FINAL

4825 GLENBROOK ROAD
HUMAN HEALTH RISK ASSESSMENT

SPRING VALLEY FORMERLY USED DEFENSE SITE
OPERABLE UNIT 3
WASHINGTON, D.C.

Prepared For:

U.S. ARMY CORPS OF ENGINEERS
BALTIMORE DISTRICT

Prepared by:

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LIST OF ACRONYMS AND ABBREVIATIONS

ABP	Agent Breakdown Products
ALS	Analytical Laboratory Services, Inc.
ATSDR	Agency for Toxic Substances and Disease Registry
AU	American University
AUES	American University Experiment Station
bgs	Below Ground Surface
CDI	Chronic Daily Intake
CENAB	United States Army Corps of Engineers, Baltimore District
COPC	Chemical of Potential Concern
CSM	Conceptual Site Model
CT	Central Tendency
CWM	Chemical Warfare Materiel
DDOE	District of Columbia Department of the Environment
DERP	Defense Environmental Restoration Program
ECBC	Edgewood Chemical and Biological Center
ECS	Engineering Control Structure
EE/CA	Engineering Evaluation/Cost Analysis
EMS	Environmental Management Systems
EPC	Exposure Point Concentration
ft	Feet
FUDS	Formerly Used Defense Site
HI	Hazard Index
HQ	Hazard Quotient
HTRW	Hazardous, Toxic and Radioactive Waste
HTW	Hazardous Toxic Waste
kg	Kilogram
LOAEL	Lowest-Observed-Adverse-Effect Level
m	Meter
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
mg	Milligram
MRL	Minimal Risk Level
NOAEL	No-Observed-Adverse-Effect Level
NTCRA	Non-Time Critical Removal Action
OU	Operable Unit
PAHs	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
PEF	Particulate Emission Factor
QAPP	Quality Assurance Project Plan
RA	Risk Assessment
RAD	Remedial Action Design
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RfC	Reference Concentration

RfD	Reference Dose
RME	Reasonable Maximum Exposure
RSL	Regional Screening Level
SF	Slope Factor
SSWP	Site-Specific Work Plan
SVFUDS	Spring Valley Formerly Used Defense Site
SVOC	Semi-Volatile Organic Compounds
TIC	Tentatively Identified Compound
TP	Test Pit
UCL	Upper Confidence Limit
URF	Unit Risk Factor
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UTL	Upper Tolerance Limit
VOC	Volatile Organic Compound
XRF	X-Ray Fluorescence

EXECUTIVE SUMMARY

ES.1 A human health risk assessment (HHRA) was performed to estimate the potential risks/hazards to current and future receptors from site-related contamination in the soil at the 4825 Glenbrook Road property, located in Spring Valley, Washington, D.C. The type and magnitude of exposures to Chemicals of Potential Concern (COPCs) at the site were estimated, potential exposure pathways, receptors, and exposure scenarios were identified, and potential exposure was quantified. This HHRA was performed under contract DACA87-02-D-0005, Task Order DA01, DERP/FUDS MEC/CWM project no. C03DC091801 and DERP/FUDS HTRW project no. C03DC091802, for the U.S. Army Corps of Engineers, Baltimore District (CENAB).

ES.2 4825 Glenbrook Road is part of the Spring Valley Formerly Used Defense Site (SVFUDS), an area of northwest Washington, D.C., formerly occupied by the American University Experiment Station (AUES). During World War I, the U.S. Government established AUES to investigate the testing, production, and effects of noxious gases, antidotes, and protective masks and to conduct research and development on chemical warfare materiel (CWM), including mustard (HD) and lewisite (L) agents, as well as adamsite, irritants, and smokes.

ES.3 During the TP 23 and subsequent Burial Pit 3 and its extensions investigations, 95 munitions and explosives of concern (MEC) were recovered. These items consisted of 75mm projectiles, 2-inch and 3-inch pipes with end caps, 4.7--inch projectiles, and intact glass containers. Twenty-three 75mm projectiles containing and one glass vial containing CWM were recovered were also recovered. In addition, 413 munitions debris (MD) items were recovered primarily 75mm scrap and an expended 4.7-inch projectile.

ES.4 Three test pits (Test Pits 120, 134, and 138) where the probability of encountering MEC/CWM was high were investigated at 4825 Glenbrook Road. These test pits are called "high probability test pits" hereinafter. High probability test pits 120 and 134 were investigated until arsenic trichloride was detected in an intact open cavity container and all operations ceased. Among the items recovered during the excavation, two 75mm projectiles were identified as MEC and 37 items were identified as CWM. The CWM items were various bottles containing liquid or powder and assorted glass debris.75mm75mm Three items were identified as MD (two open cavity 75mm projectiles, and one 75mm unfuzed projectiles with hexagonal plugs), and the remaining items were identified as suspected AUES-related scrap were also recovered. The agents/agent breakdown products (ABPs) 1,4-oxathiane and 1,4-dithiane were detected in the intact containers and soils in the vicinity of the excavation. Metals detected in agent/ABP-cleared grab samples that exceeded the acceptable comparison levels included aluminum, arsenic, and thallium.

ES.5 Forty-one (41) low probability test pits were investigated at 4825 Glenbrook Road. Suspected AUES related glassware debris was only found in one test pit (TP 117). Metals (including aluminum, arsenic, cobalt, magnesium, manganese, thallium, and vanadium) were detected at concentrations exceeding comparison levels in some of the soil samples collected from the site. Soils with arsenic concentration exceeding the Spring Valley remediation level of 20 mg/kg were removed, except for two small areas that will be excavated in the near future.

ES.6 Twenty-five full or partial soil grids contaminated with arsenic were excavated at 4825 Glenbrook Road. The grids were excavated until the arsenic concentrations in the confirmation samples were below the Spring Valley remediation level of 20 mg/kg, except for two small areas (one in the driveway and the other in the back porch area). More than 1000 cubic yards of arsenic-impacted soil were removed and disposed off-site.

ES.7 A total of 115 soil samples are still in place at the site. These samples were analyzed for the Spring Valley comprehensive list of parameters, including the agents mustard and lewisite, ABPs, volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), metals, explosives, total cyanide, fluoride, iodine, and perchlorate. Results of these samples guided interim removal measures to address potential residual risks while teams were still mobilized in the field. These analytical results were also used to identify COPCs that were the focus of the investigation from that point forward, and which were evaluated in this HHRA.

ES.8 The primary objective of this HHRA was to quantitatively characterize the human health risk associated with current and reasonably expected future exposure to contaminated soils at 4825 Glenbrook Road. Potential receptors at the site include outdoor workers, future residents (adult and child), and future recreational green space users (if property is converted to a community park). The exposure pathways evaluated here include incidental soil ingestion, dermal contact with soils, and the inhalation of particulates for all receptors. In addition, ingestion of homegrown vegetables and inhalation of volatile compounds in indoor air were evaluated for residents.

ES.9 The cumulative cancer risk estimates for adult and child residents, child recreational green space users, and outdoor workers exposed to surface soil (i.e., 0-0.5 ft or 0-2 ft below ground surface (bgs); and outdoor workers exposed to mixed soil (0-12 ft bgs) are within the USEPA target risk range of 1×10^{-6} to 1×10^{-4}. Thus, unacceptable cancer risks to the receptors at the site are not expected from assumed exposures to COPCs in soils. However, the cumulative cancer risk estimate of 2×10^{-4} for residents exposed to arsenic in mixed soil (0-12 ft bgs) as both a child and an adult (i.e., 30 years) exceeds 1×10^{-4}.

ES.10 The hazard indices (HI) estimated for adult and child residents, and child recreational green space users exposed to surface soil (i.e., 0-0.5 ft or 0-2 ft bgs), and outdoor workers exposed to surface soil (0-2 ft bgs) or mixed soil (0-12 ft bgs) are below the benchmark of 1 under both the reasonable maximum exposure (RME) and central tendency (CT) exposure scenarios. Thus, unacceptable hazards to these receptors at the site are not expected from assumed exposures to COPCs in soils. However, the HI for residents exposed to mixed soil (0-12 ft) at the site exceeds the benchmark of 1 under the RME exposure scenario due to assumed exposures to arsenic.

ES.11 The only COC identified from the risk assessment is arsenic based on soil samples remaining at the site. Elevated arsenic areas were identified in two locations; i.e., the driveway and TP 138 location (Figure 7-1). Additional risk evaluations show that the exposure point concentration for arsenic in soil will be less than the Spring Valley site-specific arsenic background level of 12.6 mg/kg by removing the three highest elevated arsenic concentrations.

ES.12 Mustard and ABPs were not selected as the COPCs in the risk assessment because they were not detected in any of the in-place soil samples. However, lewisite was detected in two of the in-place soil samples and was, therefore, selected as a COPC. The risk assessment shows that the hazards from lewisite are acceptable (i.e., < benchmark level of 1). Although HD, L and ABPs were either not detected or in the in-place samples, they are indicators of additional source of buried contamination on this property since the investigations of TPs 120 and 134 are not completed. The residential screening levels for these compounds are listed in Table 2-2.

ES.13 Mustard, lewisite, and ABPs were detected in the vicinity of TP 138, located near the back porch, and TPs 120 and 134, located near the front door of the house. Agent impacted soil detected in the vicinity of TP 138 was removed and disposed at an incineration facility. TP 138 was cleared of containerized agent/ABP and no agent or ABPs were detected in the sidewall and floor soil confirmation samples for TP 138. However, the excavation of TPs 120 and 134 was not cleared of CWM containers, and agent/ABPs impacted soil, and no soil confirmation samples were collected as work on this excavation was halted when arsenic trichloride was discovered in AUES-related glassware at the bottom of the excavation. Therefore, it is unknown whether CWM containers and agent/ABP impacted soil extend beyond the boundaries of the excavation containing TPs 120 and 134. Based on finding from the TPs 120 and 134 investigations, it is likely to encounter containerized CWM, ABPs and agent/hazardous toxic waste (HTW) contaminated soil in the uninvestigated area of TPs 120 and 134. Further action may be warranted to mitigate any unacceptable risk and hazards.

ES.14 Both containerized CWM and agent/ABP impacted soil were found in three high probability test pits (TPs 120, 134, and 138) located near the house. Two MEC were uncovered from the TPs 120 and 134 excavations. Six borings were advanced in the basement and although no MEC, CWM containers, agent/ABP impacted soil, and suspected AUES-related debris were encountered in those borings, bedrock was not encountered in the mid to front portions of the house and the spacing of the borings did not eliminate the potential that there may be undiscovered containerized CWM, AUES-related debris, and agent/ABP impacted soil beneath the building. Therefore, further action may be warranted to mitigate any unacceptable risk and hazards.

SECTION 1
INTRODUCTION

1.1 PROJECT OVERVIEW

1.1.0.1 The purpose of this report is to present the results of a human health risk assessment (RA) that estimated the potential risks/hazards to current and future receptors from site-related contamination in the soil at 4825 Glenbrook Road, located in Spring Valley, Washington, D.C. This property is owned by American University (AU). The HHRA is based on analytical data, historical information, and recommendations/conclusions presented in previous investigation reports.

1.1.0.2 As described in detail in Section 2, an HHRA evaluating the risk associated with soil contamination was previously performed for 4825 Glenbrook Road as part of an Engineering Evaluation/Cost Analysis (EE/CA) (U.S. Army Corps of Engineers [USACE] 2000). The HHRA concluded that the risk estimates exceed USEPA's target risk range and acceptable hazard index (HI) of 1 for child residents due to exposure to arsenic in soil. Therefore, arsenic impacted soils were excavated from 2000 through 2010. This HHRA uses the data from all previously collected soil samples and additional data that have been collected since the last HHRA.

1.1.0.3 This HHRA report was prepared under contract DACA87-02-D-0005, Task Order DA01, DERP/FUDS MEC/CWM project no. C03DC091801 and DERP/FUDS HTRW project no. C03DC091802, for the U.S. Army Corps of Engineers, Baltimore District (CENAB).

1.2 SVFUDS BACKGROUND

4825 Glenbrook Road is a private residential parcel of approximately 0.4 acres located within Operable Unit 3 (OU-3) of the Spring Valley Formerly Used Defense Site (SVFUDS). The SVFUDS is an area of northwest Washington, D.C., that was formerly occupied by the American University Experiment Station (AUES). During World War I, the U.S. Government established AUES to investigate the testing, production, and effects of noxious gases, antidotes, and protective masks. The AUES was located on the grounds of the current AU and used additional property in the vicinity to conduct research and development on chemical warfare materiel (CWM), including mustard agent and lewisite agent, as well as adamsite, irritants, and smokes. After the war, these activities were transferred to other locations and the site was returned to the owners. The SVFUDS location map is presented as Figure 1-1.

