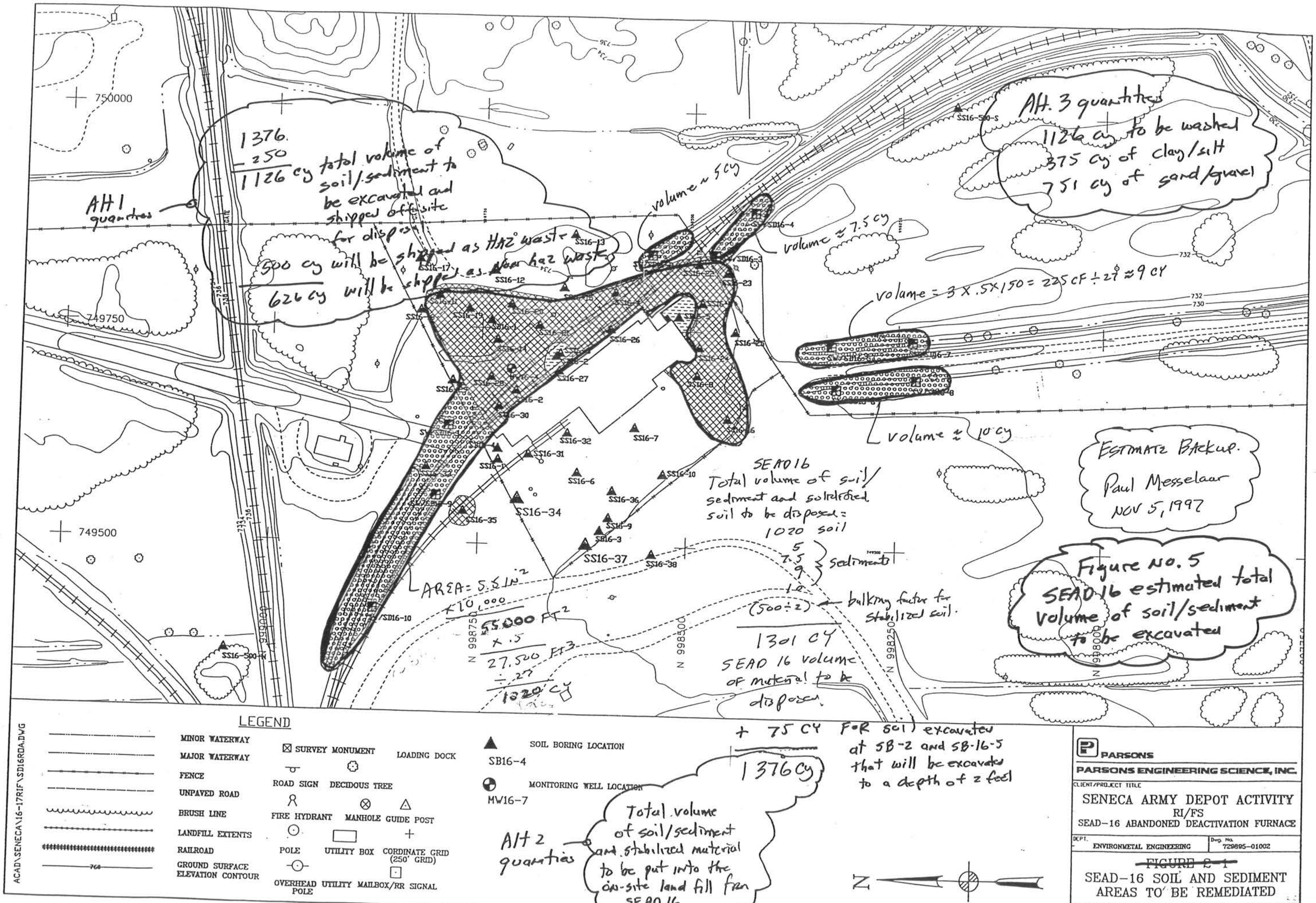
750000
749750
749500
N 999000
N 998750
N 998500
N 998250
N 998000
SS16-500-S
SD16-4
SD16-3
SS16-13
SS16-17
SS16-12
SS16-23
SS16-26
SS16-27
SS16-2
SS16-30
SS16-32
SS16-7
SS16-31
SS16-6
SS16-34
SS16-35
SS16-37
SS16-38
SD16-10
SS16-500-N
SD16-8
732
730
736
734
ESTIMATE BACKUP.
Paul Messekaur
NOV 5, 1997.
FIGURE NO. 2
Preliminary remediation system layout/site plan
REFER TO Figure 5-1
2150 cy dirt piles
treatment system area
Area for storing icy blocks
piles to have liner under them and a cover on them.
TOILET
TRAILER
Area to be cleared and rough graded.
AREA ≈ 2 acres
LEGEND
MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
GROUND SURFACE ELEVATION CONTOUR
SURVEY MONUMENT
LOADING DOCK
ROAD SIGN
DECIDOUS TREE
FIRE HYDRANT
MANHOLE
GUIDE POST
POLE
UTILITY BOX
CORDINATE GRID (250' GRID)
OVERHEAD UTILITY POLE
MAILBOX/RR SIGNAL
SOIL BORING LOCATION
SB16-4
MONITORING WELL LOCATION
MW16-7
CASE 1
CASE 2
CASE 3
N
ACAD\SENECA\16-17RIF\SD16ROA.DWG
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS
SEAD-16 ABANDONED DEACTIVATION FURNACE
DEPT. ENVIRONMETAL ENGINEERING
Dwg. No. 729895-01002
FIGURE 2-1
SEAD-16 SOIL AND SEDIMENT AREAS TO BE REMEDIATED
SCALE
DATE
REV



① ESTIMATE THE VOLUME OF soil & sediment that is over the TCLP Limit FOR LEAD
ASSUME TOTAL LEAD > 2000 ppm WILL FAIL TCLP
② DEPTH OF SOIL/SEDIMENT TO BE EXCAVATED = 1/2 FT
Figure NO. 3
SEAD 16 ESTIMATED soil over 2000 ppm lead
AREA = 2.3 IN² by planimeter
area = 0.4 IN² by planimeter
ESTIMATE BACKUP
BY Paul Messelaar
617-859-2476
DATE NOV 5, 1997.
Total AREA = 2.3 + 0.4 = 2.7 in²
1 IN² = 10,000 ft²
x 10,000
27,000 FT²
x 1 FT DEEP
27,000 FT3
÷ 27 FT³/CY
1,000 CY OVER TCLP IN SEAD16
1000
x .5
500 CY TO BE STABILIZED based ON Depth = 1/2 FT
REFERENCE DRWGS
Figure 4-3
Figure 4-8
These figures are in the R.I. REPORT
Summary OF AREA THAT IS ASSUMED TO FAIL TCLP FOR LEAD (soils/sediment with Lead > 2000 ppm).
750000
749750
749500
N 998750
N 998500
N 998250
N 998000
SS16-500-S
SS16-500-N
SS16-13
SS16-17
SS16-12
SS16-18
SS16-19
SS16-26
SS16-27
SS16-2
SS16-30
SS16-32
SS16-7
SS16-31
SS16-6
SS16-10
SS16-36
SS16-34
SS16-35
SS16-9
SB16-3
SS16-37
SS16-38
SS16-23
SS16-25
SS16-24
SS16-8
SS16-16
SD16-3
SD16-7
SD16-8
SD16-10
732
730
734
736
738
LEGEND
MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
GROUND SURFACE ELEVATION CONTOUR
SURVEY MONUMENT
LOADING DOCK
ROAD SIGN
DECIDOUS TREE
FIRE HYDRANT
MANHOLE
GUIDE POST
POLE
UTILITY BOX
CORDINATE GRID (250' GRID)
OVERHEAD UTILITY POLE
MAILBOX/RR SIGNAL
SOIL BORING LOCATION
SB16-4
MONITORING WELL LOCATION
MW16-7
CASE 1
CASE 2
CASE 3
ACAD\SENECA\16-17RIF\SD16RDA.DWG
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS
SEAD-16 ABANDONED DEACTIVATION FURNACE
DEPT. ENVIRONMETAL ENGINEERING
Dwg. No. 729895-01002
FIGURE 2-1
SEAD-16 SOIL AND SEDIMENT AREAS TO BE REMEDIATED
SCALE 1" = 100'
DATE OCTOBER 1997



① ESTIMATE THE VOLUME OF SOILS THAT EXCEED TCLP LEAD
② ASSUME LEAD (TOTAL) > 2000 ppm will fail TCLP
③ DEPTH OF SOIL TO BE REMOVED is 1/2 FOOT
Figure No. 4
SEAD 17 estimated Soil over 2000 ppm lead
ESTIMATE BACKUP BY PAUL MESSELAAR
617-859-2476
DATE: NOV 5, 1997
AREA = .85 in²
AREA = .25 in²
AREA = 0.4 in²
AREA = 0.15 in²
TOTAL AREA = .85 + .25 + .15 + .4 = 1.65 in²
1 in² = 10,000 SF
x 1.65
16,500 SF
÷ 27
611 CY OF SOIL
no sediment > 2000 ppm OF LEAD.
611
x .5
305 CY OF soil w/ depth = 1/2 ft
REFERENCE DRWGS
FIGURE 4-12
FIGURE 4-15
These figures are in the RI report
LEGEND
MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
GROUND SURFACE ELEVATION CONTOUR
SURVEY MONUMENT
ROAD SIGN
DECIDOUS TREE
FIRE HYDRANT
MANHOLE
GUIDE POST
POLE
UTILITY BOX
CORDINATE GRID (250' GRID)
OVERHEAD UTILITY POLE
MAILBOX/RR SIGNAL
CASE 1
CASE 2
CASE 3
SEAD17
SEAD-17A
N 998500
N 998250
N 998000
E 748750
E 749000
E 749250
E 749500
SS17-24
SS17-25
SS17-21
SS17-22
SS17-19
SS17-23
SS17-13
SS17-14
SS17-10
SS17-29
SS17-30
SS17-4
SS17-7
SS17-16
SS17-11
SS17-36
SS17-34
SS17-37
SS17-38
SS17-39
SW/SD17-10
SW/SD17-9
SW/SD17-8
SW/SD17-7
SW/SD17-4
SW/SD17-5
SW/SD17-6
SW/SD17-2
MW17-1/SB17-1
MW17-4/SB17-4
MW17-5
N
R:\SENECA\16-17RIF\SD17RAO.DWG
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS
SEAD-17 ACTIVE DEACTIVATION FURNACE
DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 729895-01002
~~FIGURE 2-8~~
SEAD-17 SOIL AND SEDIMENT AREAS TO BE REMEDIATED
SCALE 1" = 100'
DATE OCTOBER 1997
REV A