1.3 PREVIOUS INVESTIGATIONS AT 4825 GLENBROOK ROAD

1.3.0.1 Over the years, numerous investigations have been performed at 4825 Glenbrook Road. Previous investigations were conducted at different times, by different parties, and with different sampling objectives and analytical parameters. The previous investigations include:

- Environmental Management Systems (Environmental Management Systems [EMS] 1992) – soil sampling when workers encountered buried glassware

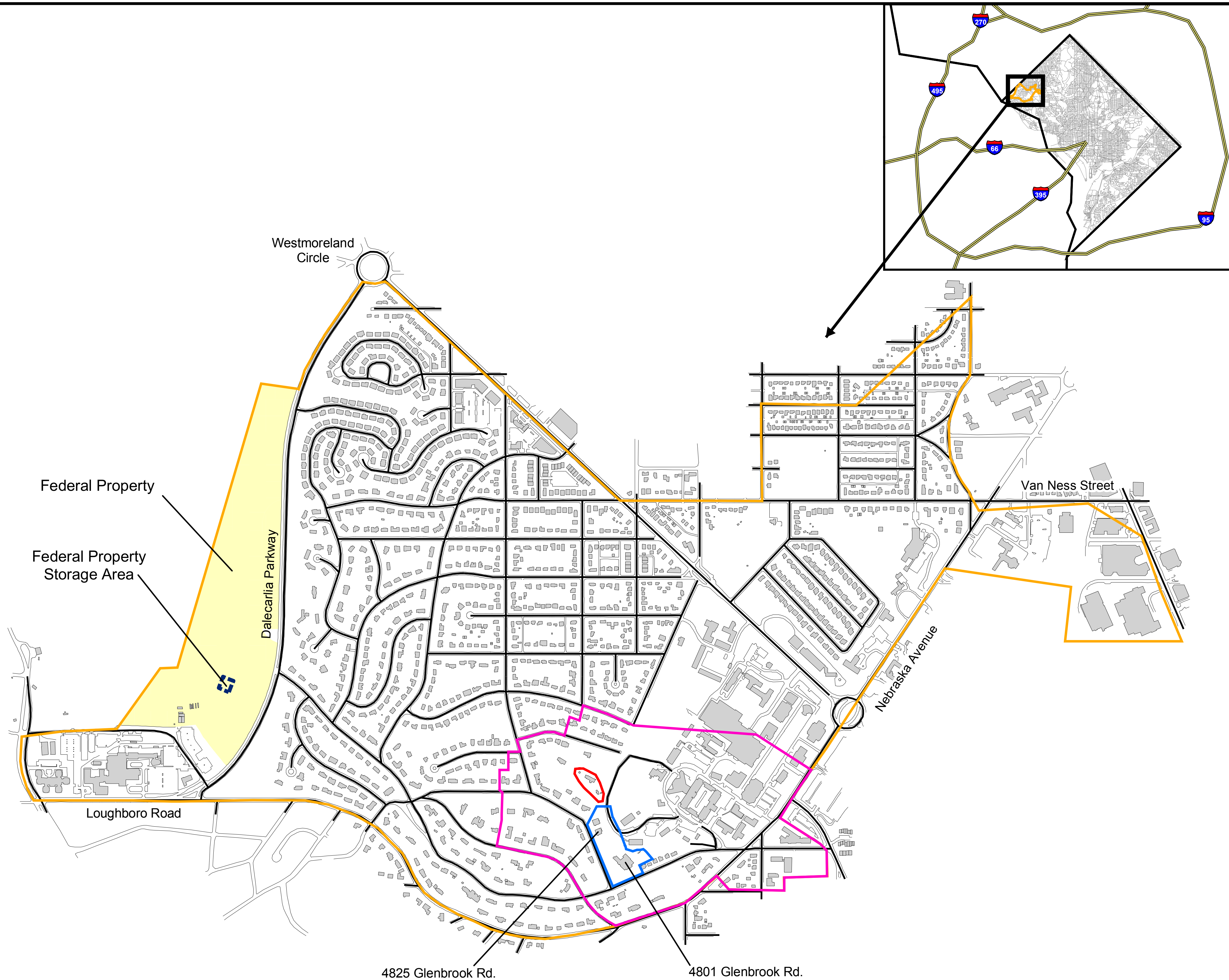

Figure 1-1
Spring Valley FUDS Location

Spring Valley
Washington, D.C.

Legend

- Buildings
- Road
- Federal Property
- Federal Property Storage Area

Operable Unit

- OU-2
- OU-3
- OU-4
- OU-5

Notes:

1. OU-1 encompasses all of the areas depicted as OU-2, 3, 4, and 5.
2. OU-4 and OU-5 do not include the smaller operable units shown within their boundaries (e.g., OU-4 does not include the areas shown as OU-2 and OU-3).

1,200 600 0 1,200 Feet

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- United States Army Corps of Engineers (USACE 1995) – Remedial Investigation (RI) soil sampling
- United States Environmental Protection Agency (USEPA 1999d) – surface soil sampling
- USACE (1999) – geophysical investigation
- USEPA (1999a) – X-ray fluorescence (XRF) sampling
- USEPA (1999b) – surface and subsurface soil sampling
- USACE (2009) – soil gas and driveway agent breakdown product (ABP) soil sampling

1.3.0.2 **EMS (1992).** In 1992, AU contracted EMS to investigate conditions discovered during construction activities in the vicinity of what would become the 4825 and 4835 Glenbrook Road properties. At that time, the properties were under construction and the EMS letter reports from May and June 1992 are not sufficiently detailed to determine the exact locations of the incidents described or the sampling performed. Workers reportedly experienced eye and respiratory irritation during construction activities (EMS 1992). A rusted drum, laboratory glassware, and a white granular material were reportedly encountered. EMS conducted soil gas probes, hand excavations around the drum, and collected various samples, including the white powder, which they concluded was the herbicide Silvex. The areas investigated were believed to be located in the vicinity of the current driveway of 4825 Glenbrook Road. A soil sample (052692-1CM) was collected; however, the exact location and the depth of the sample are unknown. Analytical results of the soil sample are summarized in Table A.1 of Appendix A. Data collected from this soil sample are conservatively used in the HHRA since the exact location of this sample is unknown.

1.3.0.3 **USACE (1995).** In support of the 1995 Operation Safe Removal (OSR) FUDS RI Report (USACE 1995) initiated by the D.C. Department of the Environment (DDOE), a soil sample (Baker-10) was collected as part of POI 53 (Baker Valley) sampling. The sample was collected at depth of 2.5 to 4 ft and analyzed for mustard, lewisite, mustard ABPs, and total cyanide but none of these analytes were detected (Table A.2 of Appendix A). The estimated location of this sample is illustrated in Figure 1-2 and it is assumed that this sample was removed during the investigation of Burial Pit 3.

1.3.0.4 **USACE (1999).** On February 22-24, 1999, a geophysical investigation was performed to locate subsurface anomalies. Geophysical data analysis indicated two anomalous areas of interest, Anomalies 6 and 7. These two anomalies were determined not to be representative of pits or trenches.

1.3.0.5 **USEPA (1999a).** In 1994, USEPA collected seven surface soil samples (S-1 through S-7) in 1994 (Figure 1-2; Table A.3 of Appendix A). As indicated in Table A.3, all of these samples, except S-7, were removed during later investigations. On April 23, 1999, as a part of a larger investigation, XRF was used to collect soil samples. XRF screening identified the depth with the highest arsenic concentration. One soil sample was collected from 4825 Glenbrook Road. The soil sample (OU3-SB01) was collected at the depth between 38-43 inches below the surface and analyzed for metals (Figure 1-2; Table A.4 in Appendix A). This sample was not removed.

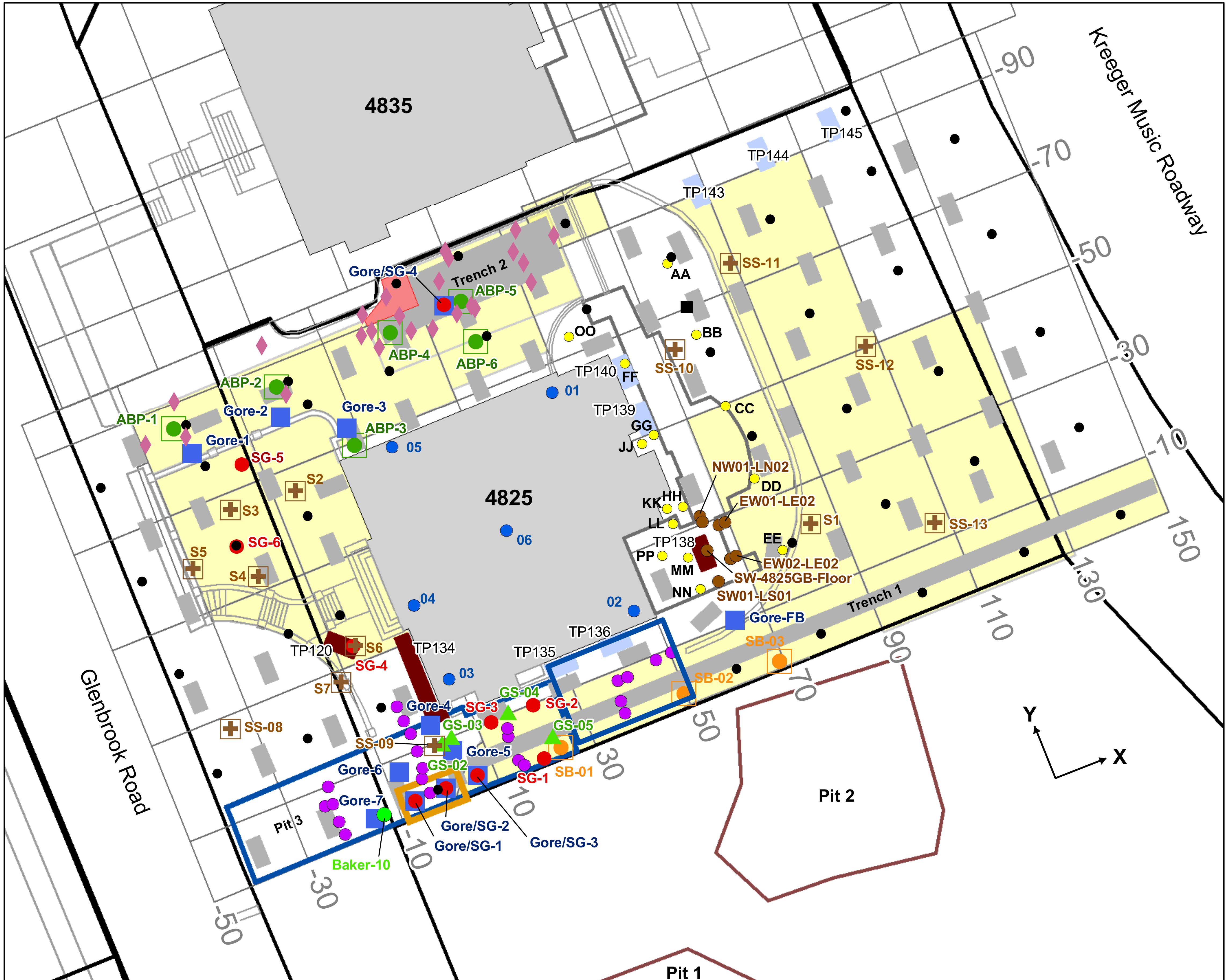

Figure 1-2
Sampling at 4825 Glenbrook Road

Spring Valley
Washington, D.C.

Legend

- High Probability Test Pits
- Test Pits Pending Investigation
- Test Pits Investigated with No Significant Finds
- Test Pit 23
- Geotechnical Borings (2010)
- Confirmation Samples-Backyard Investigation of Agent/ABP Contaminated Soil (2010)
- TP 138 Pit Characterization Samples (2009)
- Driveway Soil Confirmation Samples (2009)
- Pit 3 Soil Characterization and Confirmation Sample (2008-09)
- Grab Sample (2008)
- Soil Gas Probe Location (2007)
- Gore Sorber Location (2007)
- ABP Samples (2007)
- Arsenic Grid Soil Samples (2000-01)
- XRF Sample Location (1999)
- EPA Soil Borings (1999)
- EPA Surface Samples (1994 and 1999)
- Baker-10 Soil Sample (1994)
- Pits 1 and 2 (POI-24R)
- Property Boundaries
- Buildings
- 20' Grid
- Excavated Arsenic Grids
- Arsenic Grid to be Excavated
- ECS Footprint

Notes:

1.) Additional Sampling Not Shown: 1992 EMS Investigation (Specifics Unavailable). 2000 Quadrant Sampling for HD ABPs (Composited Locations).

0 10 20 40 Feet

1 inch = 20 feet

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1.3.0.6 **USEPA (1999b).** On June 9, 1999, USEPA collected six surface soil samples (SS-08 through SS-13) and surface and subsurface soil samples from three borings (SB-01 through SB-03) (Figure 1-2; Tables A.3 and A.4 in Appendix A). As indicated in Table A.3, four soil samples (SS-09, SS-11, SS-12, and SS-13) were removed during the later investigations, and SS-08 and SS-10 are still in place. Table A.4 summarizes the analytical results for SB-01 through SB-03. All samples collected from SB-01 boring and surface soil samples (0-0.5 ft) collected from SB-02 and SB-3 borings were removed, and the subsurface soil samples collected from SB-02 and SB-03 are still on place.

1.3.0.7 The results of the USEPA (1999c) sampling indicate that the soil at 4825 Glenbrook Road could have been affected by AUES activities in the vicinity of Burial Pits 1 and 2 at 4801 Glenbrook Road. Consequently, the USACE performed an EE/CA for 4801, 4825, and 4835 Glenbrook Road (USACE 2000a). The EE/CA investigation included extensive sampling to determine the nature and extent of contamination in surface and subsurface soil. The EE/CA included risk assessments for 4801 and 4825 Glenbrook Road, which concluded that exposure to arsenic in surface soil resulted in unacceptable risks. The EE/CA was conducted to identify the preferred remedial alternative to address arsenic soil contamination.

1.3.0.8 USACE (2009). In response to construction workers becoming sick upon encountering buried glassware beneath the driveway, a soil gas investigation was performed in March 2007. Six active soil gas samples (SG-1 through SG-6) were collected using Summa® canisters, and seven passive soil gas samples (Gore 1 through Gore 7) were collected using Gore sorber modules. Four co-located active and passive soil gas samples were collected (Gore/SG-1(4') through Gore/SG-4(2')). One ambient air Summa® canister sample was also collected. Since the mustard ABPs 1,4-oxathiane and 1,4-dithiane were detected in one co-located Summa and Gore sorber sample (Gore/SG-4(2') collected within Trench 02 at a depth of 2 ft, six soil samples (ABP-1 through ABP-6) were collected in June 2007 from the driveway and analyzed for ABPs. 1,4-Oxathiane, 1,4-dithiane, and thiodiglycol were not detected in any of the soil confirmation samples (Figure 1-2; Tables A.5, A.6 and A.7 in Appendix A).

1.4 CURRENT INVESTIGATION ACTIVITIES AND RESULTS

1.4.0.1 The USACE performed remedial investigations at 4825 Glenbrook Road from 2000 through 2010. These investigations will be documented in the Remedial Investigation Report currently being prepared and include:

- Grid-based soil sampling for arsenic and arsenic impacted soil removal (2000-2001)
- Test pit and trench investigations (May 2001- March 2002)
- Burial Pit 3 investigation and over-excavation (October 2007 – March 2009)
- Test pit investigations where the probability of encountering munitions and explosives of concern (MEC) and recovered chemical warfare materiel (RCWM)) was considered low (hereinafter referred to as "low probability test pits") (March – July 2009)
- Additional grid-based soil sampling, and removal, for arsenic in the driveway (May – July 2009)

- Test pit investigations where the probability of encountering MEC and RCWM was considered higher (hereinafter referred to as "high probability test pits") (December 2009-April 2010)

Geotechnical borings and backyard soil sampling (August 2010)

1.4.0.2 Grid-based Soil Sampling for Arsenic and Arsenic Impacted Soil Removal (2000-2001). On September 21, 2000, Parsons collected surface soil samples (0 to 6 inches below ground surface [bgs]) from the center of 44 of grids. Samples were analyzed only for arsenic (Table A.8 in Appendix A). At the request of DDOE, Parsons advanced six soil borings (Grids (-70,-30), (-70,-10), (-70,10), (-70,30), (-90,10), and (-90,30)) on January 23, 2001, in the driveway at 4825 Glenbrook Road and collected soil samples for arsenic analysis (Figure 1-2; Table A.8 in Appendix A). From December 2000 to March 2001, arsenic-contaminated soil from 25 grids at 4825 Glenbrook Road was excavated under the non-time critical removal action (NTCRA) Removal Action Design (RAD) (USACE 2000b). These arsenic-contaminated grids were identified to have arsenic concentrations greater than the Spring Valley arsenic remedial action level of 17 mg/kg for 0-2 feet and 41.4 mg/kg for below 2 feet. After the initial excavation to a depth of 2 feet (ft), grid confirmation samples were taken at the bottom of each excavation. Seven of the 25 grids required additional excavation to a depth of 4 feet based on confirmation sampling of the two-foot grid excavation. Sidewall confirmation samples were not collected. The remediation goal was revised to 20 mg/kg regardless of depth by the Scientific Advisory Panel (Scientific Advisory Panel Report, May 29, 2002 Meeting). Grids in the driveway containing arsenic concentrations higher than 20 mg/kg were excavated in 2009.

1.4.0.3 Test Pit and Trench Investigations (May 2001- March 2002). The initial test pit investigation started in May 2001. Twenty-three test pits (Test Pits 1 through 23) and two trenches were investigated. A total of 18 CWM-related items and 406 munitions-related items (73 MEC and 333 MD) were recovered from Test Pit 23. The southern portion of TP 23 location at 4801 Glenbrook Road was completely investigated and the northern portion of TP 23 was investigated later as Burial Pit 3.

1.4.0.4 Burial Pit 3 Investigations and Over-excavation (October 2007 – March 2009). In October 2007, the high probability test pit investigation commenced at Burial Pit 3 (former Test Pit 23). The primary goal of this intrusive investigation was to locate and remove all suspected AUES-related material from Burial Pit 3. All intrusive operations were conducted inside a negative pressure engineering control structure (ECS), and Edgewood Chemical and Biological Center (ECBC) monitored ambient air outside of the ECS for chemical agents. The original 50 ft by 16 ft proposed investigation area was excavated and cleared of debris. However, it was determined debris extended to the south and east beyond the original area.

1.4.0.5 Between April 28 and July 24, 2008, the Burial Pit 3 excavation and ECS were extended 17 ft to the east.

1.4.0.6 Between October 20 and 28, 2008, the excavation and ECS were extended 34 ft to the south to clear several geophysical anomalies adjacent to the Burial Pit 3 ECS that were identified during the Glenbrook Road Area geophysical survey (USACE 1999). Nineteen geophysical anomalies and one exploratory trench were excavated and no munitions debris or AUES-related glassware were found.

1.4.0.7 Between January 12 and March 12, 2009, the excavation and ECS were extended 24 ft to the east to investigate two anomalies identified in the east wall of the first east extension excavation.

1.4.0.8 During the excavation of Burial Pit 3 and extensions, six RCWM-related items, 22 MEC related items, and 80 MD items were recovered. One intact glass vial recovered from the excavation contained the CWM chlorodiphenylarsine (DA), a respiratory irritant, and was destroyed by ECBC. Four soil grab samples (SW-BP3-GS-02 through SW-BP3-GS-05) were collected near the munitions or AUES-related debris items (Table A.9) found during the excavations. No agent or ABP were detected in the samples. After the completion of the Burial Pit 3 investigation, pit characterization samples were collected from the excavation sidewalls and floors, including four floor samples (SW-BP3-EFL-(-10), SW-BP3-WFL-(-1), SW-BP3-EAST-FL-11.5, and SW-BP3-East2-FL(01)-5.0) and seven sidewall samples (SW-BP3-NEW01-5, SW-BP3-NWW01-2, SW-BP3-SEW01-5, SW-BP3-SWW01-2, SW-BP3-EAST-SW(01)-8, SW-BP3-East2-NEW(01)-2.5, and SW-BP3-East2-SWW(01)-2.5) (Figure 1-2; Table A.10 in Appendix A).

1.4.0.9 In July 2009, additional confirmation samples were collected in the Burial Pit 3 investigation. The confirmation sample locations are illustrated in Figure 1-2. Additional soil removal was performed based on the arsenic confirmation soil sampling results. Analytical results are summarized in Table A.10 in Appendix A.

1.4.0.10 Low Probability Test Pit Investigations (March - July 2009). On March 24, 2009, the 4825 Glenbrook Road Low Probability Test Pit Investigation started. Seven of the test pits were investigated during the Burial Pit 3 investigation. The original 39 test pits (Test Pits 95-133) were completed on July 17, 2009 with the exception of Test Pit 120. As arsenic was detected at 4,280 mg/kg (Table A.15) in a grab sample associated with discolored soil in Test Pit 120. Aluminum and thallium were the only other non-essential nutrient metals detected at elevated concentrations in this sample.

1.4.0.11 In July 2009, intrusive investigations started on the 12 additional test pits (Test Pits 134-145). The investigations continued until August 4, 2009, when mustard and mustard ABPs were detected inside a glass flask found in Test Pit 138 (Table A.13). In addition, mustard, lewisite, and ABPs were detected in white powdery soils encountered in Test Pit 120. These two test pits were instead covered with a plastic tarp until work resumes under an approved ECS. While investigating TP 137, a surface soil sample was collected on August 3, 2009 and analyzed for total arsenic only. The sampling location is illustrated in Figure 1-2. Analytical results are summarized in Table A.11 in Appendix A.

1.4.0.12 Additional Driveway Grid-Based Soil Sampling for Arsenic and Soil Removal (May – July 2009). Soil samples were collected in grid pattern to define the extent of arsenic-impacted soil in the driveway area (Figure 1-2). All arsenic-impacted soil in the driveway with concentrations exceeding the Spring Valley action level of 20 mg/kg was excavated and disposed off-site, except for one location beneath the retaining wall between 4825 and 4835 Glenbrook Road (Figure 1-2). It was agreed to leave this soil in place until further delineation is conducted. Analytical results are summarized in Table A.11 in Appendix A.

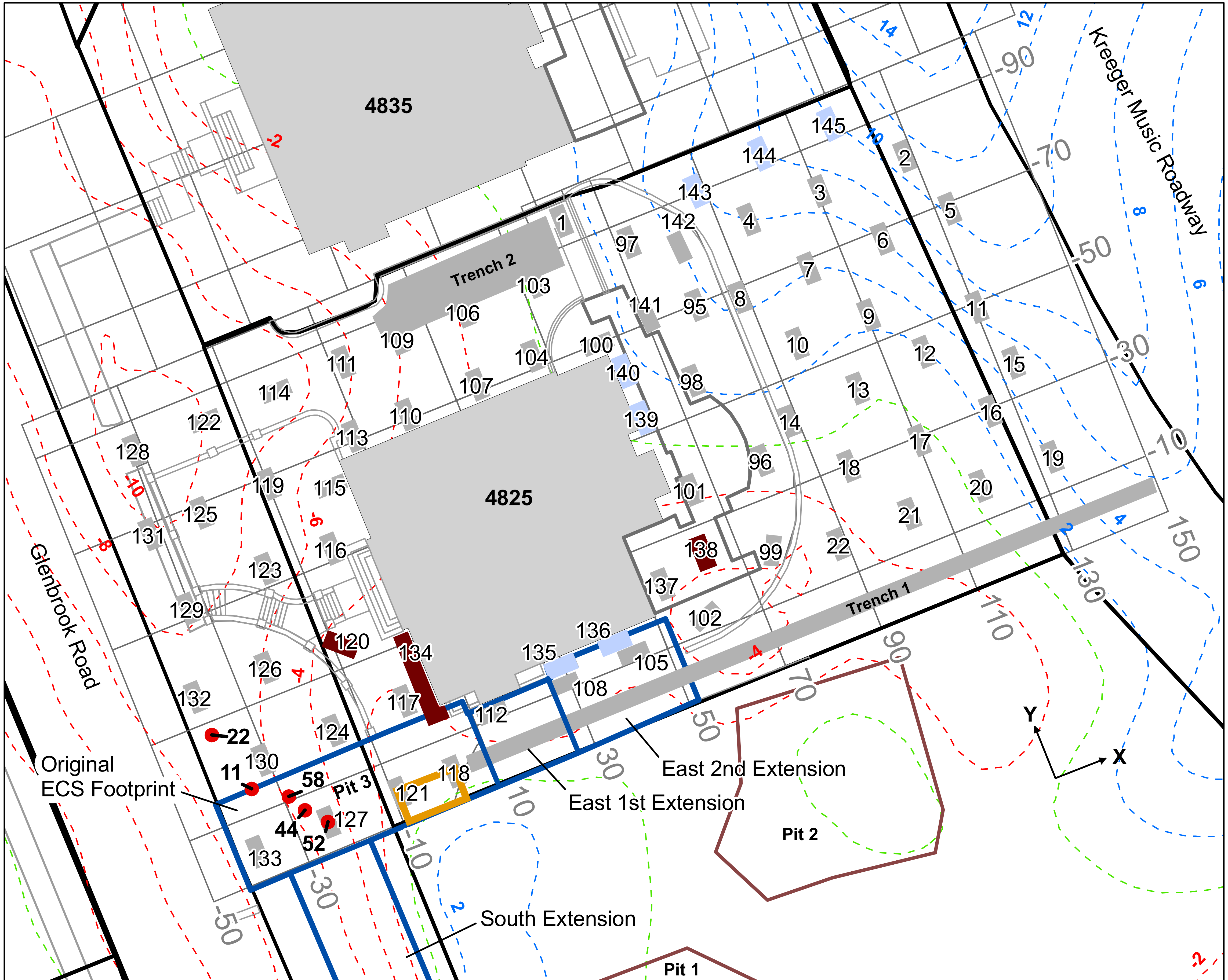

Figure 1-3
Test Pit Locations
4825 Glenbrook Road

Spring Valley
Washington, D.C.

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1.4.0.13 High Probability Test Pit Investigations (November 2009 – April 2010). In November 2009, high probability test pit investigations started on Test Pit 138 and were completed in December 2009. Agent and ABPs were detected in an open cavity container and soil in this test pit. One grab sample was collected in an area where the container (SCR-006) was recovered. Mustard ABPs were detected in the grab sample. All agent and ABP-impacted soils were excavated, placed in drums, and disposed off-site. After the completion of TP 138, one floor (6.5 ft bgs) and four sidewall (2 ft bgs) pit characterization samples were collected. Arsenic was detected in the floor sample at a concentration of 601 ppm and therefore, the excavation was temporarily backfilled. The sampling locations are illustrated in Figure 1-2. Analytical results for the pit characterization and grab samples are summarized in Tables A.12 and A.13 in Appendix A.

1.4.0.14 In January 2010, high probability test pit investigations started on TPs 120 and 134. Agent and ABPs were detected in uncovered intact containers and soil in these test pits. Samples collected from intact (open and closed) containers were analyzed for agent, ABPs, and unknown compounds. Three grab samples (SW-4825GB-GS11, SW-4825GB-GS12, and SW-4825GB-GS13) cleared for agent/ABP were submitted to Analytical Laboratory Services, Inc. (ALSI) in Middletown, Pennsylvania and analyzed for Spring Valley grab sample parameter analysis. The high probability test pit investigations were ceased due to detection of arsenic trichloride in a glass bottle in April 2010. CWM, including H, L, and ABPs, were quantitatively detected in intact container and grab soil samples. Other CWM-related compounds such as chloroacetophenone (CN), chlorodiphenylarsine (DA), phosgene oxime (CX), and arsenic trichloride were also identified by the qualitative gas chromatography/mass spectrometry (GC/MS) full scan analysis in some of the intact container samples. This area will be addressed later after the chemical filtration system is approved for arsenic trichloride. Analytical results for the intact containers and grab samples are summarized in Tables A.14 and A.15 in Appendix A. CWM, including H, L and ABPs, were detected in the soil, and suspected AUES intact containers were uncovered in the vicinity of Test Pits 120 and 134.