1376.
- 250
1126 cy total volume of soil/sediment to be excavated and shipped offsite for disposal
500 cy will be shipped as HAZ waste
626 cy will be shipped as non haz waste
AH 1 quantities
volume ≈ 5 cy
volume ≈ 7.5 cy
Alt. 3 quantities
1126 cy to be washed
375 cy of clay/silt
751 cy of sand/gravel
volume = 3 X .5X150 = 225 CF ÷ 27 ≈ 9 CY
volume ≈ 10 cy
ESTIMATE BACKUP.
Paul Messelaar
NOV 5, 1997
SEAD 16
Total volume of soil/sediment and solidified soil to be disposed =
1020 soil
5
7.5
9
10
} sediment
(500 ÷ 2) bulking factor for stabilized soil.
1301 CY
SEAD 16 volume of material to be disposed.
+ 75 CY FOR soil excavated at SB-2 and SB-16-5 that will be excavated to a depth of 2 feet
1376 Cy
AREA = 5.5 IN²
X 10,000
55,000 FT²
X .5
27,500 FT³
÷ 27
1020 CY
Figure NO. 5
SEAD 16 estimated total volume of soil/sediment to be excavated
Alt 2 quantities
Total volume of soil/sediment and stabilized material to be put into the on-site landfill from SEAD 16
750000
749750
749500
N 998750
N 998500
N 998250
N 998000
SS16-13
SS16-17
SS16-12
SD16-4
SD16-3
SS16-23
SS16-26
SS16-27
SS16-30
SS16-32
SS16-7
SS16-31
SS16-6
SS16-10
SS16-36
SS16-34
SS16-35
SS16-9
SB16-3
SS16-37
SS16-38
SD16-10
SS16-500-N
SS16-500-S
LEGEND
MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
GROUND SURFACE ELEVATION CONTOUR
SURVEY MONUMENT
LOADING DOCK
ROAD SIGN
DECIDOUS TREE
FIRE HYDRANT
MANHOLE
GUIDE POST
POLE
UTILITY BOX
CORDINATE GRID (250' GRID)
OVERHEAD UTILITY POLE
MAILBOX/RR SIGNAL
SOIL BORING LOCATION
SB16-4
MONITORING WELL LOCATION
MW16-7
ACAD:SENECA\16-17RIF\SD16RDA.DWG
PARSONS
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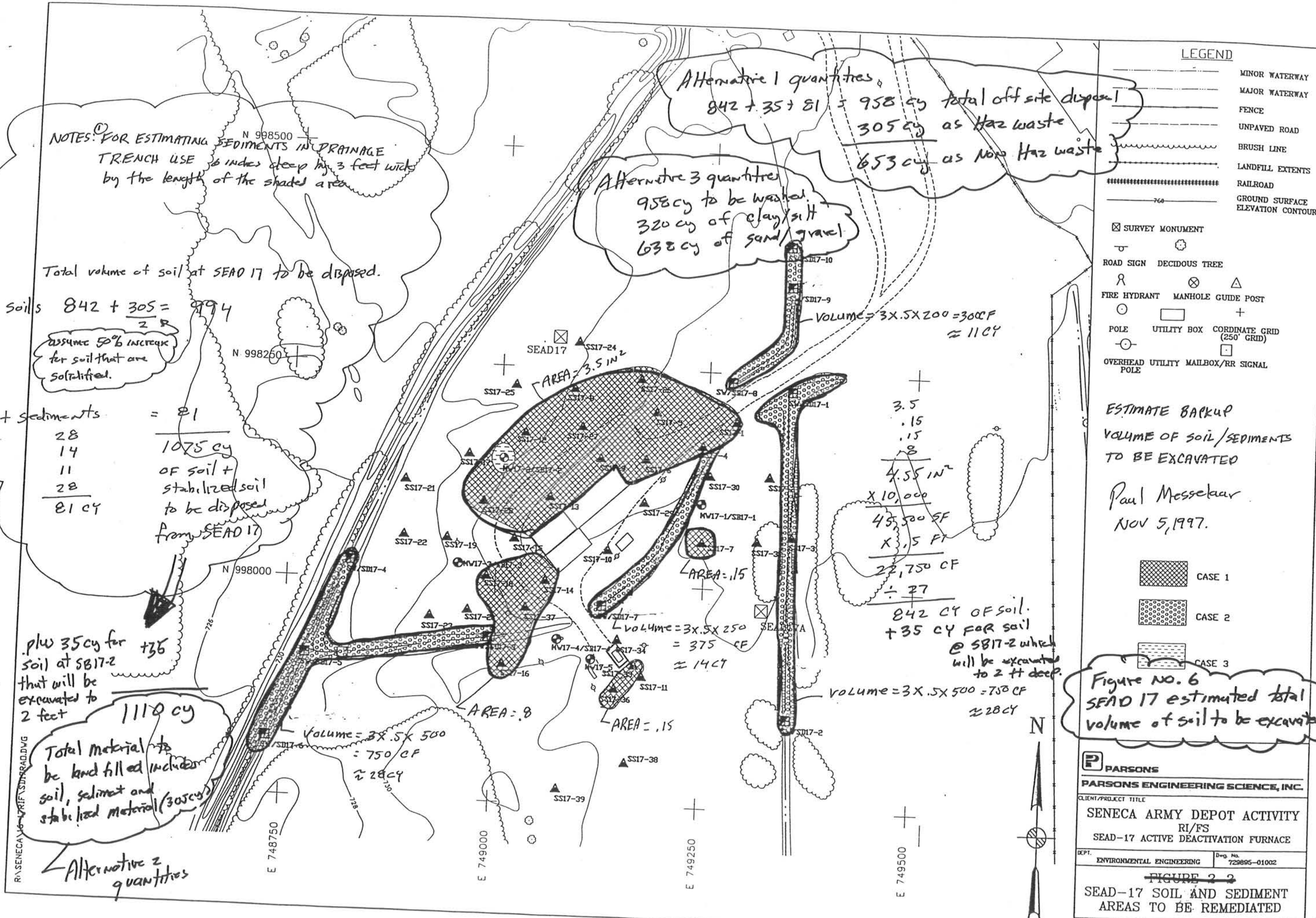
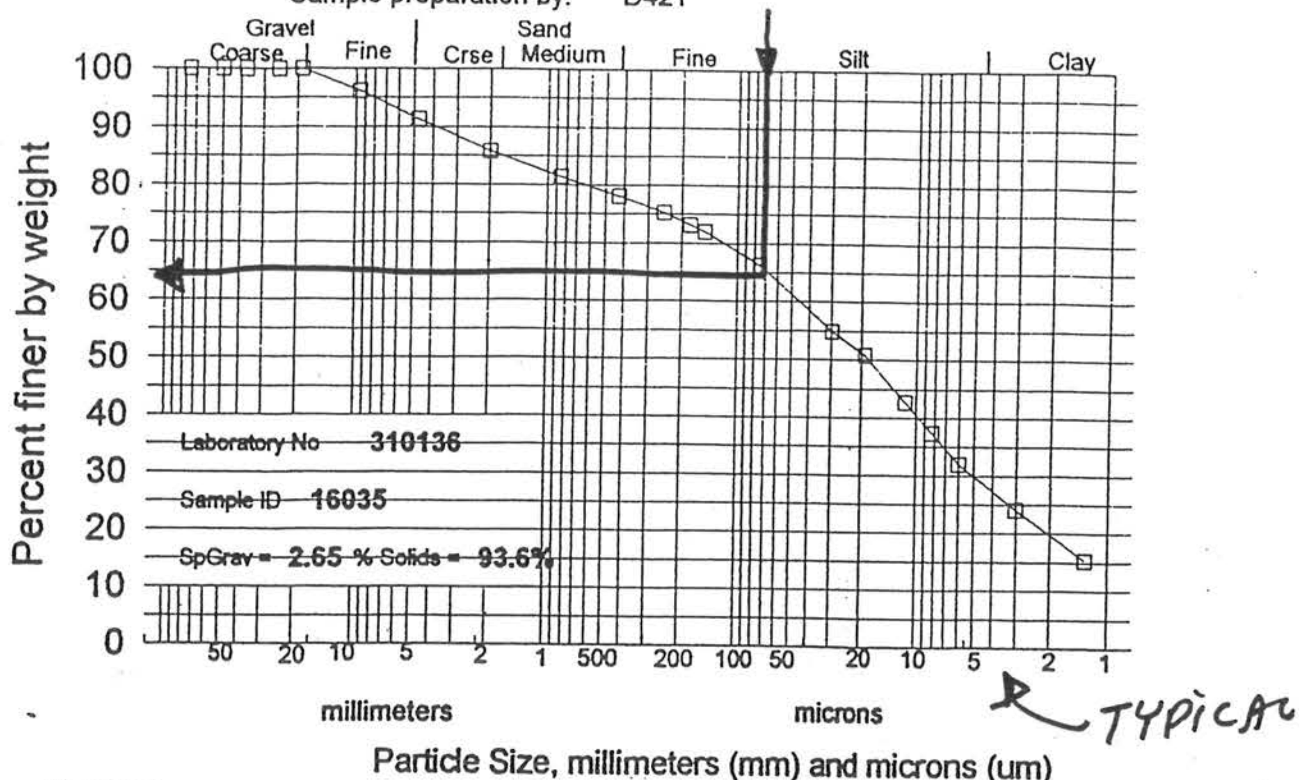
SENECA ARMY DEPOT ACTIVITY
RI/FS
SEAD-16 ABANDONED DEACTIVATION FURNACE
DEPT. ENVIRONMETAL ENGINEERING
Dwg. No. 729895-01002
FIGURE 2-1
SEAD-16 SOIL AND SEDIMENT AREAS TO BE REMEDIATED
SCALE
DATE
REV