1.4.0.15 Geotechnical Borings and Backyard Sampling (August 2010). In August 2010, geotechnical borings and backyard sampling were completed. For the backyard sampling, 15 soil sample locations were chosen in a grid pattern to investigate if there was any presence of agent and ABPs in the backyard. At 12 of the 15 sample locations, samples were collected at 0-6 inches bgs and 3 ft bgs. At the remaining three locations, samples were collected at 4.5 ft bgs due to the area being backfilled previously to 4 ft bgs. Samples were cleared for agent and ABPs except for two samples (SW-4825GBMM2, and SW-4825GB-PP2). L was detected in these two samples. Two samples collected and cleared for agent and ABPs (SW-4825GB-AA2 and SW-4825GB-GG2) were submitted to ALSI for volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), and explosives analysis. Six geotechnical boring samples were collected inside the house at 4825 Glenbrook Road. Geotechnical boring soil samples were cleared for agent and ABPs, and further analyzed for VOCs and tentatively identified compounds (TIC), SVOCs and TICs, explosives, metals, and other individual parameters as listed in the Quality Assurance Project Plan (QAPP). Sampling locations are illustrated in Figure 1-2. Analytical results are summarized in Tables A.16 and A.17 in Appendix A.

1.5 OBJECTIVES AND SCOPE

1.5.0.1 The objective is to conduct a site-specific quantitative HHRA for human receptors at 4825 Glenbrook Road. All previously collected data was evaluated following guidance from the United States Environmental Protection Agency (USEPA, 1992a) to determine whether it was acceptable for use in an HHRA. Data considered acceptable were used to identify and screen chemicals of potential concern (COPCs). For the receptors present at the site, the HHRA estimated the magnitude of assumed exposure to COPCs and identified potential exposure pathways. This information, in conjunction with toxicity information for the COPCs, provides a quantitative post-interim removal measures risk assessment and determines if potential risks to human health associated with exposure to chemicals in the soil remaining at 4825 Glenbrook Road are acceptable.

1.5.0.2 The HHRA was conducted following techniques and methods prescribed by the USACE and USEPA, including the following:

- Risk Assessment Guidance for Superfund (RAGS), Volume 1, Human Health Evaluation Manual (Part A), interim final (USEPA 1989a);
- Risk Assessment Guidance for Superfund (RAGS), Volume 1, Human Health Evaluation Manual, Supplemental Guidance, Standard Default Exposure Factors (USEPA 1991a);
- Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions (USEPA 1991b).
- Guidance for Data Usability in Risk Assessment (Part A) (USEPA 1992a);
- Soil Screening Guidance: Technical Background Document (USEPA 1996);
- Exposure Factors Handbook (USEPA 1997a);
- Child-Specific Exposure Factors Handbook (USEPA 2008);
- Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (USEPA 2002a);
- Calculating upper confidence limits for exposure point concentrations at hazardous waste sites (USEPA 2002b)
- Human Health Toxicity Values in Superfund Risk Assessments (USEPA 2003);
- Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment (USEPA 2004a);
- On the computation of a 95 percent upper confidence limit of the unknown population mean based upon data sets with below detection limit observations (USEPA 2006a);
- Risk Assessment Guidance for Superfund (RAGS). Volume I: Human health evaluation manual. Part F, Supplemental Guidance for Inhalation Risk Assessment (USEPA 2009);
- Technical and user guides to ProUCL v4.1.00 (USEPA 2010a,b); and
- Regional Screening Levels – User's Guide (USEPA 2011a).

1.5.0.3 The scope of this HHRA only evaluates the risks associated with assumed human exposure to soil contamination and the potential for contaminants detected in soil to leach to groundwater. The potable use of groundwater will be evaluated on a site-wide basis in a separate report.

1.6 TECHNICAL APPROACH OVERVIEW

1.6.0.1 The four-step risk assessment procedure recommended by USEPA (1989a) was used for this evaluation. The four steps are as follows:

1. data evaluation;
2. exposure assessment;
3. toxicity assessment; and
4. risk characterization.

1.6.0.2 The first step of the HHRA process involves an evaluation of available data. Section 2.1 describes data from previous site investigations used in this evaluation. Data were also screened to identify the COPCs that will be evaluated in the subsequent steps.

1.6.0.3 The second step in the HHRA process is exposure assessment. The purpose of the exposure assessment is to identify and evaluate the nature of past chemical releases, potential exposure pathways, potential receptors, and exposure scenarios. This involves the preparation of a Conceptual Site Model (CSM) to determine which potential exposure pathways will be evaluated. The CSM is site specific and was used to identify all potentially complete exposure pathways for both current and future human receptors.

1.6.0.4 Steps 3 and 4 (toxicity assessment and risk characterization) are performed for those chemicals identified as COPCs in step 1. The toxicity assessment involves researching available toxicity data and is conducted concurrently with step 2, the exposure assessment. If toxicity data are available, step 4 is conducted and cancer risk estimates and noncancer estimates (also referred to as hazard estimates) are determined for each COPC for each complete exposure pathway. Risk/hazard estimates for each chemical are summed for each receptor to determine the cumulative potential health threat to a potential receptor exposed to site-related contamination (i.e., risk characterization). The risk characterization step also includes an evaluation of the uncertainties associated with steps 1 through 4, including a qualitative description of the inherent and site-specific uncertainties in the HHRA. The uncertainty evaluation also discusses the potential effects on the risk estimates; i.e., the risks may be over- or under-estimated, depending on the uncertainties in the HHRA.

1.7 ORGANIZATION OF THE RISK ASSESSMENT

This report consists of seven sections, including this introduction, and seven appendices.

- Section 2 presents the data evaluation, summarizes the analytical results, summarizes the results of the statistical calculations (including the background comparisons and derivation of exposure-point concentrations), and presents the results of the risk-based concentration screening.
- Section 3 presents the human health exposure assessment.
- Section 4 presents the toxicity assessment.
- Section 5 provides the method to characterize potential human health risks, including a qualitative analysis of the uncertainties in the HHRA process.
- Section 6 presents the potential risk remaining in the uninvestigated areas.
- Section 7 presents the conclusions of the HHRA.
- Section 8 lists references cited in this report.

- Appendix A presents data summary tables.
- Appendix B presents the calculations of the exposure point concentrations.
- Appendix C presents the derivation of the particulate emissions factors (PEF).
- Appendix D presents the site-related soil gas indoor air calculations.
- Appendix E presents homegrown vegetable intake parameters.
- Appendix F presents the SESOIL modeling.
- Appendix G presents USEPA Region 3 e-mail
- Appendix H presents the risk characterization tables.

SECTION 2
DATA EVALUATION AND IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN

2.0.0.1 The first step of the HHRA process involves a review of the available site data that can be used in the HHRA. This step includes:

- Data gathering and review of existing reports;
- Development of data sets for potentially complete exposure pathways (performed in conjunction with the human health exposure assessment – discussed in Section 3 of this report); and
- Identification of COPCs to be included in the HHRA.

2.0.0.2 The section below describes the process for evaluating site data, developing the data set used in the HHRA, and presents the specific COPCs evaluated in the HHRA.

2.1 SUMMARY OF EXISTING DATA

2.1.0.1 4825 Glenbrook Road (4825GR) is a private residential parcel of approximately 0.4 acres located within OU-3 of the SVFUDS. Over the years, numerous investigations have been performed at the 4825GR property, at different times, by different parties, and with different sampling objectives and analytical parameters. These efforts include:

- 1992, EMS (contracted by AU)
- 1995, USACE
- 1994, USEPA
- 1999, USEPA
- 2000-present, USACE/Parsons

2.1.0.2 The existing data collected from various investigation activities are summarized in Appendix A, with a separate data summary table for each investigation (Tables A.1 through A.17).

2.1.0.3 The locations of the samples, color-coded to match the various investigations, are shown in Figure 1-2. Note that because of overlapping excavations and sample locations, not every sample is individually identified on the figure. Additionally, some samples are shown in approximate locations (for example, the blue dots are specific to the excavated grid with which they are associated, but the discrete location is approximate).

2.1.0.4 Several removal actions have been performed to remove CWM and hazardous and toxic waste, as follows:

- 2000-2001. All arsenic impacted soil detected at concentrations exceeding 20 mg/kg was removed from the site, except for a small area in the northwest portion of the site that will be removed at a later date (Figure 2-1).

- 2007-2009. Burial Pit 3, and areas to the east, and south were excavated to remove munitions and HTW impacted soil. These excavations were covered by an ECS (Figure 2-1).
- 2009 and 2010. The area in the vicinity of Test Pit 138 was excavated for munitions clearance and the area in the vicinity of Test Pits 120 and 134 were excavated until excavations were forced to cease when arsenic trichloride was found within the excavation (Figures 1-3, 2-1). These excavations were covered by an ECS.

All samples from previous reports and investigations that were collected within the lateral and vertical boundaries of the excavation have been removed. The samples remaining at the site are shown in Table 2-1 and Figure 2-2. The excavated soil was disposed off-site at a permitted hazardous waste landfill and clean imported fill material was used to bring the excavation back to the original grade. Four representative soil samples were collected from the imported fill (Table 2-1, Table A.18 in Appendix A).

2.1.0.5 A total of 119 soil samples, including four fill samples, representative of soil still in place (Table 2-1, Figure 2-2) were collected at the site. Seventy-one samples were collected during the arsenic removal and one sample was collected from the low probability test pit investigation activities. These 71 samples were analyzed either a) only for arsenic, or b) for aluminum, antimony, barium, cadmium, copper, lead, manganese, mercury, nickel, thallium, vanadium, and zinc (Tables A.8 and A.11). The 12-metals suite was based on a request from AU at the time arsenic remediation and associated sampling was beginning at the 4825 Glenbrook Road property. The 12 metals represent constituents that historically exceeded risk-based screening levels at SVFUDS. Twenty-three pit characterization samples were collected from Burial Pit 3 and high probability test pits. Six grab samples were collected from geotechnical borings inside the house and two were from backyard soil sampling. All samples collected in Burial Pit 3 (Tables A.9 and A.10) and all geotechnical soil boring and backyard grab soil samples (Table A.17) were analyzed for the full Spring Valley suite of analytes, including VOCs, SVOCs, metals, explosives, total cyanide, fluoride, iodide, and perchlorate. Three surface and eight subsurface soil samples were collected by USEPA (1999a&b) in 1994 and 1999. These samples were analyzed for VOCs, SVOCs, metals, and pesticides/herbicides and polychlorinated biphenyls (PCB) (Tables A.3 and A.4). Finally, EMS (1992) collected a sample that was analyzed for VOCs, SVOCs, metals, and pesticides/herbicides/PCBs (Tables A.3 and A.4). The data collected by USACE between 2000 through 2010 was validated in accordance with the USEPA data validation guidance listed in the approved QAPP in the Site-Wide Work Plan (USACE 2007). These data, except for the R qualified (i.e., rejected) data, are usable for risk assessment purposes and were used in the risk assessment (USACE 2011). Data from EMS (1992) and USEPA (1999a, b, d) were used as originally reported.

Figure 2-1
Excavated Areas at
4825 Glenbrook Road

Spring Valley
Washington, D.C.

Legend

- Buildings
- Property Boundaries
- 20' Grid
- Pits 1 and 2 (POI-24R)
- ECS Footprint - (Burial Pit 3)
- Arsenic Exceedance to be Further Excavated

Arsenic Soil

- Arsenic Grid Previously Removed [2'] (2000-01)
- Arsenic Grid Previously Removed [3'] (2009)
- Arsenic Grid Previously Removed [4'] (2000-01)
- Arsenic Grid Previously Removed [5'] (2009)
- Arsenic Grid Previously Removed [6'] (2009)

Soil Excavation

- Excavation Depth [3.5'] (2009)
- Excavation Depth [4'] (2010)
- Excavation Depth [5'] (2010)
- Excavation Depth [6'] (2010)
- Excavation Depth [6.5'] (2009)

Test Pit 23

- Excavation Depth [13'] (2002)

Soil Overexcavation

- Overexcavation Depth [1.5'] (2009)
- Overexcavation Depth [4.5'-6.5'] (2009)
- Overexcavation Depth [10.5'] (2009)
- Overexcavation Depth [12'] (2009)

0 10 20 40 Feet

1 inch = 20 feet

Scale:	1:245
Created By:	Parsons
File:	20101020 4825 Glenbrook Road Clean Fill.mxd
Date:	10/20/2010
Figure Number:	2-1
Page Number:	2-3

PARSONS

Figure 2-2
In Place Sample Location Map
4825 Glenbrook Road

Spring Valley
Washington, D.C.

Legend

- Geotechnical Borings (2010)
- Soil Confirmation Samples (2010)
- TP 138 Pit Characterization Samples (2009)
- Driveway Soil Confirmation Samples (2009)
- Pit 3 Soil Characterization and Confirmation Sample (2008-09)
- Arsenic Grid Soil Samples (2000-01)
- XRF Sample Location (1999)
- EPA Soil Borings (1999)
- EPA Surface Samples (1994 and 1999)
- Pits 1 and 2 (POI-24R)
- Test Pit 23
- Property Boundaries
- Buildings
- 20' Grid
- Excavated Arsenic Grids
- Arsenic Grid to be Excavated
- ECS Footprint

Notes:

1.) Additional Sampling Not Shown: 1992 EMS Investigation (Specifics Unavailable). 2000 Quadrant Sampling for HD ABPs (Composited Locations).

0 10 20 40 Feet

1 inch = 20 feet

Scale:	1:240
Created By:	Parsons
File:	20110314 4825 Glenbrook Sampling Location Map.mxd
Date:	10/4/2010
Figure Number:	2-2
Page Number:	2-4

PARSONS

Table 2-1
Unexcavated Samples Used in the Risk Assessment
4825 Glenbrook Rd.