NOTES: (1) FOR ESTIMATING SEDIMENTS IN DRAINAGE TRENCH USE 6 inches deep by 3 feet wide by the length of the shaded area
Total volume of soil at SEAD 17 to be disposed.
Soils 842 + 305/2 = 994
assume 50% increase for soil that are solidified.
+ Sediments = 81
28
14
11
28
81 CY
1075 cy of soil + stabilized soil to be disposed from SEAD 17
plus 35 cy for soil at SB17-2 that will be excavated to 2 feet
+35
1110 cy
Total material to be land filled includes soil, sediment and stabilized material (305cy)
Alternative 2 quantities
Alternative 1 quantities
842 + 35 + 81 = 958 cy total off site disposal
305 cy as Haz waste
653 cy as Non Haz waste
Alternative 3 quantities
958 cy to be washed
320 cy of clay/silt
638 cy of sand/gravel
VOLUME = 3X.5X200 = 300 CF ≈ 11 CY
AREA = 3.5 IN²
AREA = .15
AREA = .8
AREA = .15
volume = 3x.5x250 = 375 CF ≈ 14 CY
volume = 3X.5X500 = 750 CF ≈ 28 CY
Volume = 3X.5X500 = 750 CF ≈ 28 CY
3.5
.15
.15
.8
4.55 IN²
x 10,000
45,500 SF
x .5 FT
22,750 CF
÷ 27
842 CY OF SOIL.
+35 CY FOR SOIL @ SB17-2 which will be excavated to 2 ft deep.
ESTIMATE BACKUP VOLUME OF SOIL/SEDIMENTS TO BE EXCAVATED
Paul Messelaar
NOV 5, 1997.
Figure No. 6
SEAD 17 estimated total volume of soil to be excavated
N 998500
N 998250
N 998000
E 748750
E 749000
E 749250
E 749500
SEAD17
SEAD17A
LEGEND
MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
GROUND SURFACE ELEVATION CONTOUR
SURVEY MONUMENT
ROAD SIGN
DECIDOUS TREE
FIRE HYDRANT
MANHOLE
GUIDE POST
POLE
UTILITY BOX
CORDINATE GRID (250' GRID)
OVERHEAD UTILITY POLE
MAILBOX/RR SIGNAL
CASE 1
CASE 2
CASE 3
N
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS
SEAD-17 ACTIVE DEACTIVATION FURNACE
DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 729895-01002
FIGURE 2-2
SEAD-17 SOIL AND SEDIMENT AREAS TO BE REMEDIATED
R:\SENECA\S-17RIFS\SDTRAD.DWG

Inchcape ASTM D422 Particle Size Analysis Sample ID 16035

Sample preparation by: D421



Maximum particle size: 19 mm

Shape and hardness (>#10):

Sieve size	Particle Size	Percent finer	Incremental percent	Specific Gravity assumed
3 inch	75.00 mm	100.0	0.0	
2 inch	50.00	100.0	0.0	
1.5 inch	37.50	100.0	0.0	
1 inch	25.00	100.0	0.0	
3/4 inch	19.00	100.0	0.0	
3/8 inch	9.50	96.2	3.8	
#4	4.75	91.3	4.9	
#10	2.00	85.8	5.5	
#20	850.0 um	81.4	4.4	
#40	425.0	78.0	3.4	
#60	250.0	75.2	2.8	
#80	180.0	73.1	2.1	
#100	150.0	72.0	1.1	
#200	75.0	66.2	5.8	
Hydrometer	29.8	54.9	11.3	Dispersion of soil
|	19.2	50.8	4.1	for hydrometer test
|	11.5	42.7	8.1	by mechanical mixer
|	8.3	37.4	5.4	with metal paddle
|	6.0	32.0	5.3	operated for at least
|	3.0	24.1	8.0	one minute within a
V	1.3	15.3	8.8	dispersion cup

Printed by [signature] 08:38 on 28-Aug-96

Set 210
Lab No. 310136

SOIL

Soil sample ID	% silt/clay
16034	24
16035	63
16036	24
16047	15
16068	37
16069	63
16080	23

7 | 249

AVG = 36% silt/clay BY WT FOR SOIL

SEDIMENT

SEDIMENT ID	% silt/clay
16124A	55
16123A	55
16122A	65
16120A	65
16119A	33
16121A	48
16125A	28
16126A	95
16127A	28
16128A	18
16129A	80
16130A	80
16131A	61
16132A	60
16133A	4
16134A	67
16135A	98
16136A	87
16137A	73
16142A	67
16143A	45

21 | 1204

Avg = 57% silt/clay BY WT FOR SEDIMENT.

The majority of soil/sediment to be excavated on this project is soils therefore use a 1/3 volume reduction based on separating silt/clay from gravel/sand.

FIGURE 7
SENECA ARMY DEPOT - SEAD 16 & 17 RIFS
COST ESTIMATE BACKUP
Soil Washing - estimated volume reduction calculation
BY: Paul Messelaar
Date: Nov. 5, 1997.

section 5 Quotations

Earthwatch
WASTE SYSTEMS, INC.

November 12, 1997

Ms. Hillary Eiklor
Parsons Engineering, Inc.
101 Huntington Avenue
Boston, Massachusetts 02199

Dear Hillary:

On behalf of Earthwatch Waste Systems, Inc., I would like to thank you for giving me the opportunity to provide you with the following quotation for the transportation and disposal of the hazardous soil located in Romulus, NY.

Hazardous Soil (D-Series)

Disposal:	**$75.00/ton**
Transportation:	**$75.00/ton**

- Disposal pricing is contingent upon facility approval.
- There is a twenty-two (22) ton minimum on transportation.
- Payment terms to be granted upon completion of a credit application.

Earthwatch Waste Systems, Inc., welcomes the opportunity to service all of your waste disposal needs. If you have any questions regarding this proposal, pleases do not hesitate to contact me. Prices are valid for thirty (30) days and are subject to verification thereafter.

Sincerely,

Christopher J. McCune
Account Executive

"With An Eye On Your Future"

CORPORATE AND SALES OFFICE:
3527 Harlem Road • Buffalo, NY 14225
Phone (716) 833-3286 • Fax (716) 833-5670

Earthwatch
WASTE SYSTEMS, INC.

November 12, 1997

Ms. Hillary Eiklor
Parsons Engineering, Inc.
101 Huntington Avenue
Boston, Massachusetts 02199

Dear Hillary:

On behalf of Earthwatch Waste Systems, Inc., I would like to thank you for giving me the opportunity to provide you with the following quotation for the transportation and disposal of the non-hazardous contaminated soil located in Romulus, NY.

Ontario County Landfill, Stanley, NY.

Disposal:	**$15.00/ton**
Transportation:	**$14.00/ton**

Approval Requirements: **Full TCLP including Pesticides and Herbicides.**

- There is a twenty-two (22) ton minimum on transportation.
- Payment terms to be granted upon completion of a credit application.

Earthwatch Waste Systems, Inc., welcomes the opportunity to service all of your waste disposal needs. If you have any questions regarding this proposal, pleases do not hesitate to contact me. Prices are valid for thirty (30) days and are subject to verification thereafter.

Sincerely,

Christopher J. McCune
Account Executive

"With An Eye On Your Future"

CORPORATE AND SALES OFFICE:
3527 Harlem Road • Buffalo, NY 14225
Phone (716) 833-3286 • Fax (716) 833-5670

PARSONS ENGINEERING SCIENCE, INC.
TELEPHONE MEMORANDUM

TO:	Rocky LaRocca	**INITIATED BY:**	Hilary Eichler
COMPANY:	Seneca Meadows Landfill	**TELEPHONE NO:**	315-539-5624
DATE:	November 10, 1997	**TIME:**	10:00 am
CLIENT:	U.S. Army Engineer Division	**PROJECT:**	SEAD-16 and 17 FS
SUBJECT:	Cost Estimate for Subtitle D Landfill	**FILE:**	729895.01002

Discussed pricing and acceptance requirements for disposal of materials from SEAD-16 and 17. He has sent a package of information to Don Yonika in the last month (refer to attached selected copies from this package), which shows that the landfill has adequate capacity and complies with Subtitle D requirements. Rocky confirmed pricing as follows, assuming the contaminated soil meets requirements:

Transportation and Landfilling $40/ton

Section 6 Comparative cost estimate

Alternative 1: Excavate/ Stabilize/ Off-site Disposal

SENECA ARMY DEPOT SEAD 16 & 17 RIFS
COST ESTIMATE SUMMARY
ALTERNATIVE NO 1 EXCAVATE/STABILIZE/OFF-SITE DISPOSAL

WBS number	description	cost
32xxx	**design and treatability study** (estimated at 15% of construction cost)	$65,773
331xx01	**mobilization and preparatory work** (includes decontamination facilities and fencing)	$7,621
331xx02	**monitoring, sampling,testing,and analysis** (includes soil sampling analysis)	$64,312
331xx03	**site work** (includes access roads, cleanup and landscaping, clear and grub)	$6,598
331xx06	**groundwater collection and control** (includes groundwater monitoring wells)	$11,372
331xx08	**solids collection and containment** (Excavation, buried waste)	$49,644
331XX15	**stabilize/fixation/encapsulation** (includes solidification/stabilization)	$176,648
331xx19	**disposal commercial** (Includes landfill disposal)	$70,429
331xx22	**general requirements** (includes contractor costs/ General Conditions)	$28,520
332xx	**engineering during construction** (includes professional Labor)	$13,345
333xx	**construction management**	$10,000
	SUBTOTAL ESTIMATED CONSTRUCTION COST	$504,262
	location multiplier 0.85	$428,622
	escalation 10%	42,862
	overhead and profit 13%	$55,720
	contingencies 20%	$85,724
	TOTAL ESTIMATED CONSTRUCTION COST	$612,924
342XXX	**operation and maintenance (post construction)** (includes o&m costs)	$10,422 per sampling event
	Present worth based on 30 years and i = 5%	$773,110

parsons engineering science
Prudential Center
Boston, Massachusetts, 02199
617 262 3200

o&m cost		
	Professional Labor	$1,963.83
	Sampling and Analysis	$10,422.04
	Site Total	**$12,385.87**
RA-4		
	Access Roads	$3,544.80
	Analyses: Soil, Sludge, and Sediment	$54,312.57
	Cleanup and Landscaping	$1,397.83
	Clear and Grub	$1,657.59
	Contractor Costs / General Conditions	$46,941.06
	Decontamination Facilities	$5,621.80
	Excavation, Buried Waste	$49,644.12
	Fencing	$2,000.25
	Groundwater Monitoring Wells	$11,372.16
	Landfill Disposal	$70,429.00
	Professional Labor	$17,457.00
	Solidification/Stabilization	$176,646.00

parsons engineering science
Prudential Center
Boston, Massachusetts, 02199
617 262 3200

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
o&m cost						
Professional Labor						
Project Manager	4.00 HOUR	D	$197.06	$0.00	$0.00	$197.06
Project Engineer	40.00 HOUR	D	$1,698.82	$0.00	$0.00	$1,698.82
Word Processing/Clerical	4.00 HOUR	D	$67.95	$0.00	$0.00	$67.95
	Professional Labor Total		$1,963.83	$0.00	$0.00	$1,963.83
Sampling and Analysis						
Van or Pickup Rental	2.00 DAY	D	$0.00	$0.00	$71.35	$71.35
Mobilize Crew, >= 500 Miles, per Person	2.00 EACH	D	$0.00	$0.00	$2,378.34	$2,378.34
Per Diem	4.00 DAY	D	$0.00	$0.00	$356.75	$356.75
Prefiltering Liquids	4.00 EACH	D	$0.00	$0.00	$59.46	$59.46
Acid Digestion	4.00 EACH	D	$0.00	$0.00	$95.13	$95.13
Repackage and Ship Sample	4.00 EACH	D	$0.00	$0.00	$142.70	$142.70
Organic Vapor Analyzer Rental, per Day	2.00 DAY	D	$0.00	$0.00	$237.84	$237.84
Disposable Materials per Sample	4.00 EACH	D	$0.00	$0.00	$26.98	$26.98
Decontamination Materials per Sample	4.00 EACH	D	$0.00	$0.00	$24.97	$24.97
Rinsate Analysis	1.00 EACH	D	$0.00	$0.00	$190.27	$190.27
Pesticides/PCBs (EPA 608)	4.00 EACH	D	$0.00	$0.00	$713.50	$713.50
Volatile Organic Analysis (EPA 624)	4.00 EACH	D	$0.00	$0.00	$1,070.25	$1,070.25
Base Neutral & Acid Extractable Organics (EPA 625)	4.00 EACH	D	$0.00	$0.00	$1,664.84	$1,664.84
Target Analyte List Metals (EPA 6010/7000S), Soil	4.00 EACH	D	$0.00	$0.00	$975.12	$975.12
1 Liter, 32 Oz, Clear Wide Mouth Jar, Case of 12	1.00 EACH	D	$0.00	$0.00	$44.80	$44.80
40 ml, Clear Vial, Case of 72	1.00 EACH	D	$0.00	$0.00	$104.77	$104.77
1 Liter, 32 oz, High-density Polyethylene Bottle, Case of 12	1.00 EACH	D	$0.00	$0.00	$34.78	$34.78
Custody Seals, Package of 10	1.00 EACH	D	$0.00	$0.00	$1.34	$1.34

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Safe Transport Can Filled with Vermiculite, 1 Gallon, Case of 4	1.00 EACH	D	$0.00	$0.00	$16.71	$16.71
Documentation Package for QA Verification, Data & Benchwork	4.00 EACH	D	$0.00	$0.00	$738.76	$738.76
Overnight Delivery, 21 - 50 Lb Package	25.00 LB	D	$0.00	$0.00	$47.57	$47.57
60 Quart Ice Chest	1.00 EACH	D	$0.00	$0.00	$53.10	$53.10
Blue Ice Soft Packs (Equivalent to 7 Lbs Ice)	1.00 EACH	D	$0.00	$0.00	$5.97	$5.97
Field Technician	32.00 HOUR	D	$652.34	$0.00	$0.00	$652.34
Teflon Bailer, 3/4" Outside Diameter x 1', 60 cc	4.00 EACH	D	$0.00	$0.00	$612.14	$612.14
Suspension Cable, Teflon Coated	100.00 FT	D	$0.00	$0.00	$102.27	$102.27
	Sampling and Analysis Total		$652.34	$0.00	$9,769.70	$10,422.04

Total o&m cost

			Labor	Equipment	Materials	Total
Total o&m cost			$2,616.17	$0.00	$9,769.70	$12,385.87

RA-4

Access Roads

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Rough Grading, 14G, 1 Pass	7,000.00 SY	D	$1,547.00	$1,997.80	$0.00	$3,544.80
	Access Roads Total		$1,547.00	$1,997.80	$0.00	$3,544.80

Analyses: Soil, Sludge, and Sediment

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Van or Pickup Rental	3.00 DAY	D	$0.00	$0.00	$107.03	$107.03
Mobilize Crew, >= 500 Miles, per Person	2.00 EACH	D	$0.00	$0.00	$2,378.34	$2,378.34
Per Diem	6.00 DAY	C	$0.00	$0.00	$535.13	$535.13
Repackage and Ship Sample	5.00 EACH	D	$0.00	$0.00	$178.38	$178.38
Organic Vapor Analyzer Rental, per Day	3.00 DAY	D	$0.00	$0.00	$356.75	$356.75
Disposable Materials per Sample	50.00 EACH	D	$0.00	$0.00	$337.24	$337.24
Decontamination Materials per Sample	50.00 EACH	D	$0.00	$0.00	$312.16	$312.16
TCLP (RCRA) (EPA 1311)	15.00 EACH	D	$0.00	$0.00	$27,915.77	$27,915.77
Target Analyte List Metals (EPA 6010/7000S), Soil	35.00 EACH	D	$0.00	$0.00	$8,532.30	$8,532.30
1 Liter, 32 Oz, Clear Wide Mouth Jar, Case of 12	5.00 EACH	D	$0.00	$0.00	$223.98	$223.98
1 Liter, 32 Oz, Boston Round Bottle, Case of 12	5.00 EACH	D	$0.00	$0.00	$170.59	$170.59
40 ml, Clear Vial, Case of 72	2.00 EACH	D	$0.00	$0.00	$209.53	$209.53
Custody Seals, Package of 10	5.00 EACH	D	$0.00	$0.00	$6.72	$6.72
Safe Transport Can Filled with Vermiculite, 1 Gallon, Case of 4	4.00 EACH	D	$0.00	$0.00	$66.83	$66.83

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Documentation Package for QA Verification, Data & Benchwork	50.00 EACH	D	$0.00	$0.00	$9,234.51	$9,234.51
Overnight Delivery, 21 - 50 Lb Package	200.00 LB	D	$0.00	$0.00	$380.54	$380.54
60 Quart Ice Chest	5.00 EACH	D	$0.00	$0.00	$265.48	$265.48
Blue Ice Soft Packs (Equivalent to 7 Lbs Ice)	5.00 EACH	D	$0.00	$0.00	$29.85	$29.85
Project Manager	8.00 HOUR	D	$394.12	$0.00	$0.00	$394.12
Project Engineer	40.00 HOUR	D	$1,698.82	$0.00	$0.00	$1,698.82
Field Technician	48.00 HOUR	D	$978.51	$0.00	$0.00	$978.51
Analyses: Soil, Sludge, and Sediment Total			$3,071.46	$0.00	$51,241.11	$54,312.57

Cleanup and Landscaping

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
General Area Cleanup	2.00 ACRE	D	$288.29	$190.73	$0.00	$479.02
Area Preparation, 67% Level & 33% Slope	2.00 ACRE	D	$41.44	$61.12	$0.00	$102.56
Seeding, 67% Level & 33% Slope, Hydroseeding	2.00 ACRE	D	$114.16	$131.28	$570.80	$816.25
Cleanup and Landscaping Total			$443.89	$383.14	$570.80	$1,397.83

Clear and Grub

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Light Brush without Grub, Chipping	2.00 ACRE	D	$954.32	$703.26	$0.00	$1,657.59
Clear and Grub Total			$954.32	$703.26	$0.00	$1,657.59