Metals data		Metals and Non-Metals data	
Sample ID	**Collected By**	**Sample ID**	**Collected By**
Grid (-90, 50)-2	Parsons, 2000	052692-1CM	EMS (1992)
Grid (-90, 110)	Parsons, 2000	S-7	EPA (1994)
Grid (-70,-50)	Parsons, 2000	SS-8	EPA (1999)
Grid (-70,-30)-4	Parsons, 2000	SS-10	EPA (1999)
Grid (-70, 30)	Parsons, 2000	OU3-SB01	EPA (1999)
Grid (-70, 50)	Parsons, 2000	SB-02-02	EPA (1999)
Grid (-70, 70)	Parsons, 2000	SB-02-03	EPA (1999)
Grid (-70, 70)-2	Parsons, 2000	SB-02-04	EPA (1999)
Grid (-70, 90)-2	Parsons, 2000	SB-02-05	EPA (1999)
Grid (-70, 110)	Parsons, 2000	SB-03-02	EPA (1999)
Grid (-70, 130)	Parsons, 2000	SB-03-03	EPA (1999)
Grid (-50, -50)-1	Parsons, 2000	SB-03-04	EPA (1999)
Grid (-50, -50)-2	Parsons, 2000	SW-BP3-EFL-(-10)/-C	Parsons, 2008/2009
Grid (-50, -30)-2	Parsons, 2000	SW-BP3-WFL-(-1)/-C	Parsons, 2008/2009
Grid (-50, -10)-2	Parsons, 2000	SW-BP3-NEW01-5/-1	Parsons, 2008/2009
Grid (-50, 70)-1	Parsons, 2000	SW-BP3-NEW01-5-2	Parsons, 2009
Grid (-50, 70)-2	Parsons, 2000	SW-BP3-NEW01-5-3	Parsons, 2009
Grid (-50, 90)-2	Parsons, 2000	SW-BP3-NEW01-5-4	Parsons, 2009
Grid (-50, 110)	Parsons, 2000	SW-BP3-NWW01-2	Parsons, 2008
Grid (-50, 130)	Parsons, 2000	SW-BP3-SEW01-5	Parsons, 2008
Grid (-30, -50)	Parsons, 2000	SW-BP3-SWW01-2/02	Parsons, 2008/2009
Grid (-30, -30)-2	Parsons, 2000	SW-BP3-EAST-FL-11.5/-C	Parsons, 2008/2009
Grid (-30, -10)-2	Parsons, 2000	SW-BP3-EAST-SW(01)-8/(02)	Parsons, 2008/2009
Grid (-30, 70)-4	Parsons, 2000	SW-BP3-EAST-SW(02)-11	Parsons, 2008
Grid (-30, 90)-2	Parsons, 2000	SW-BP3-East2-FL(01)-5.0	Parsons, 2008
Grid (-30, 110)-2	Parsons, 2000	SW-BP3-East2-FL(01)-5.0-C	Parsons, 2009
Grid (-30, 130)-1	Parsons, 2000	SW-BP3-East2-NEW(01)-2.5	Parsons, 2008
Grid (-30, 130)-2	Parsons, 2000	SW-BP3-East2-NEW(02)-2.5	Parsons, 2008
Grid (-10, -50)	Parsons, 2000	SW-BP3-East2-SWW(01)-2.5	Parsons, 2008
Grid (-10, -30)	Parsons, 2000	SW-BP3-East2-SWW(02)-2.5	Parsons, 2008
Grid (-10, 70)-4	Parsons, 2000	SW-4825GB-EW01-LE01[2]	Parsons, 2009
Grid (-10, 90)-2	Parsons, 2000	SW-4825GB-EW02-LE01[2]	Parsons, 2009
Grid (-10, 110)-4	Parsons, 2000	SW-4825GB-NW01-LN01[2]	Parsons, 2009
Grid (-10, 130)	Parsons, 2000	SW-4825GB-SW01-LS01[2]	Parsons, 2009
Grid (-10, 130)	Parsons, 2000	SW-4825GB-FLOOR-[6.5]	Parsons, 2009
Grid (0, 50)	Parsons, 2000	SW-4825GB-AA2	Parsons, 2010
Grid (0, 70)-2	Parsons, 2000	SW-4825GB-GG2	Parsons, 2010
Grid (0, 90)-4	Parsons, 2000	SW-4825GB-GS01	Parsons, 2010
Grid (0, 110)-4	Parsons, 2000	SW-4825GB-GS02	Parsons, 2010
Grid (0, 130)-2	Parsons, 2000	SW-4825GB-GS03/SW-4825GB-GS07	Parsons, 2010
SW-4825GB-(-70,-30)-3.0	Parsons, 2009	SW-4825GB-GS04	Parsons, 2010
SW-4825GB-(-70,-30)-4.0	Parsons, 2009	SW-4825GB-GS05	Parsons, 2010
SW-4825GB-(-70,-10)-3.0	Parsons, 2009	SW-4825GB-GS06	Parsons, 2010
SW-4825GB-(-70,-10)-4.0	Parsons, 2009	SW-4825GB-AA1	Parsons, 2010
SW-4825GB-(-70,10)-3.0	Parsons, 2009	SW-4825GB-BB1	Parsons, 2010
SW-4825GB-(-70,10)-4.0	Parsons, 2009	SW-4825GB-BB2	Parsons, 2010
SW-4825GB-(-70,10)SW-E-0.5	Parsons, 2009	SW-4825GB-CC(4.5)	Parsons, 2010
SW-4825GB-(-90, 30)-T2-6.0	Parsons, 2009	SW-4825GB-DD(4.5)	Parsons, 2010
SW-4825GB-(-90,50)-T2-5.0	Parsons, 2009	SW-4825GB-EE(4.5)	Parsons, 2010
SW-4825GB-(-70, 30)SW-S(5)-0.5	Parsons, 2009	SW-4825GB-FF1	Parsons, 2010
SW-4825GB-(-70,50)-T2-SW-N-4.5	Parsons, 2009	SW-4825GB-FF2	Parsons, 2010

Table 2-1
Unexcavated Samples Used in the Risk Assessment
4825 Glenbrook Rd.

Metals data		**Metals and Non-Metals data**	
SW-4825GB-(-90,50)-T2-SW-E-4.5	Parsons, 2009	SW-4825GB-GG1	Parsons, 2010
SW-4825GB-(-70,50)SW-T2-S1-0.5	Parsons, 2009	SW-4825GB-HH1	Parsons, 2010
SW-4825GB-(-70,50)SW-T2-S1-4.5	Parsons, 2009	SW-4825GB-HH2	Parsons, 2010
SW-4825GB-(-90,10)SW-E-2.5	Parsons, 2009	SW-4825GB-JJ1	Parsons, 2010
SW-4825GB-(-90,-10)SW-N1-0.5	Parsons, 2009	SW-4825GB-JJ2	Parsons, 2010
SW-4825GB-(-90,-10)SW-N1-2.5	Parsons, 2009	SW-4825GB-KK1	Parsons, 2010
SW-4825GB-(-90,10)SW-N1-0.5	Parsons, 2009	SW-4825GB-KK2	Parsons, 2010
SW-4825GB-(-90,10)SW-N1-2.5	Parsons, 2009	SW-4825GB-LL1	Parsons, 2010
SW-4825GB-(-70,30)-T2-SW-S-5.0	Parsons, 2009	SW-4825GB-LL2	Parsons, 2010
SW-4825GB-(-70,30)-T2-SW-S-6.0	Parsons, 2009	SW-4825GB-MM1	Parsons, 2010
SW-4825GB-(-90,-30)-SW-N-0.5	Parsons, 2009	SW-4825GB-MM2	Parsons, 2010
SW-4825GB-(-90,-30)-SW-N-2.5	Parsons, 2009	SW-4825GB-NN1	Parsons, 2010
SW-4825GB-(-90,-30)-SW-W-0.5	Parsons, 2009	SW-4825GB-NN2	Parsons, 2010
SW-4825GB-(-90,-30)-SW-W-2.5	Parsons, 2009	SW-4825GB-OO1	Parsons, 2010
SW-4825GB-(-70,10)-T2-6.0	Parsons, 2009	SW-4825GB-OO2	Parsons, 2010
SW-4825GB-(-70,10)-T2-SW-S-5.5	Parsons, 2009	SW-4825GB-PP1	Parsons, 2010
SW-4825GB-(-70,10)T2-SW-W2-5.5	Parsons, 2009	SW-4825GB-PP2	Parsons, 2010
SW-4825GB-(-70,30)-T2-SW-S-5.5	Parsons, 2009		
SW-4825GB-(-90,10)-T2-SW-N-5.5	Parsons, 2009		
SW-4825GB-(90,30)-T2-SW-N1-5.5	Parsons, 2009		
4825GB-TEST PIT 137-18 BGS	Parsons, 2009		
203-BF(G1)-2751-0	Sevenson, 2007		
203-BF(G2)-2752-0	Sevenson, 2007		
203-BF(G3)-2753-0	Sevenson, 2007		
203-BF(C)-2754-0 7H07004-	Sevenson, 2007		

Note:

	Agent/ABPs and non-metal data were analyzed in the grey shaded samples.
	Only agent/ABPs were analyzed in the yellow shaded samples.

2.1.0.6 ECBC analyzed samples collected from suspected AUES-related uncovered intact containers and soil samples collected from the high probability investigation activities for chemical agents (i.e., mustard agent and lewisite) and their breakdown products (e.g., 1,4-dithiane and 1,4-oxathiane). Qualitative full scan GC/MS analyses were performed in selected samples from intact containers to identify the contents (Table A.14). All soil samples associated with the high probability test pits, six driveway soil samples, six geotechnical boring soil samples, and fifteen backyard samples were also analyzed for chemical agents and ABPs (Table A.16).

2.1.0.7 Ten soil gas samples were collected using Summa® canisters and twelve soil gas samples were collected using Gore sorbers (Tables A.5 and A.6).

2.1.0.8 The number of samples that reflect current conditions at the site that were analyzed for the various groups of analytes are as follows:

- Metals 115
- VOCs 43
- SVOCs 43
- Pesticides 12
- Herbicides 12
- PCBs 12
- Explosives 31
- Agent/ABPs 56/56
- Soil Gas[1] 22

2.1.0.9 Note that within each analyte group, the numbers of samples analyzed for an individual chemical may vary, as the analyte list differed among the multiple investigations performed at the site.

2.2 IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN

The chemicals of potential concern (COPCs) identified for soil, soil gas, and groundwater protection were discussed in this section.

2.2.1 Soil

2.2.1.1 COPCs were identified from the 119 samples representative of soils remaining in place at the site (Tables 2-1 through 2-3). As discussed in the HHRA work plan (USACE 2010), data from the samples remaining in place at the site were screened to identify COPCs in soils:

- Essential nutrients were removed from further consideration. Essential nutrients include calcium, chloride, iodine, iron, magnesium, phosphorus, potassium, and sodium (USEPA 1989). Iodine and phosphorous are potentially related to the AUES activities. However, these compounds are essential nutrients for humans and are not considered to be toxic.

[1]These soils were subsequently removed and replaced with clean soil. Soil gas results, therefore, reflect conservative estimates of soil gas concentrations.

- For non-metals (excluding polycyclic aromatic hydrocarbons [PAH]), the maximum detected concentration (from up to 10 feet bgs) of each chemical was compared to the USEPA residential Regional Screening Levels (RSL) (USEPA 2011a). For carcinogens, the RSL is protective of a risk level of 1×10^{-6}. For noncarcinogens, the RSL is protective of a hazard quotient of 1. To account for potential cumulative effects, the RSLs for noncarcinogens were divided by 10 to be protective of a hazard quotient of 0.1. Only chemicals detected at concentrations that exceed the RSLs were retained as COPCs.
- For metals and PAHs, the maximum detected concentration was compared to the greater of the residential RSL (as described above) and the background Upper Tolerance Limit (UTL, or the upper 95 % confidence limit on the 95th percentile) (USACE, 2008a). Metals and PAHs were eliminated as COPCs if the maximum detected concentration was less than the greater of the background UTL or the residential RSL. Comparison to background UTLs, to determine which metals and PAHs are elevated over background, is consistent with USEPA guidance (1989b, 1992b, 2006a,b, and 2010a,b).
- The screening levels for H and L were from a study performed by Oak Ridge National Laboratory (ORNL, 2007), which reflects validation of values published in United States Army Center for Health Promotion and Preventive Medicine (USACHPPM, 1999). The RSL for 1,4-dithiane was used for 1,4-thioxane (USACE 2008g).
- Thallium and vanadium were screened against background levels.

2.2.1.2 Although the three chemicals listed below were detected in soils at the site, they do not have RSLs.

- Iodine pentafluoride (as iodate)
- 4-Nitrophenol
- Phenyl isocyanate

2.2.1.3 Further, there is no toxicity data for these three chemicals from the hierarchy of sources listed in Section 4. Therefore, iodine pentafluoride, 4-nitrophenol, and phenyl isocyanate cannot be quantitatively evaluated in this risk assessment and these chemicals were not identified as COPCs. Mustard agent and ABPs were not identified as COPCs because they were not detected in any of the in-place soil samples.

2.2.1.4 Following this procedure, the following 7 COPCs were identified in soil for quantitative evaluation (Tables 2-2 and 2-3):

- Aluminum;
- Arsenic;
- Cobalt;
- Manganese;
- Thallium;
- Vanadium; and
- Lewisite.

Table 2-2
Soil COPC Selection for Metals, PAHs, and Agents/ABPs
4825 Glenbrook Road
Spring Valley, Washington, D.C.