Contractor Costs / General Conditions

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Van or Pickup Rental	90.00 DAY	D	$0.00	$0.00	$3,210.76	$3,210.76
Mobilize Crew, >= 500 Miles, per Person	4.00 EACH	D	$0.00	$0.00	$4,756.68	$4,756.68
Per Diem	360.00 DAY	D	$0.00	$0.00	$32,107.61	$32,107.61
Disposable Boot Covers (Tyvek)	360.00 PAIR	D	$0.00	$0.00	$494.46	$494.46
Disposable Gloves (Latex)	360.00 PAIR	D	$0.00	$0.00	$81.94	$81.94
Disposable Coveralls (Tyvek)	360.00 EACH	D	$0.00	$0.00	$1,284.30	$1,284.30
Temporary Office 20' x 8'	3.00 MONTH	D	$0.00	$0.00	$673.65	$673.65
Temporary Storage Trailer 28' x 10'	3.00 MONTH	D	$0.00	$0.00	$366.63	$366.63
Portable Toilets - Chemical	3.00 MONTH	D	$0.00	$0.00	$356.75	$356.75
Construction Photographs	1.00 SET	D	$509.64	$0.00	$0.00	$509.64
Surveying - 2-man Crew	5.00 DAY	D	$2,123.52	$975.12	$0.00	$3,098.64
Contractor Costs / General Conditions Total			$2,633.16	$975.12	$43,332.78	$46,941.06

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Decontamination Facilities						
1,800 PSI Steam Cleaner Rental	3.00 MONTH	D	$0.00	$0.00	$3,506.86	$3,506.86
8' x 36' Decontamination Trailer with 2 Showers, Fans	3.00 MONTH	D	$0.00	$0.00	$1,605.38	$1,605.38
DOT Steel Drum, 55 Gallon	10.00 EACH	D	$0.00	$0.00	$509.56	$509.56
Decontamination Facilities Total			$0.00	$0.00	$5,621.80	$5,621.80
Excavation, Buried Waste						
D6 with A-blade Bulldozer	40.00 HOUR	D	$1,165.39	$1,731.43	$0.00	$2,896.82
Hand Excavation, Normal Soil	80.00 CY	D	$2,446.83	$20.49	$0.00	$2,467.32
950, 3.0 CY, Wheel Loader	160.00 HOUR	D	$4,626.22	$6,518.56	$0.00	$11,144.78
Crawler-mounted, 1 CY, 215 Hydraulic Excavator	40.00 HOUR	D	$1,440.57	$1,686.72	$0.00	$3,127.29
12 CY DUMP TRUCK	160.00 HOUR	D	$2,850.29	$4,710.40	$0.00	$7,560.69
Unclassified Fill, 6" Lifts, On-Site	1,500.00 CY	D	$2,199.86	$5,050.65	$356.70	$7,607.21
Organic Vapor Analyzer Rental, per Month	3.00 MONTH	D	$0.00	$0.00	$3,717.35	$3,717.35
Plastic Laminate Waste Pile Cover	60,000.00 SF	D	$900.00	$6.00	$7,854.00	$8,760.00
Sprayed Water Dust Suppressant	7,000.00 SY	D	$29.00	$32.20	$0.00	$61.20
Decontaminate Heavy Equipment	10.00 EACH	D	$2,046.39	$255.08	$0.00	$2,301.47
Excavation, Buried Waste Total			$17,704.55	$20,011.53	$11,928.05	$49,644.12
Fencing						
6' Galvanized Chain-link Fence	800.00 LF	D	$957.03	$8.80	$10,147.76	$1,942.86
Hazardous Waste Signing	1.00 EACH	D	$26.76	$0.23	$30.40	$57.40
Fencing Total			$983.79	$9.03	$10,178.16	$2,000.25
Groundwater Monitoring Wells						
Mobilization/Demobilization Drilling Rig & Crew	1.00 LS	D	$563.60	$837.56	$0.00	$0.00
Organic Vapor Analyzer Rental, per Day	2.00 DAY	D	$0.00	$0.00	$237.84	$237.84
Decontaminate Rig, Augers, Screen (Rental Equipment)	1.00 DAY	D	$0.00	$0.00	$161.73	$161.73
2" Stainless Steel, Well Casing	100.00 LF	D	$221.71	$329.45	$1,864.38	$2,415.54
2" Stainless Steel, Well Screen	12.00 LF	D	$22.55	$33.50	$579.13	$635.18
2" Stainless Steel, Well Plug	4.00 EACH	D	$22.55	$33.50	$120.65	$176.70
2" Submersible Pump Rental, Day	1.00 DAY	D	$0.00	$0.00	$59.46	$59.46
Hollow-stem Auger, 8" Outside Diameter Borehole for 2" Well	100.00 LF	D	$1,024.84	$1,522.87	$0.00	$2,547.71

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Split Spoon Sample, 2" x 24", During Drilling	50.00 EACH	D	$0.00	$0.00	$1,486.47	$1,486.47
Well Development Equipment Rental	1.00 WEEK	D	$39.28	$0.44	$452.56	$492.28
Standby for Drilling	1.00 EACH	D	$70.45	$104.69	$0.00	$0.00
Move Rig/Equipment Around Site	4.00 EACH	D	$70.45	$104.69	$0.00	$175.14
Furnish 55 Gallon Drum for Drill Cuttings & Development Water	8.00 EACH	D	$0.00	$0.00	$407.65	$407.65
2" Screen, Filter Pack	80.00 LF	D	$127.77	$189.85	$557.90	$875.52
Surface Pad, Concrete, 4' x 4' x 4"	4.00 EACH	D	$16.27	$0.76	$50.74	$67.77
2" Well, Portland Cement Grout	4.00 LF	D	$0.00	$0.00	$4.28	$4.28
2" Well, Bentonite Seal	4.00 EACH	D	$25.36	$37.69	$68.93	$131.98
5' Guard Posts, Cast Iron, Concrete Fill	12.00 EACH	D	$345.74	$5.28	$351.09	$702.10
Teflon Bailer, 3/4" Outside Diameter x 1', 60 cc	4.00 EACH	D	$0.00	$0.00	$612.14	$612.14
Suspension Cable, Teflon Coated	100.00 FT	D	$0.00	$0.00	$102.27	$102.27
Hand Reel	4.00 EACH	D	$0.00	$0.00	$80.39	$80.39
	Groundwater Monitoring Wells Total		$2,550.58	$3,200.28	$7,197.60	$11,372.16

Landfill Disposal

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Transport Bulk Solid non-Hazardous Waste, 22 tons per trip (quote Earthwatch)	113.00 trip	D	$0.00	$0.00	$34,804.00	$34,804.00
Landfill Nonhazardous Solid Bulk Waste by ton (quote Earthwatch)	2,375.00 ton	D	$0.00	$0.00	$35,625.00	$35,625.00
	Landfill Disposal Total		$0.00	$0.00	$70,429.00	$70,429.00

Professional Labor

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Project Manager	40.00 HOUR	D	$1,970.62	$0.00	$0.00	$1,970.62
QA/QC Officer	8.00 HOUR	D	$231.04	$0.00	$0.00	$231.04
Project Engineer	120.00 HOUR	D	$5,096.45	$0.00	$0.00	$5,096.45
Health & Safety Officer	8.00 HOUR	D	$203.86	$0.00	$0.00	$203.86
Field Technician	480.00 HOUR	D	$9,785.14	$0.00	$0.00	$9,785.14
Word Processing/Clerical	10.00 HOUR	D	$169.88	$0.00	$0.00	$169.88
	Professional Labor Total		$17,457.00	$0.00	$0.00	$17,457.00

Solidification/Stabilization

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
950, 3.0 CY, Wheel Loader	160.00 HOUR	D	$4,626.22	$6,518.56	$0.00	$11,144.78
580K, 1CY, Backhoe with Front-end Loader	320.00 HOUR	D	$9,475.34	$4,448.48	$0.00	$13,923.82

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
6" Structural Slab on Grade	100.00 SF	D	$202.37	$16.96	$224.26	$443.59
Per Diem	240.00 DAY	D	$0.00	$0.00	$21,405.07	$21,405.07
Truck Scale Rental	1.00 MONTH	D	$0.00	$0.00	$4,162.10	$4,162.10
R60 Rough Terrain Forklift, 6,000 Lb @ 24" LC	320.00 HOUR	D	$9,268.75	$4,075.55	$0.00	$13,344.31
Portland Cement Type I (Bulk)	300.00 TON	D	$0.00	$0.00	$25,329.33	$25,329.33
Tank Truck Standby Time for Solidification/Stabilization Unit	320.00 HOUR	D	$0.00	$3,446.85	$0.00	$3,446.85
1 CY Plywood Boxes	100.00 EACH	D	$3,002.06	$81.88	$2,675.63	$5,759.57
Operational Labor for Process Equipment	640.00 HOUR	D	$33,160.87	$0.00	$0.00	$33,160.87
Bulk Chemical Transport (40,000 Lb Truckload)	15.00 EACH	D	$0.00	$0.00	$5,351.27	$5,351.27
10 CY Mixing System	2.00 MONTH	D	$0.00	$0.00	$9,930.76	$9,930.76
Solidification/Stabilization Ancillary Equipment	1.00 EACH	D	$0.00	$0.00	$7,135.02	$7,135.02
Mobilization/Demobilization of Solidification/Stabilization Equipment	1.00 LS	D	$16,839.50	$0.00	$0.00	$16,839.50
DOT Steel Drum, 55 Gallon	10.00 EACH	D	$0.00	$0.00	$509.56	$509.56
Diesel Fuel	2,000.00 GAL	D	$0.00	$0.00	$2,806.40	$2,806.40
Water	250.00 KGAL	D	$0.00	$0.00	$1,953.23	$1,953.23
Solidification/Stabilization Total			$76,575.10	$18,588.28	$81,482.61	$176,646.00
Total RA-4			$123,920.84	$45,868.44	$281,981.91	$441,024.17