Chemical	Sample Size (-)	Number of NDs (-)	Frequency of Detection (-)	Arithmetic Average of Detected Concentrations (mg/kg)	Range of Detection Limits (mg/kg)	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Background UTL[1] (mg/kg)	Residential RSL[2,3] (mg/kg)	Screening Level[4] (mg/kg)	Maximum Detect Greater Than Screening Level?	COPC?
Polycyclic Aromatic Hydrocarbons												
Benzo(a)anthracene	27	26	4%	0.02	0.000398 - 0.42	0.024	0.024	0.36	0.15	0.15	No	No
Benzo(b)fluoranthene	27	26	4%	0.03	0.000398 - 0.42	0.026	0.026	0.37	1.5	0.15	No	No
Benzo(k)fluoranthene	26	25	4%	0.02	0.0523 - 0.42	0.021	0.021	0.37	1.5	1.5	No	No
Chrysene	26	25	4%	0.03	0.0523 - 0.42	0.031	0.031	0.4	15	15	No	No
Fluoranthene	26	25	4%	0.04	0.0523 - 0.42	0.043	0.043	0.7	230	230	No	No
Pyrene	27	25	7%	0.03	0.0523 - 0.42	0.02	0.035	0.63	170	170	No	No
Metals												
Aluminum	59	0	100%	27250.85	NA	9700	59300	19100	7700	19100	Yes	**Yes**
Antimony	46	36	22%	1.21	1.9 - 32.5	0.3	4.7	5.2	3.1	5.2	No	No
Arsenic	113	3	97%	22.36	1 - 10	0.38	601	12.6	0.39	12.6	Yes	**Yes**
Barium	53	0	100%	129.35	NA	23.2	277	172	1500	1500	No	No
Beryllium	28	3	89%	1.76	2.5 - 2.5	0.59	15	1.9	16	16	No	No
Boron, Total	15	10	33%	10.48	9.4 - 25	8.3	13.7	NA	1600	1600	No	No
Cadmium	51	26	49%	0.40	0.47 - 5	0.023	2	2.36	7	7	No	No
Chromium	32	0	100%	74.28	NA	15.5	177	51.3	12000	12000	No	No
Chromium, hexavalent	1	0	100%	2.60	NA	2.6	2.6	7.33	0.29	7.33	No	No
Cobalt	33	1	97%	20.51	5 - 5	8.35	53.6	17.8	2.4	17.8	Yes	**Yes**
Copper	52	0	100%	59.28	NA	1.3	250	49.65	310	310	No	No
Iron	28	0	100%	35226.79	NA	19800	59600	32400	5500	32400	Yes	No[5]
Lead	54	4	93%	11.16	20.5 - 20.5	3.2	100	194	400	400	No	No
Manganese	56	0	100%	580.27	NA	64.6	2960	968	180	968	Yes	**Yes**
Mercury	53	13	75%	0.13	0.088 - 0.21	0.021	0.52	0.25	0.56	0.56	No	No
Nickel	53	0	100%	50.10	NA	5.81	135	33.5	150	150	No	No
Selenium	28	21	25%	2.08	1 - 15.3	0.51	3.3	1.2	39	39	No	No
Silver	28	17	39%	2.08	0.47 - 4	0.031	8.6	0.87	39	39	No	No
Strontium	21	0	100%	20.86	NA	3.4	70.5	53	4700	4700	No	No
Tellurium	22	11	50%	3.07	2.4 - 3	1.7	4.4	5	39.11	39.11	No	No
Thallium	54	27	50%	3.06	0.35 - 7.2	0.35	12.1	2.2	NA	2.2	Yes	**Yes**
Tin	26	15	42%	2.84	4.7 - 12	1	5.5	8.4	4700	4700	No	No
Titanium	21	0	100%	1165.14	NA	307	2140	2690	NA	31000	No	No
Vanadium	61	0	100%	91.71	NA	18.9	264	75.5	39	75.5	Yes	**Yes**
Zinc	52	0	100%	75.90	NA	28.5	438	158	2300	2300	No	No
Zirconium	22	0	100%	7.79	NA	0.53	27.3	48.3	NA	48.3	No	No
Agents/ABPs												
L	56	54	4%	0.06	0.047-0.07	0.047	0.07	NA	0.03	0.03	Yes	**Yes**
HD	56	56	0%	NA	NA	NA	NA	NA	0.1	0.1	No	No
1,4-dithiane	56	56	0%	NA	NA	NA	NA	NA	61	61	No	No
1,4-Thioxane	56	56	0%	NA	NA	NA	NA	NA	61	61	No	No

Notes:

1 - All background UTLs are from USACE (2008a), except for pyrene, which is from USACE (2009)

2 - The residential RSLs listed here are the lesser of the cancer-based and non-cancer based November 2010 USEPA Regional Screening Levels (RSL), except for tellurium. Note that non-cancer RSLs were divided by 10 to be protective of an HQ of 0.1. The tellurium PRG is from a toxicological literature review (USACE, 2008b).

3 - The residential RSLs listed for HD and L are from a study performed by Oak Ridge National Laboratory (ORNL, 2007). See 2008 Parameters Report (USACE 2008d) for derivation of oxathiane comparison value.

4 - The greater of the background UTL and the residential PRG

5 - Although the RSL was exceeded, iron is a human nutrient. Therefore, it was not selected as COPC.

Definitions:

COPC - Chemcial of Potential Concern
PRG - Preliminary Remediation goal
NA - Not Applicable
ND - Non-detects
RSL - USEPA (2010) Regional Screening Levels
UTL - Upper tolerance limit

Table 2-3
Soil COPC Selection for VOCs, SVOCs, Pesticides, and Ions
4825 Glenbrook Road
Spring Valley, Washington, D.C.

Chemical	Sample Size (-)	Number of NDs (-)	Frequency of Detection (-)	Arithmetic Average of Detected Concentrations (mg/kg)	Range of Detection Limits[1] (mg/kg)	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Residential RSL[2] (mg/kg)	Maximum Detect Greater Than Screening Level?	COPC?
VOCs										
1,1,2,2-Tetrachloroethane	26	25	4%	0.002	0.001 - 0.013	0.002	0.002	0.56	No	No
Acetone	29	14	52%	0.18119	0.002 - 0.012	0.0025	1.27	6,100	No	No
Carbon Disulfide	27	24	11%	0.00095	0.002 - 0.013	0.00086	0.001	82	No	No
Carbon Tetrachloride	25	24	4%	0.00087	0.001 - 0.013	0.00087	0.00087	0.61	No	No
Chlorobenzene	25	22	12%	0.00833	0.001 - 0.013	0.002	0.0158	29	No	No
Chloroform	25	20	20%	0.00124	0.001 - 0.013	0.0011	0.0013	0.29	No	No
cis-1,2-Dichloroethene	24	22	8%	0.0034	0.002 - 0.013	0.0023	0.0045	78	No	No
Methyl t-Butyl Ether	24	22	8%	0.0006	0.002 - 0.013	0.0006	0.0006	43	No	No
Methylene Chloride	29	5	83%	0.00879	0.002 - 0.013	0.0019	0.074	11	No	No
Tetrachloroethene	29	25	14%	0.0265	0.001 - 0.013	0.02	0.039	0.55	No	No
Toluene	28	24	14%	0.0015	0.002 - 0.013	0.001	0.002	500	No	No
trans-1,2-Dichloroethene	24	23	4%	0.00081	0.002 - 0.013	0.00081	0.00081	15	No	No
Trichloroethene	26	25	4%	0.001	0.001 - 0.013	0.001	0.001	2.80	No	No
Xylenes (Total)	29	24	17%	0.00316	0.005 - 0.013	0.00081	0.005	63	No	No
SVOCs										
4-Nitrophenol	25	24	4%	0.038	0.1 - 1.1	0.038	0.038	NA	NA	NA
Benzaldehyde	24	23	4%	0.22	0.282 - 0.42	0.218	0.218	780	No	No
Benzoic acid	14	13	7%	0.56	0.1 - 0.86	0.563	0.563	24000	No	No
bis(2-Ethylhexyl)phthalate	27	5	81%	0.06	0.1 - 0.38	0.021	0.11	35	No	No
Di-n-Butylphthalate	27	19	30%	0.06	0.0161 - 0.42	0.0161	0.11	610	No	No
Diethylphthalate	26	24	8%	0.56	0.1 - 0.42	0.028	1.1	4900	No	No
Diphenylamine	13	12	8%	0.03	0.105 - 0.123	0.0315	0.0315	150	No	No
N-Nitrosodiphenylamine	25	24	4%	0.04	0.1 - 0.42	0.0368	0.0368	99	No	No
Phenyl isocyanate	9	7	22%	0.08	0.37 - 0.42	0.064	0.1	NA	NA	NA
Pesticides										
Chlordane-alpha	1	0	100%	0.00	NA	0.0011	0.0011	1.6	No	No
4,4,4-DDT	2	1	50%	0.00	0.1 - 0.1	0.0022	0.0022	1.7	No	No
2,4,5-TP (silvex)	1	0	100%	0.01	NA	0.013	0.013	49	No	No
Ions										
Cyanide	23	20	13%	0.24	0.15 - 0.5	0.12	0.48	160	No	No
Fluoride	22	0	100%	5.58	NA	0.96	17	310	No	No
Iodine Pentafluoride (as Iodate)	12	2	83%	75.40	5.3 - 5.6	19	180	NA	No	No
Perchlorate	23	17	26%	0.00	0.0021 - 0.00246	0.00113	0.0027	5.5	No	No

Notes:

1 - The residential RSLs listed here are the lesser of the cancer-based and non-cancer based November 2010 USEPA Regional Screening Levels (RSL). Note that non-cancer RSLs were divided by 10 to be protective of an HQ of 0.1.

2 - No RSL; the RSL for 1,4-dichlorobenzene was used.

3 - No RSL; the RSL for cumene (isopropylbenzene) was used. Also listed as "1-Methyl-4-(1-methylethyl)benzene" in previous reports.

Definitions:

COPC - Chemcial of Potential Concern
NA - Not Applicable
RSL '- USEPA (2010) Regional Screening Levels
PRG - Preliminary Remediation goal
ND - Non-detect

2.2.2 Soil Gas

2.2.2.1 Table 2-4 summarizes the soil gas data collected at the site before completion of the interim removal actions and, therefore, reflect conservative estimates of soil gas concentrations. Five shallow soil gas samples (4825GB-SG-1 through 4825GB-SG-5) and four co-located soil gas/gore sorber samples (4825GB-SG/Gore-1 through 4825GB-SG/Gore-4) were collected from the top 4 ft bgs using Summa® canisters (Figure 1-2, Table A.5). Soil gas screening levels were calculated by dividing the USEPA Residential Ambient Air RSLs by an attenuation factor of 0.1 (USEPA 2002c). For noncarcinogens, the screening levels were multiplied by an additional factor of 0.1 to ensure that the screening levels are adequately protective.

2.2.2.2 1,2-Dichloroethane, 1,3-butadiene, benzene, carbon tetrachloride, chloroform, tetrachloroethene, and trichloroethene were detected in one or more samples at concentrations exceeding screening levels (Table 2-4). Benzene, carbon tetrachloride, and chloroform are considered Spring Valley site-specific VOCs identified in the Parameter Report (USACE, 2008b) and were detected at concentrations exceeding the screening levels at the following locations:

- SG/Gore-1(4'): benzene, chloroform,
- SG/Gore-2(4'): benzene
- SG/Gore-3(3'): chloroform
- SG/Gore-4(2'): benzene, carbon tetrachloride, chloroform
- SG-01(2'): chloroform
- SG-04(2'): chloroform
- SG-05 (4'): benzene

2.2.2.3 All of these samples were collected within the lateral and vertical bounds of subsequent excavations (i.e., the soils within which the soil gas samples were collected are no longer present). The analytical results for the soil samples that are still in place were reviewed to determine whether the VOCs detected in soil gas (i.e., benzene, carbon tetrachloride, and chloroform) are present.

2.2.2.4 Benzene was not detected in any of the in-place soil samples, and therefore, was not selected as a COPC for exposure to indoor air. However, benzene may remain in soil in the uninvestigated areas. Benzene is a known human carcinogen where long term exposure can lead to anemia and a compromised immune system (ATSDR 2007). Potential exposure to benzene in the uninvestigated areas may result in unacceptable risk.

2.2.2.5 Chloroform and carbon tetrachloride were detected in soil samples remaining at the site. Therefore, these two compounds were selected as COPCs for exposure to indoor air. Soil gas data collected from within the area that was later excavated were used to estimate the risks associated with chloroform and carbon tetrachloride. This provides a health-protective risk assessment as the concentrations of chloroform and carbon tetrachloride in soil gas are expected to be lower after the excavation.

2.2.2.6 Non-AUES specific compounds (e.g., 1,2-dichloroethane, 1,3-butadiene, tetrachloroethene, and trichloroethene) were also detected at concentrations exceeding soil gas screening levels in SG/Gore-4(2') and SG-4(2'). Both of these samples were collected at 2 ft bgs. Samples collected at 2 ft bgs may be impacted by the intrusion of atmospheric air during sampling. No additional evaluation was performed for the non-AUES VOCs detected in soil gas because all of the samples locations where VOCs were detected at concentrations exceeding soil gas screening levels have been excavated during subsequent removal actions and they were not detected in the in-place confirmation samples.

2.2.3 Groundwater Protection

The soil analytical results were also compared to the groundwater protection screening levels to determine whether contaminants in soils could potentially impact groundwater via leaching (Table 2-5). All compounds identified in the AUES list of Parameters Report (USACE, 2008b) were detected at concentrations greater than soil screening levels for groundwater protection were selected as COPCs in soil. These included: carbon tetrachloride, chloroform, aluminum, antimony, arsenic, cadmium, cobalt, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and vanadium. Groundwater associated with the 4825 Glenbrook Road property will be evaluated in a separate site-wide GW RI and is not evaluated in this document.