SEAD 16 & 17

Paul Messelaar

11/2/97

parsons engineering science

Prudential Center

Boston , Massachusetts ,02199

617 262 3200

Soil and sediment remediation at two small arms munitions deactivation furnaces, one active and one inactive. Remediation alternatives includs; RA-1 no action; RA-4 excavate/solidify/off-site landfill; RA-5 excavate/solidify/ on-site landfill ; and RA-6 excavate/soil washing/backfill clean soils/solidify and off-site landfill dirty soils

o&m cost

SEAD 16 & 17 groundwater monitoring
groundwater/metals
groundwater monitoring
prepare monitoring report

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Professional Labor						
Project Manager	4.00 HOUR		*$34.4859*	*$0.0000*	*$0.0000*	
33220101		D	70.00%	100.00%		
			$197.06	**$0.00**	**$0.00**	**$197.06**
Project Engineer	40.00 HOUR		*$29.7293*	*$0.0000*	*$0.0000*	
33220105		D	70.00%	100.00%		
			$1,698.82	**$0.00**	**$0.00**	**$1,698.82**
Word Processing/Clerical	4.00 HOUR		*$11.8917*	*$0.0000*	*$0.0000*	
33220119		D	70.00%	100.00%		
			$67.95	**$0.00**	**$0.00**	**$67.95**
Professional Labor Total			**$1,963.83**	**$0.00**	**$0.00**	**$1,963.83**
Sampling and Analysis						
Van or Pickup Rental	2.00 DAY		*$0.0000*	*$0.0000*	*$35.6751*	
33010102		D	70.00%	100.00%		
			$0.00	**$0.00**	**$71.35**	**$71.35**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Mobilize Crew, >= 500 Miles, per Person	2.00 EACH		*$0.0000*	*$0.0000*	*$1,189.1700*	
33010201		D	70.00%	100.00%		
			$0.00	**$0.00**	**$2,378.34**	**$2,378.34**
Per Diem	4.00 DAY		*$0.0000*	*$0.0000*	*$89.1878*	
33010202		D	70.00%	100.00%		
			$0.00	**$0.00**	**$356.75**	**$356.75**
Prefiltering Liquids	4.00 EACH		*$0.0000*	*$0.0000*	*$14.8646*	
33020206		D	70.00%	100.00%		
			$0.00	**$0.00**	**$59.46**	**$59.46**
Acid Digestion	4.00 EACH		*$0.0000*	*$0.0000*	*$23.7834*	
33020207		D	70.00%	100.00%		
			$0.00	**$0.00**	**$95.13**	**$95.13**
Repackage and Ship Sample	4.00 EACH		*$0.0000*	*$0.0000*	*$35.6751*	
33020225		D	70.00%	100.00%		
			$0.00	**$0.00**	**$142.70**	**$142.70**
Organic Vapor Analyzer Rental, per Day	2.00 DAY		*$0.0000*	*$0.0000*	*$118.9178*	
33020303		D	70.00%	100.00%		
			$0.00	**$0.00**	**$237.84**	**$237.84**
Disposable Materials per Sample	4.00 EACH		*$0.0000*	*$0.0000*	*$6.7448*	
33020401		D	70.00%	100.00%		
			$0.00	**$0.00**	**$26.98**	**$26.98**
Decontamination Materials per Sample	4.00 EACH		*$0.0000*	*$0.0000*	*$6.2432*	
33020402		D	70.00%	100.00%		
			$0.00	**$0.00**	**$24.97**	**$24.97**
Rinsate Analysis	1.00 EACH		*$0.0000*	*$0.0000*	*$190.2672*	
33020512		D	70.00%	100.00%		
			$0.00	**$0.00**	**$190.27**	**$190.27**
Pesticides/PCBs (EPA 608)	4.00 EACH		*$0.0000*	*$0.0000*	*$178.3755*	
33021617		D	70.00%	100.00%		
			$0.00	**$0.00**	**$713.50**	**$713.50**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Volatile Organic Analysis (EPA 624)	4.00 EACH		*$0.0000*	*$0.0000*	*$267.5633*	
33021618		D	70.00%	100.00%		
			$0.00	**$0.00**	**$1,070.25**	**$1,070.25**
Base Neutral & Acid Extractable Organics (EPA 625)	4.00 EACH		*$0.0000*	*$0.0000*	*$416.2095*	
33021619		D	70.00%	100.00%		
			$0.00	**$0.00**	**$1,664.84**	**$1,664.84**
Target Analyte List Metals (EPA 6010/7000S), Soil	4.00 EACH		*$0.0000*	*$0.0000*	*$243.7799*	
33021709		D	70.00%	100.00%		
			$0.00	**$0.00**	**$975.12**	**$975.12**
1 Liter, 32 Oz, Clear Wide Mouth Jar, Case of 12	1.00 EACH		*$0.0000*	*$0.0000*	*$44.7961*	
33022020		D	70.00%	100.00%		
			$0.00	**$0.00**	**$44.80**	**$44.80**
40 ml, Clear Vial, Case of 72	1.00 EACH		*$0.0000*	*$0.0000*	*$104.7659*	
33022026		D	70.00%	100.00%		
			$0.00	**$0.00**	**$104.77**	**$104.77**
1 Liter, 32 oz, High-density Polyethylene Bottle, Case of 12	1.00 EACH		*$0.0000*	*$0.0000*	*$34.7833*	
33022030		D	70.00%	100.00%		
			$0.00	**$0.00**	**$34.78**	**$34.78**
Custody Seals, Package of 10	1.00 EACH		*$0.0000*	*$0.0000*	*$1.3438*	
33022034		D	70.00%	100.00%		
			$0.00	**$0.00**	**$1.34**	**$1.34**
Safe Transport Can Filled with Vermiculite, 1 Gallon, Case of 4	1.00 EACH		*$0.0000*	*$0.0000*	*$16.7079*	
33022035		D	70.00%	100.00%		
			$0.00	**$0.00**	**$16.71**	**$16.71**
Documentation Package for QA Verification, Data & Benchwork	4.00 EACH		*$0.0000*	*$0.0000*	*$184.6901*	
33022036		D	70.00%	100.00%		
			$0.00	**$0.00**	**$738.76**	**$738.76**
Overnight Delivery, 21 - 50 Lb Package	25.00 LB		*$0.0000*	*$0.0000*	*$1.9027*	
33022042		D	70.00%	100.00%		
			$0.00	**$0.00**	**$47.57**	**$47.57**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
60 Quart Ice Chest	1.00 EACH		*$0.0000*	*$0.0000*	*$53.0965*	
33022046		D	70.00%	100.00%		
			$0.00	**$0.00**	**$53.10**	**$53.10**
Blue Ice Soft Packs (Equivalent to 7 Lbs Ice)	1.00 EACH		*$0.0000*	*$0.0000*	*$5.9696*	
33022050		D	70.00%	100.00%		
			$0.00	**$0.00**	**$5.97**	**$5.97**
Field Technician	32.00 HOUR		*$14.2700*	*$0.0000*	*$0.0000*	
33220117		D	70.00%	100.00%		
			$652.34	**$0.00**	**$0.00**	**$652.34**
Teflon Bailer, 3/4" Outside Diameter x 1', 60 cc	4.00 EACH		*$0.0000*	*$0.0000*	*$153.0344*	
33232401		D	70.00%	100.00%		
			$0.00	**$0.00**	**$612.14**	**$612.14**
Suspension Cable, Teflon Coated	100.00 FT		*$0.0000*	*$0.0000*	*$1.0227*	
33232422		D	70.00%	100.00%		
			$0.00	**$0.00**	**$102.27**	**$102.27**
Sampling and Analysis Total			**$652.34**	**$0.00**	**$9,769.70**	**$10,422.04**
Site Total			**$2,616.17**	**$0.00**	**$9,769.70**	**$12,385.87**

RA-4

SEAD 16 has an inactive deactivation furnace that was used to destroy small arms munitions. Sead 17 is ajacent to SEAD 16 and has an active deactivation furnace that is used for the destruction of small arms munitions.

The primary media of concern are soils and sediments. THe primary cintaiminants of concern are metals such as lead and copper.

excavate/solidify/stabilize/off-site lanfill disposal

groundwater monitoring

Access Roads

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Rough Grading, 14G, 1 Pass	7,000.00 SY		*$0.1547*	*$0.2854*	*$0.0000*	
17030103		D	70.00%	100.00%		
			$1,547.00	**$1,997.80**	**$0.00**	**$3,544.80**
Access Roads Total			**$1,547.00**	**$1,997.80**	**$0.00**	**$3,544.80**

Analyses: Soil, Sludge, and Sediment

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Van or Pickup Rental	3.00 DAY		*$0.0000*	*$0.0000*	*$35.6751*	
33010102		D	70.00%	100.00%		
			$0.00	**$0.00**	**$107.03**	$107.03
Mobilize Crew, >= 500 Miles, per Person	2.00 EACH		*$0.0000*	*$0.0000*	*$1,189.1700*	
33010201		D	70.00%	100.00%		
			$0.00	**$0.00**	**$2,378.34**	$2,378.34
Per Diem	6.00 DAY		*$0.0000*	*$0.0000*	*$89.1878*	
33010202		C	50.00%	75.00%		
			$0.00	**$0.00**	**$535.13**	$535.13
Repackage and Ship Sample	5.00 EACH		*$0.0000*	*$0.0000*	*$35.6751*	
33020225		D	70.00%	100.00%		
			$0.00	**$0.00**	**$178.38**	$178.38
Organic Vapor Analyzer Rental, per Day	3.00 DAY		*$0.0000*	*$0.0000*	*$118.9178*	
33020303		D	70.00%	100.00%		
			$0.00	**$0.00**	**$356.75**	$356.75
Disposable Materials per Sample	50.00 EACH		*$0.0000*	*$0.0000*	*$6.7448*	
33020401		D	70.00%	100.00%		
			$0.00	**$0.00**	**$337.24**	$337.24
Decontamination Materials per Sample	50.00 EACH		*$0.0000*	*$0.0000*	*$6.2432*	
33020402		D	70.00%	100.00%		
			$0.00	**$0.00**	**$312.16**	$312.16
TCLP (RCRA) (EPA 1311)	15.00 EACH		*$0.0000*	*$0.0000*	*$1,861.0511*	
33021702		D	70.00%	100.00%		
			$0.00	**$0.00**	**$27,915.77**	$27,915.77
Target Analyte List Metals (EPA 6010/7000S), Soil	35.00 EACH		*$0.0000*	*$0.0000*	*$243.7799*	
33021709		D	70.00%	100.00%		
			$0.00	**$0.00**	**$8,532.30**	$8,532.30
1 Liter, 32 Oz, Clear Wide Mouth Jar, Case of 12	5.00 EACH		*$0.0000*	*$0.0000*	*$44.7961*	
33022020		D	70.00%	100.00%		
			$0.00	**$0.00**	**$223.98**	$223.98

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
1 Liter, 32 Oz, Boston Round Bottle, Case of 12	5.00 EACH		*$0.0000*	*$0.0000*	*$34.1174*	
33022024		D	70.00%	100.00%		
			$0.00	**$0.00**	**$170.59**	**$170.59**
40 ml, Clear Vial, Case of 72	2.00 EACH		*$0.0000*	*$0.0000*	*$104.7659*	
33022026		D	70.00%	100.00%		
			$0.00	**$0.00**	**$209.53**	**$209.53**
Custody Seals, Package of 10	5.00 EACH		*$0.0000*	*$0.0000*	*$1.3438*	
33022034		D	70.00%	100.00%		
			$0.00	**$0.00**	**$6.72**	**$6.72**
Safe Transport Can Filled with Vermiculite, 1 Gallon, Case of 4	4.00 EACH		*$0.0000*	*$0.0000*	*$16.7079*	
33022035		D	70.00%	100.00%		
			$0.00	**$0.00**	**$66.83**	**$66.83**
Documentation Package for QA Verification, Data & Benchwork	50.00 EACH		*$0.0000*	*$0.0000*	*$184.6901*	
33022036		D	70.00%	100.00%		
			$0.00	**$0.00**	**$9,234.51**	**$9,234.51**
Overnight Delivery, 21 - 50 Lb Package	200.00 LB		*$0.0000*	*$0.0000*	*$1.9027*	
33022042		D	70.00%	100.00%		
			$0.00	**$0.00**	**$380.54**	**$380.54**
60 Quart Ice Chest	5.00 EACH		*$0.0000*	*$0.0000*	*$53.0965*	
33022046		D	70.00%	100.00%		
			$0.00	**$0.00**	**$265.48**	**$265.48**
Blue Ice Soft Packs (Equivalent to 7 Lbs Ice) -	5.00 EACH		*$0.0000*	*$0.0000*	*$5.9696*	
33022050		D	70.00%	100.00%		
			$0.00	**$0.00**	**$29.85**	**$29.85**
Project Manager	8.00 HOUR		*$34.4859*	*$0.0000*	*$0.0000*	
33220101		D	70.00%	100.00%		
			$394.12	**$0.00**	**$0.00**	**$394.12**
Project Engineer	40.00 HOUR		*$29.7293*	*$0.0000*	*$0.0000*	
33220105		D	70.00%	100.00%		
			$1,698.82	**$0.00**	**$0.00**	**$1,698.82**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Field Technician	48.00 HOUR		*$14.2700*	*$0.0000*	*$0.0000*	
33220117		D	70.00%	100.00%		
			$978.51	**$0.00**	**$0.00**	**$978.51**
Analyses: Soil, Sludge, and Sediment Total			**$3,071.46**	**$0.00**	**$51,241.11**	**$54,312.57**

Cleanup and Landscaping

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
General Area Cleanup	2.00 ACRE		*$100.9011*	*$95.3650*	*$0.0000*	
17040101		D	70.00%	100.00%		
			$288.29	**$190.73**	**$0.00**	**$479.02**
Area Preparation, 67% Level & 33% Slope	2.00 ACRE		*$14.5041*	*$30.5622*	*$0.0000*	
18050101		D	70.00%	100.00%		
			$41.44	**$61.12**	**$0.00**	**$102.56**
Seeding, 67% Level & 33% Slope, Hydroseeding	2.00 ACRE		*$39.9561*	*$65.6422*	*$285.4008*	
18050401		D	70.00%	100.00%		
			$114.16	**$131.28**	**$570.80**	**$816.25**
Cleanup and Landscaping Total			**$443.89**	**$383.14**	**$570.80**	**$1,397.83**

Clear and Grub

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Light Brush without Grub, Chipping	2.00 ACRE		*$334.0125*	*$351.6323*	*$0.0000*	
17010401		D	70.00%	100.00%		
			$954.32	**$703.26**	**$0.00**	**$1,657.59**
Clear and Grub Total			**$954.32**	**$703.26**	**$0.00**	**$1,657.59**

Contractor Costs / General Conditions

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Van or Pickup Rental	90.00 DAY		*$0.0000*	*$0.0000*	*$35.6751*	
33010102		D	70.00%	100.00%		
			$0.00	**$0.00**	**$3,210.76**	**$3,210.76**
Mobilize Crew, >= 500 Miles, per Person	4.00 EACH		*$0.0000*	*$0.0000*	*$1,189.1700*	
33010201		D	70.00%	100.00%		
			$0.00	**$0.00**	**$4,756.68**	**$4,756.68**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Per Diem	360.00 DAY		*$0.0000*	*$0.0000*	*$89.1878*	
33010202		D	70.00%	100.00%		
			$0.00	**$0.00**	**$32,107.61**	**$32,107.61**
Disposable Boot Covers (Tyvek)	360.00 PAIR		*$0.0000*	*$0.0000*	*$1.3735*	
33010421		D	70.00%	100.00%		
			$0.00	**$0.00**	**$494.46**	**$494.46**
Disposable Gloves (Latex)	360.00 PAIR		*$0.0000*	*$0.0000*	*$0.2276*	
33010423		D	70.00%	100.00%		
			$0.00	**$0.00**	**$81.94**	**$81.94**
Disposable Coveralls (Tyvek)	360.00 EACH		*$0.0000*	*$0.0000*	*$3.5675*	
33010425		D	70.00%	100.00%		
			$0.00	**$0.00**	**$1,284.30**	**$1,284.30**
Temporary Office 20' x 8'	3.00 MONTH		*$0.0000*	*$0.0000*	*$224.5510*	
99040101		D	70.00%	100.00%		
			$0.00	**$0.00**	**$673.65**	**$673.65**
Temporary Storage Trailer 28' x 10'	3.00 MONTH		*$0.0000*	*$0.0000*	*$122.2111*	
99040202		D	70.00%	100.00%		
			$0.00	**$0.00**	**$366.63**	**$366.63**
Portable Toilets - Chemical	3.00 MONTH		*$0.0000*	*$0.0000*	*$118.9170*	
99040501		D	70.00%	100.00%		
			$0.00	**$0.00**	**$356.75**	**$356.75**
Construction Photographs	1.00 SET		*$356.7510*	*$0.0000*	*$0.0000*	
99041101		D	70.00%	100.00%		
			$509.64	**$0.00**	**$0.00**	**$509.64**
Surveying - 2-man Crew	5.00 DAY		*$297.2925*	*$195.0239*	*$0.0000*	
99041201		D	70.00%	100.00%		
			$2,123.52	**$975.12**	**$0.00**	**$3,098.64**
Contractor Costs / General Conditions Total			**$2,633.16**	**$975.12**	**$43,332.78**	**$46,941.06**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Decontamination Facilities						
1,800 PSI Steam Cleaner Rental	3.00 MONTH		*$0.0000*	*$0.0000*	*$1,168.9541*	
33170819		D	70.00%	100.00%		
			$0.00	**$0.00**	**$3,506.86**	**$3,506.86**
8' x 36' Decontamination Trailer with 2 Showers, Fans	3.00 MONTH		*$0.0000*	*$0.0000*	*$535.1265*	
33170822		D	70.00%	100.00%		
			$0.00	**$0.00**	**$1,605.38**	**$1,605.38**
DOT Steel Drum, 55 Gallon	10.00 EACH		*$0.0000*	*$0.0000*	*$50.9560*	
33199921		D	70.00%	100.00%		
			$0.00	**$0.00**	**$509.56**	**$509.56**
Decontamination Facilities Total			**$0.00**	**$0.00**	**$5,621.80**	**$5,621.80**
Excavation, Buried Waste						
D6 with A-blade Bulldozer	40.00 HOUR		*$20.3943*	*$43.2858*	*$0.0000*	
17030209		D	70.00%	100.00%		
			$1,165.39	**$1,731.43**	**$0.00**	**$2,896.82**
Hand Excavation, Normal Soil	80.00 CY		*$21.4098*	*$0.2561*	*$0.0000*	
17030211		D	70.00%	100.00%		
			$2,446.83	**$20.49**	**$0.00**	**$2,467.32**
950, 3.0 CY, Wheel Loader	160.00 HOUR		*$20.2397*	*$40.7410*	*$0.0000*	
17030223		D	70.00%	100.00%		
			$4,626.22	**$6,518.56**	**$0.00**	**$11,144.78**
Crawler-mounted, 1 CY, 215 Hydraulic Excavator	40.00 HOUR		*$25.2100*	*$42.1680*	*$0.0000*	
17030230		D	70.00%	100.00%		
			$1,440.57	**$1,686.72**	**$0.00**	**$3,127.29**
12 CY DUMP TRUCK	160.00 HOUR		*$12.4700*	*$29.4400*	*$0.0000*	
17030236		D	70.00%	100.00%		
			$2,850.29	**$4,710.40**	**$0.00**	**$7,560.69**
Unclassified Fill, 6" Lifts, On-Site	1,500.00 CY		*$1.0266*	*$3.3671*	*$0.2378*	
17030422		D	70.00%	100.00%		
			$2,199.86	**$5,050.65**	**$356.70**	**$7,607.21**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Organic Vapor Analyzer Rental, per Month	3.00 MONTH		*$0.0000*	*$0.0000*	*$1,239.1151*	
33020302		D	70.00%	100.00%		
			$0.00	**$0.00**	**$3,717.35**	**$3,717.35**
Plastic Laminate Waste Pile Cover	60,000.00 SF		*$0.0105*	*$0.0001*	*$0.1309*	
33080584		D	70.00%	100.00%		
			$900.00	**$6.00**	**$7,854.00**	**$8,760.00**
Sprayed Water Dust Suppressant	7,000.00 SY		*$0.0029*	*$0.0046*	*$0.0000*	
33080585		D	70.00%	100.00%		
			$29.00	**$32.20**	**$0.00**	**$61.20**
Decontaminate Heavy Equipment	10.00 EACH		*$143.2474*	*$25.5078*	*$0.0000*	
33170803		D	70.00%	100.00%		
			$2,046.39	**$255.08**	**$0.00**	**$2,301.47**
	Excavation, Buried Waste Total		**$17,704.55**	**$20,011.53**	**$11,928.05**	**$49,644.12**