2.3 STATISTICAL EVALUATION OF DATA

2.3.0.1 The 95 percent Upper Confidence Limit (UCL) of the mean (95% UCL) of each COPC was used to estimate the concentration of a contaminant that a receptor could be exposed to over a length of time. This exposure point concentration (EPC) was then used to estimate risk. All UCLs were calculated using the latest version of ProUCL from USEPA (2010a, b); i.e., ProUCL v4.1.00. Refer to the ProUCL User's and Technical Guides (USEPA 2010a, b) for a detailed discussion of the statistical methods used. Criteria for the selection of the computational method, as well as the formulae for the computational methods, are provided in USEPA (2002b, 2006a, 2010a, b) and are not repeated here. ProUCL uses the Kaplan-Meier method to account for non-detects in the calculation of UCLs (USEPA 2006a, 2010a,b)

2.3.0.2 The UCLs recommended by ProUCL were used as the EPCs for the RME exposure scenario. The corresponding CT estimate for the same sample distribution as the recommended UCL was used as the EPC for the CT exposure scenario. The EPCs for reasonable maximum exposure (RME) and central tendency (CT) scenarios calculated using ProUCL are summarized in Table 2-6. In the case where the 95% UCL was greater than the maximum detected concentration, the maximum detected concentration was used as the RME in accordance with USEPA guidance. The summary statistics and the detailed output from ProUCL are presented in Appendix B.

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Table 2-4
COPC Selection for Air
4825 Glenbrook Road
Spring Valley, Washington, D.C.

Parameter	Sample Size	Number of Non-Detects	Frequency of Detection	Arithmetic Average of Detected Concentrations	Range of Detection Limits	Minimum Detect	Maximum Detect	Screening Level[1]	Maximum Detect Greater than Screening Level?	COPCs?
	(-)	(-)	(-)	(ppbv)	(ppbv)	(ppbv)	(ppbv)	(ppbv)		
1,1-Dichloroethene	10	9	10%	0.44	0.2 - 4	0.44	0.44	53	No	No
1,2-Dichloroethane	10	9	10%	1.50	0.2 - 4	1.5	1.5	0.23	**Yes**	No[2]
1,3-Butadiene	10	9	10%	0.53	0.5 - 10	0.53	0.53	0.4	**Yes**	No[2]
2,2,4-Trimethylpentane	10	8	20%	12.78	0.2 - 4	0.56	25	NA	NA	No
Acetone	10	2	80%	56.13	5 - 100	30	94	1347.11	No	No
Benzene	10	3	70%	1.10	0.7 - 4	0.31	2.3	0.97	**Yes**	No[2]
Bromomethane	10	9	10%	0.20	0.2 - 4	0.2	0.2	1.34	No	No
Carbon Tetrachloride	10	8	20%	40.12	0.2 - 4	0.23	80	0.65	**Yes**	**Yes[3]**
Chlorobenzene	10	9	10%	0.29	0.2 - 4	0.29	0.29	11.3	No	No
Chloroform	10	5	50%	6.45	0.2 - 4	0.74	26	0.23	**Yes**	**Yes[3]**
Chloromethane	10	9	10%	0.66	0.5 - 10	0.66	0.66	20.4	No	No
Dichlorodifluoromethane	10	8	20%	0.64	1 - 10	0.6	0.67	42.5	No	No
Ethylbenzene	10	9	10%	0.29	0.2 - 4	0.29	0.29	2.2	No	No
Isopropyl Alcohol	10	2	80%	61.75	5 - 100	15	120	NA	NA	No
Methyl Ethyl Ketone	10	5	50%	3.36	1.75 - 10	1.1	7.1	176.34	No	No
Methyl Isobutyl Ketone	10	8	20%	5.17	0.5 - 10	0.94	9.4	756.7	No	No
n-Heptane	10	5	50%	3.46	0.2 - 4	1	7.4	NA	NA	No
Styrene	10	9	10%	0.59	0.2 - 4	0.59	0.59	234.8	No	No
Tetrachloroethene	10	7	30%	16.64	0.2 - 4	0.93	34	0.6	**Yes**	No[2]
Toluene	10	2	80%	2.90	0.7 - 4	0.3	11	1380	No	No
Trichloroethene	10	3	70%	2.49	0.2 - 4	1.1	6.2	2.23	**Yes**	No[2]
Trichlorofluoromethane	10	6	40%	0.60	0.7 - 4	0.32	1.1	129.9	No	No
Vinyl Chloride	10	9	10%	2.40	0.2 - 4	2.4	2.4	0.63	**Yes**	No[2]
Xylene (m,p)	10	9	10%	1.00	0.5 - 10	1	1	168.1	No	No
Xylene (o)	10	9	10%	0.34	0.2 - 4	0.34	0.34	168.1	No	No
Xylene (total)	10	9	10%	0.71	0.2 - 4	0.71	0.71	23	No	No

Notes:

1 - USEPA November 2010 Residential Ambient Air Regional Screening Levels (RSLs).
Soil gas screening levels were calculated by dividing the USEPA Residential Ambient Air RSLs by an attenuation factor of 0.1.
For non-carcinogens, the screening level was multipled by a factor of 0.1 to be protective of exposures to multiple chemicals.
2 Although the screening levels were exceeded, compounds were not selected as COPCs because they are non Spring Valley specific compounds.
3 Compounds were selected as COPCs for exposure to vapor in air because Chloroform and carbon tetrachloride were detected in soil samples remaining at the site.

Definitions:

NA - Not Applicable

Table 2-5
Soil COPCs for Groundwater Protection
4825 Glenbrook Road
Spring Valley, Washington, D.C.

Parameter	Sample Size	Number of Non-Detects	Frequency of Detection	Arithmetic Average of Detected Concentrations	Range of Detection Limits	Minimum Detect	Maximum Detect	Groundwater Protection SSL [1]	Maximum Detect Greater than Screening Level?	COPCs?
	(-)	(-)	(-)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)		
1,1,2,2-Tetrachloroethane	26	25	4%	0.0020	0.001 - 0.013	0.002	0.002	2.6E-05	**Yes**	No[1]
Acetone	28	13	54%	0.1812	0.002 - 0.012	0.0025	1.27	4.5E+00	No	No
Carbon Disulfide	27	24	11%	0.0010	0.002 - 0.013	0.00086	0.001	3.1E-01	No	No
Carbon Tetrachloride	25	24	4%	0.0009	0.001 - 0.013	0.00087	0.00087	1.7E-04	**Yes**	**Yes**
Chlorobenzene	25	22	12%	0.0083	0.001 - 0.013	0.002	0.0158	6.2E-02	No	No
Chloroform	25	20	20%	0.0012	0.001 - 0.013	0.0011	0.0013	5.3E-05	**Yes**	**Yes**
cis-1,2-Dichloroethene	24	22	8%	0.0034	0.002 - 0.013	0.0023	0.0045	2.1E-02	No	No
Methyl t-Butyl Ether	24	22	8%	0.0006	0.002 - 0.013	0.0006	0.0006	2.8E-03	No	No
Methylene Chloride	29	5	83%	0.0088	ND - 0.013	0.0019	0.074	1.2E-03	**Yes**	No[1]
Tetrachloroethene	29	25	14%	0.0265	0.001 - 0.013	0.02	0.039	4.9E-05	**Yes**	No[1]
Toluene	28	24	14%	0.0015	0.002 - 0.013	0.001	0.002	1.6E+00	No	No
trans-1,2-Dichloroethene	24	23	4%	0.0008	0.002 - 0.013	0.00081	0.00081	3.1E-02	No	No
Trichloroethene	26	25	4%	0.0010	0.001 - 0.013	0.001	0.001	7.2E-04	**Yes**	No[1]
Xylenes (Total)	29	24	17%	0.0032	0.005 - 0.013	0.00081	0.005	2.0E-01	No	No
4-Nitrophenol	25	24	4%	0.0380	0.1 - 1.1	0.038	0.038	NA	No	No
Benzaldehyde	24	23	4%	0.2180	0.282 - 0.42	0.218	0.218	8.1E-01	No	No
Benzo(a)anthracene	27	26	4%	0.0240	0.000398 - 0.42	0.024	0.024	1.0E-02	**Yes**	No[1]
Benzo(b)fluoranthene	27	26	4%	0.0260	0.000398 - 0.42	0.026	0.026	7.7E-02	No	No
Benzo(k)fluoranthene	26	25	4%	0.0210	0.0523 - 0.42	0.021	0.021	3.5E-01	No	No
Benzoic acid	14	13	7%	0.5630	0.1 - 0.86	0.563	0.563	3.4E+01	No	No
bis(2-Ethylhexyl)phthalate	27	5	81%	0.0599	0.1 - 0.38	0.021	0.11	1.1E+00	No	No
Chrysene	26	25	4%	0.0310	0.0523 - 0.42	0.031	0.031	1.1E+00	No	No
Di-n-Butylphthalate	27	19	30%	0.0579	0.1 - 0.42	0.0161	0.11	9.2E+00	No	No
Diethylphthalate	26	24	8%	0.5640	0.1 - 0.42	0.028	1.1	1.2E+01	No	No
Diphenylamine	13	12	8%	0.0315	ND - 0.123	0.0315	0.0315	1.7E+00	No	No
Fluoranthene	26	25	4%	0.0430	0.0523 - 0.42	0.043	0.043	1.6E+02	No	No
N-Nitrosodiphenylamine	25	24	4%	0.0368	0.1 - 0.42	0.0368	0.0368	7.5E-02	No	No
Phenyl isocyanate	9	7	22%	0.0820	ND - 0.42	0.064	0.1	NA	No	No
Pyrene	27	25	7%	0.0275	0.0523 - 0.42	0.02	0.035	1.2E+02	No	No
Chlordane-alpha	1	0	100%	0.0011	NA	0.0011	0.0011	NA	No	No
4,4,4-DDT	2	1	50%	0.0022	ND - 0.1	0.0022	0.0022	6.7E-02	No	No
2,4,5-TP (silvex)	1	0	100%	0.0130	NA	0.013	0.013	1.6E-01	No	No
Aluminum	61	0	100%	27221.31	NA	9700	59300	5.5E+04	**Yes**	**Yes**
Antimony	47	37	21%	1.21	1.9 - 32.5	0.3	4.7	6.6E-01	**Yes**	**Yes**
Arsenic	113	3	97%	22.37	1 - 10	0.38	601	1.3E-03	**Yes**	**Yes**
Barium	55	0	100%	133.00	NA	23.2	277	3.0E+02	No	No
Beryllium	31	3	94%	1.72	2.5 - 2.5	0.59	15	5.8E+01	No	No
Boron, Total	15	10	33%	10.48	9.4 - 25	8.3	13.7	2.3E+01	No	No
Cadmium	51	26	49%	0.40	0.47 - 5	0.023	2	1.4E+00	**Yes**	**Yes**

Table 2-5
Soil COPCs for Groundwater Protection
4825 Glenbrook Road
Spring Valley, Washington, D.C.

Parameter	Sample Size	Number of Non-Detects	Frequency of Detection	Arithmetic Average of Detected Concentrations	Range of Detection Limits	Minimum Detect	Maximum Detect	Groundwater Protection SSL [1]	Maximum Detect Greater than Screening Level?	COPCs?
	(-)	(-)	(-)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)		
Chromium	33	0	100%	76.06	NA	15.5	177	9.9E+07	No	No
Cobalt	36	1	97%	20.26	5 - 5	8.35	53.6	4.9E-01	**Yes**	**Yes**
Copper	54	0	100%	54.25	NA	1.3	250	5.1E+01	**Yes**	**Yes**
Iron	31	0	100%	34401.61	NA	19800	59600	6.4E+02	**Yes**	No[2]
Lead	56	4	93%	11.15	20.5 - 20.5	3.2	100	1.4E+01	**Yes**	**Yes**
Manganese	58	0	100%	560.43	NA	64.6	2960	5.7E+01	**Yes**	**Yes**
Mercury	54	13	76%	0.12	0.088 - 0.21	0.021	0.52	3.0E-02	**Yes**	**Yes**
Nickel	55	0	100%	48.62	NA	5.81	135	4.8E+01	**Yes**	**Yes**
Selenium	30	22	27%	2.13	1 - 15.3	0.51	3.3	9.5E-01	**Yes**	**Yes**
Silver	31	18	42%	2.48	0.47 - 4	0.031	8.6	1.6E+00	**Yes**	**Yes**
Strontium	22	0	100%	20.52	NA	3.4	70.5	7.7E+02	No	No
Tellurium	22	10	55%	3.03	2.4 - 3	1.7	4.4	NA	No	No
Thallium	55	27	51%	2.97	0.35 - 7.2	0.35	12.1	1.4E-01	**Yes**	**Yes**
Tin	26	15	42%	2.84	4.7 - 12	1	5.5	5.5E+03	No	No
Titanium	22	0	100%	1183.09	NA	307	2140	NA	No	No
Vanadium	61	0	100%	88.59	NA	18.9	264	1.8E+02	**Yes**	**Yes**
Zinc	54	0	100%	75.44	NA	28.5	438	6.8E+02	No	No
Zirconium	22	0	100%	7.52	NA	0.53	27.3	NA	No	No
Cyanide	25	22	12%	0.24	0.15 - 0.5	0.12	0.48	7.4E+00	No	No
Fluoride	23	0	100%	5.43	NA	0.96	17	3.3E+02	No	No
Iodine Pentafluoride	12	2	83%	75.40	ND - 5.6	19	180	NA	No	No
Perchlorate	23	17	26%	0.00	0.0021 - 0.00246	0.00113	0.0027	NA	No	No
Hexavalent Chromium	1	0	100%	2.60	NA	2.6	2.6	8.3E-04	**Yes**	No[1]

Definitions:

COPC - Chemical of Potential Concern
NA - Not Applicable
SSL - Soil Screening Level (source: November 2010 USEPA Regional Screening Levels)
1 - Although the RSLs were exceeded, non Spring Valley specific compounds identified in the Parameter Report (USACE, 2008b) were not selected as COPCs for groundwater protection.
2 - Although the RSL was exceeded, iron is a human essential nutrient. Therefore, it was not selected as COPC.
shade - Compounds are identified as COPCs.