Fencing

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
6' Galvanized Chain-link Fence	800.00 LF		*$0.8374*	*$0.0110*	*$12.6847*	
18040107		D	70.00%	100.00%		
			$957.03	**$8.80**	**$10,147.76**	**$1,942.86**
Hazardous Waste Signing	1.00 EACH		*$18.7336*	*$0.2328*	*$30.4015*	
18040501		D	70.00%	100.00%		
			$26.76	**$0.23**	**$30.40**	**$57.40**
	Fencing Total		**$983.79**	**$9.03**	**$10,178.16**	**$2,000.25**

Groundwater Monitoring Wells

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Mobilization/Demobilization Drilling Rig & Crew	1.00 LS		*$394.5190*	*$837.5562*	*$0.0000*	
33010101		D	70.00%	100.00%		
			$563.60	**$837.56**	**$0.00**	**$0.00**
Organic Vapor Analyzer Rental, per Day	2.00 DAY		*$0.0000*	*$0.0000*	*$118.9178*	
33020303		D	70.00%	100.00%		
			$0.00	**$0.00**	**$237.84**	**$237.84**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Decontaminate Rig, Augers, Screen (Rental Equipment)	1.00 DAY		*$0.0000*	*$0.0000*	*$161.7271*	
33170808		D	70.00%	100.00%		
			$0.00	**$0.00**	**$161.73**	**$161.73**
2" Stainless Steel, Well Casing	100.00 LF		*$1.5520*	*$3.2945*	*$18.6438*	
33230121		D	70.00%	100.00%		
			$221.71	**$329.45**	**$1,864.38**	**$2,415.54**
2" Stainless Steel, Well Screen	12.00 LF		*$1.3152*	*$2.7920*	*$48.2611*	
33230221		D	70.00%	100.00%		
			$22.55	**$33.50**	**$579.13**	**$635.18**
2" Stainless Steel, Well Plug	4.00 EACH		*$3.9457*	*$8.3758*	*$30.1633*	
33230311		D	70.00%	100.00%		
			$22.55	**$33.50**	**$120.65**	**$176.70**
2" Submersible Pump Rental, Day	1.00 DAY		*$0.0000*	*$0.0000*	*$59.4585*	
33230506		D	70.00%	100.00%		
			$0.00	**$0.00**	**$59.46**	**$59.46**
Hollow-stem Auger, 8" Outside Diameter Borehole for 2" Well	100.00 LF		*$7.1739*	*$15.2287*	*$0.0000*	
33231101		D	70.00%	100.00%		
			$1,024.84	**$1,522.87**	**$0.00**	**$2,547.71**
Split Spoon Sample, 2" x 24", During Drilling	50.00 EACH		*$0.0000*	*$0.0000*	*$29.7293*	
33231106		D	70.00%	100.00%		
			$0.00	**$0.00**	**$1,486.47**	**$1,486.47**
Well Development Equipment Rental	1.00 WEEK		*$27.4970*	*$0.4357*	*$452.5599*	
33231111		D	70.00%	100.00%		
			$39.28	**$0.44**	**$452.56**	**$492.28**
Standby for Drilling	1.00 EACH		*$49.3149*	*$104.6945*	*$0.0000*	
33231121		D	70.00%	100.00%		
			$70.45	**$104.69**	**$0.00**	**$0.00**
Move Rig/Equipment Around Site	4.00 EACH		*$12.3287*	*$26.1737*	*$0.0000*	
33231122		D	70.00%	100.00%		
			$70.45	**$104.69**	**$0.00**	**$175.14**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Furnish 55 Gallon Drum for Drill Cuttings & Development Water	8.00 EACH		*$0.0000*	*$0.0000*	*$50.9560*	
33231126		D	70.00%	100.00%		
			$0.00	**$0.00**	**$407.65**	**$407.65**
2" Screen, Filter Pack	80.00 LF		*$1.1180*	*$2.3731*	*$6.9738*	
33231401		D	70.00%	100.00%		
			$127.77	**$189.85**	**$557.90**	**$875.52**
Surface Pad, Concrete, 4' x 4' x 4"	4.00 EACH		*$2.8481*	*$0.1893*	*$12.6844*	
33231502		D	70.00%	100.00%		
			$16.27	**$0.76**	**$50.74**	**$67.77**
2" Well, Portland Cement Grout	4.00 LF		*$0.0000*	*$0.0000*	*$1.0703*	
33231811		D	70.00%	100.00%		
			$0.00	**$0.00**	**$4.28**	**$4.28**
2" Well, Bentonite Seal	4.00 EACH		*$4.4388*	*$9.4228*	*$17.2319*	
33232101		D	70.00%	100.00%		
			$25.36	**$37.69**	**$68.93**	**$131.98**
5' Guard Posts, Cast Iron, Concrete Fill	12.00 EACH		*$20.1681*	*$0.4397*	*$29.2574*	
33232301		D	70.00%	100.00%		
			$345.74	**$5.28**	**$351.09**	**$702.10**
Teflon Bailer, 3/4" Outside Diameter x 1', 60 cc	4.00 EACH		*$0.0000*	*$0.0000*	*$153.0344*	
33232401		D	70.00%	100.00%		
			$0.00	**$0.00**	**$612.14**	**$612.14**
Suspension Cable, Teflon Coated	100.00 FT		*$0.0000*	*$0.0000*	*$1.0227*	
33232422		D	70.00%	100.00%		
			$0.00	**$0.00**	**$102.27**	**$102.27**
Hand Reel	4.00 EACH		*$0.0000*	*$0.0000*	*$20.0970*	
33232423		D	70.00%	100.00%		
			$0.00	**$0.00**	**$80.39**	**$80.39**
Groundwater Monitoring Wells Total			**$2,550.58**	**$3,200.28**	**$7,197.60**	**$11,372.16**

	Quantity/Unit	Safety Level	Labor	Equipment	Materials	Total
Landfill Disposal						
Transport Bulk Solid non-Hazardous Waste, 22 tons per trip (quote Earthwatch)	113.00 trip		*$0.0000*	*$0.0000*	*$308.0000*	
33190205		D	70.00%	100.00%		
2486 cy of soil,sediment and stabilized material at one ton equals one yard			$0.00	$0.00	$34,804.00	$34,804.00
Landfill Nonhazardous Solid Bulk Waste by ton (quote Earthwatch)	2,375.00 ton		*$0.0000*	*$0.0000*	*$15.0000*	
33197270		D	70.00%	100.00%		
			$0.00	$0.00	$35,625.00	$35,625.00
Landfill Disposal Total			$0.00	$0.00	$70,429.00	$70,429.00
Professional Labor						
Project Manager	40.00 HOUR		*$34.4859*	*$0.0000*	*$0.0000*	
33220101		D	70.00%	100.00%		
			$1,970.62	$0.00	$0.00	$1,970.62
QA/QC Officer	8.00 HOUR		*$20.2159*	*$0.0000*	*$0.0000*	
33220104		D	70.00%	100.00%		
			$231.04	$0.00	$0.00	$231.04
Project Engineer	120.00 HOUR		*$29.7293*	*$0.0000*	*$0.0000*	
33220105		D	70.00%	100.00%		
			$5,096.45	$0.00	$0.00	$5,096.45
Health & Safety Officer	8.00 HOUR		*$17.8376*	*$0.0000*	*$0.0000*	
33220113		D	70.00%	100.00%		
			$203.86	$0.00	$0.00	$203.86
Field Technician	480.00 HOUR		*$14.2700*	*$0.0000*	*$0.0000*	
33220117		D	70.00%	100.00%		
			$9,785.14	$0.00	$0.00	$9,785.14
Word Processing/Clerical	10.00 HOUR		*$11.8917*	*$0.0000*	*$0.0000*	
33220119		D	70.00%	100.00%		
			$169.88	$0.00	$0.00	$169.88
Professional Labor Total			$17,457.00	$0.00	$0.00	$17,457.00