Table 2-6
RME and CT Exposure Point Concentrations
4825 Glenbrook Road
Spring Valley, Washington, D.C.

RME Exposure Point Concentrations

COPC	Surface Soils: 0-0.5 ft bgs (mg/kg)	Surface Soils: 0-2 ft bgs (mg/kg)	Mixed Soils: 0-12 ft bgs (mg/kg)	Dust in Outdoor Air (mg/m³)			Homegrown Vegetables (mg/kg)		
				0-0.5' Soil	0-2' Soil	Mixed Soils	0-0.5' Soil	0-2' Soil	Mixed Soils
Aluminum	24058	30,605	29,590	1.89E-05	2.41E-05	2.33E-05	-	-	-
Arsenic	8.779	9.915	61.08	6.91E-09	7.81E-09	4.81E-08	-	3.72E-01	2.29E+00
Cobalt	27.59	23.47	22.77	2.17E-08	1.85E-08	1.79E-08	-	-	-
Manganese	614.2	638	802.8	4.84E-07	5.02E-07	6.32E-07	-	-	-
Thallium	5.009	3.157	2.715	3.94E-09	2.49E-09	2.14E-09	-	-	-
Vanadium	105.7	96.48	99.07	8.32E-08	7.60E-08	7.80E-08	-	-	-
Lewisit	-	-	0.07	-	-	5.51E-11	-	-	-

CT Exposure Point Concentrations

COPC	Surface Soils: 0-0.5 ft bgs (mg/kg)	Surface Soils: 0-2 ft bgs (mg/kg)	Mixed Soils: 0-12 ft bgs (mg/kg)	Dust in Outdoor Air (mg/m³)			Homegrown Vegetables (mg/kg)		
				0-0.5' Soil	0-2' Soil	Mixed Soils	0-0.5' Soil	0-2' Soil	Mixed Soils
Aluminum	19977	25,431	27,221	1.57E-05	2.00E-05	2.14E-05	-	-	-
Arsenic	7.421	7.182	21.84	5.84E-09	5.66E-09	1.72E-08	-	2.69E-01	8.19E-01
Cobalt	16.59	19.43	19.93	1.31E-08	1.53E-08	1.57E-08	-	-	-
Manganese	422.4	507.7	474.5	3.33E-07	4.00E-07	3.74E-07	-	-	-
Thallium	3.13	2.129	2.236	2.46E-09	1.68E-09	1.76E-09	-	-	-
Vanadium	75.02	78.16	88.59	5.91E-08	6.15E-08	6.98E-08	-	-	-
Lewisite	-	-	0.0585	-	-	4.61E-11	-	-	-

SECTION 3
EXPOSURE ASSESSMENT

3.0.0.1 The objective of the exposure assessment is to estimate the type and magnitude of potential exposures to COPCs at the site. The exposure assessment includes identification of potential exposure pathways, receptors, and exposure scenarios, as well as quantification of exposure. Following USEPA (1989a) guidance, exposure assessment is a three-step process involving characterization of the exposure setting, identification of exposure pathways, and quantification of exposure. To complete these three steps, it is important to 1) develop a CSM; 2) estimate the EPC; 3) determine exposure assumptions; and 4) quantitatively estimate exposure.

3.0.0.2 The following sections present the human health exposure assessment conducted for 4825 Glenbrook Road. It should be noted that this HHRA evaluates only assumed exposures to soil as indicated in the CSM (Figure 3-1).

3.1 CONCEPTUAL SITE MODEL

3.1.0.1 A CSM is an effective tool to define site dynamics, streamline the risk evaluation, and develop appropriate response actions. The CSM is the mechanism to identify complete exposure pathways between environmental media affected by site-related contamination and potential receptors.

3.1.0.2 The CSM (Figure 3-1) is intended to present and clarify assumptions regarding:

- Suspected sources and types of contaminants present;
- Contaminant release and transport mechanisms;
- Affected media (e.g., soil);
- Exposure or contact points with contaminated media at the site (e.g., direct contact with soil);
- Exposure routes for chemical intake by receptors at the site (e.g., dermal uptake); and
- Potential receptors that could contact site-related contaminants in affected media under current or future land use scenarios.

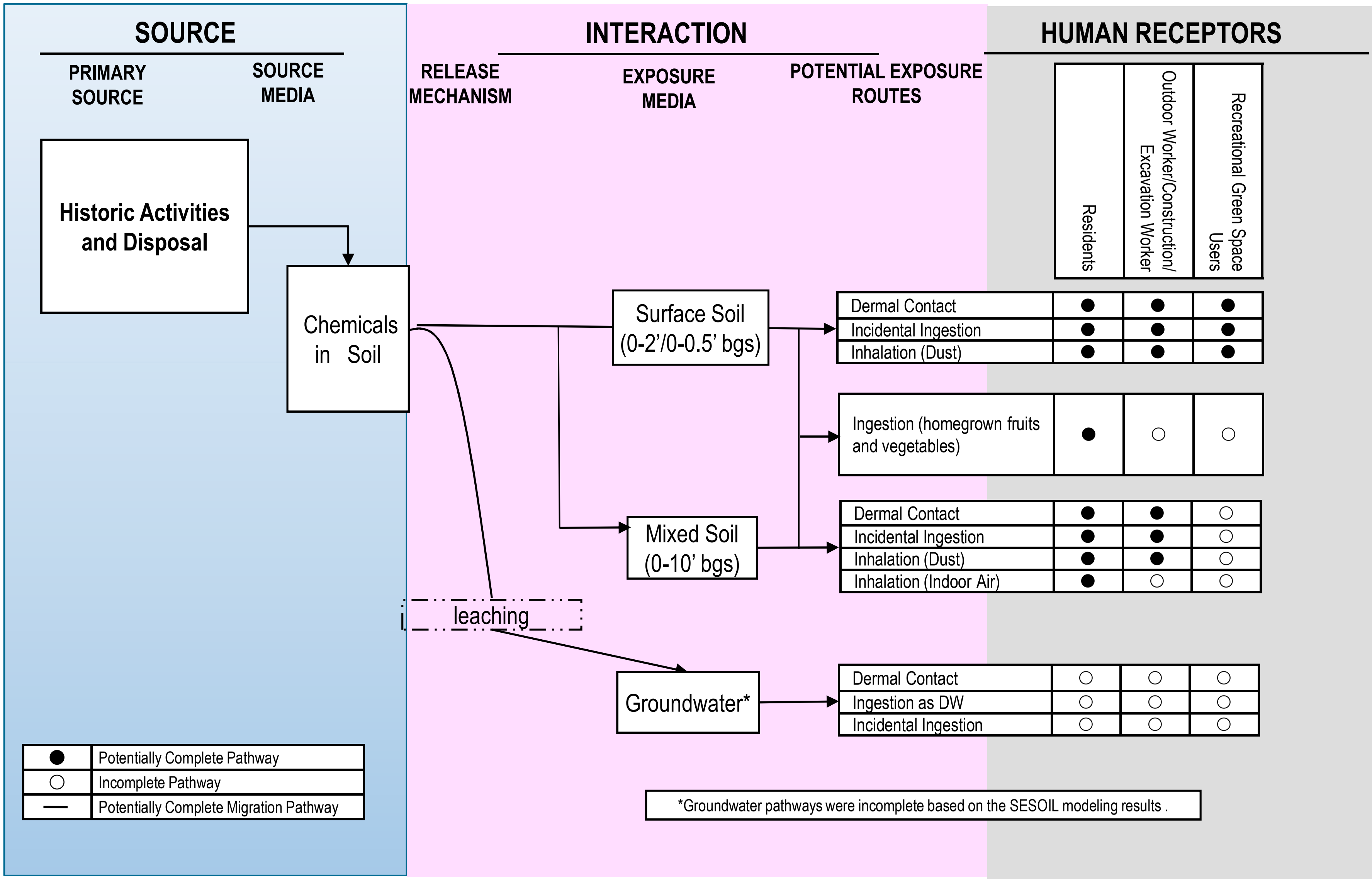
3.1.0.3 Designation of an exposure pathway as complete indicates that human exposure is possible but does not necessarily mean that exposure will occur, nor that exposure will occur at the levels estimated here. When any one of the factors listed above is missing in a pathway, it is considered to be incomplete. Incomplete exposure pathways do not pose a potential risk and were not evaluated in this risk assessment.

3.1.0.4 CSMs are dynamic tools that can be updated as necessary. For example, if changes in site conditions occur, or additional site characterization information is collected, the CSM can be revised to more accurately reflect the most current information. Understanding site conditions and land uses helps to accurately identify potential receptors under current and likely future scenarios, as well as the most appropriate corrective action(s), if necessary.

Figure 3-1 HUMAN HEALTH CONCEPTUAL SITE MODEL

Site Name: 4825 Glenbrook Road, Spring Valley, Washington D.C.

Completed By: PARSONS ***Date Completed:*** April 14, 2011



3.1.0.5 In addition, a potential receptor evaluation considers criteria such as:

- Current and future land use on and near the site;
- Zoning status and/or deed restrictions of the site and adjacent properties;
- Current and future access to the site and to the affected media;
- Existing and/or planned exposure controls (e.g., engineered containment structures);
- Present and planned site activities;
- Extent that the site is developed and vegetated; and
- Potential for soils to be disturbed (e.g., excavation such as tree planting at the site, installation of a swimming pool, digging trenches for utility lines, etc.).

3.1.0.6 Potential human receptors are defined as individuals who may be exposed to site-related contaminants in environmental media at a site. Consistent with USEPA (1989a, 1995a) guidance, current and reasonably anticipated land uses were considered in the receptor selection process.

3.1.0.7 Based on previous investigations (EMS 1992; USEPA 1994, 1999a, b, c; and USACE 2000, 2009) the potential human receptors that may reasonably be anticipated to be present at 4825 Glenbrook Road are as follows:

- **Current Receptors** – The 4825 Glenbrook Road property is a vacant residential property located in between the AU President’s house and the Republic of South Korea Ambassador’s residence. Future land use at 4825 Glenbrook Road is expected to be residential. The site is currently fenced to restrict access. Only personnel under contract to USACE or their subcontractors, visit the site to perform weekly inspections, including routine landscaping.
- **Future Receptors –** 4825 Glenbrook Road is not currently used for residential purposes. However, a residential dwelling is located on the lot and the lot may be returned to residential use in the future. Therefore, the residential exposure scenario was evaluated here. Additionally, future receptors could include the outdoor (landscaping) workers as indicated above, as well as construction workers. Conservative exposure assumptions were used for outdoor workers so that risks estimated for outdoor workers are anticipated to be protective of construction workers. Therefore, construction workers were not evaluated separately. A recreational green space (i.e., park) user was also evaluated because green space is a potential future use (the structure could be demolished and property converted to a community park area). This receptor is assumed to be a child (0 to 6 years of age) who goes to a park for recreational purposes.

3.1.0.8 In summary, the following receptors were selected for evaluation at the site: 1) residents, 2) outdoor workers, and 3) green space users.

3.2 ESTIMATION OF EXPOSURE POINT CONCENTRATIONS

Exposure point concentrations estimated using USEPA ProUCL for surface soil (0-0.5 ft and 0-0.2 ft) and mixed soil (0-12 ft) under RME and CT scenarios are summarized in Table 2-6. The anticipated exposures for each receptor are discussed in Section 3.3.0.7

3.3 EXPOSURE PATHWAYS

3.3.0.1 USEPA (1989a) defines an exposure pathway as: "The course a chemical or physical agent takes from a source to an exposed organism. An exposure pathway describes a unique mechanism by which an individual or population is exposed to chemicals or physical agents at or originating from a site. Each exposure pathway includes a source or release from a source, an exposure point, and an exposure route. If the exposure point differs from the source, a transport/exposure medium (*e.g.*, air) or media (in cases of intermedia transfer) is also included."

3.3.0.2 The potential soil exposure routes that are evaluated here for all receptors include the following:

- Soils - direct contact pathways
    - Inhalation of volatiles
    - Incidental soil ingestion
    - Dermal contact with soil
    - Inhalation of particulates
    - Ingestion of home grown vegetables (residents only)
- Soils – groundwater protection
    - Leaching to groundwater
- Soil gas
    - Inhalation of volatiles in indoor air (residents only)

3.3.0.3 <u>Soils - direct contact pathways.</u> For direct contact with soils, none of the identified COPCs (aluminum, arsenic, cobalt, manganese, thallium, vanadium, and lewisite) are classified by USEPA (1991c, 2011a) as volatiles; i.e., have a molecular weight of less than 200 g/mole and a Henry's law constant greater than 1 x 10^{-5} atm-m^3/mole. Therefore, inhalation of volatiles in ambient air at the site is an incomplete pathway and was not evaluated further. Lewisite has a Henry's law constant greater than 1 x 10^{-5} atm-m^3/mole, however, its molecular weight is more than 200 g/mole. Therefore, it is not defined as a VOC per USEPA RSL guidance (USEPA, 2011a).

3.3.0.4 <u>Soils – groundwater protection</u>. Sixteen COPCs (carbon tetrachloride, chloroform, aluminum, antimony, arsenic, cadmium, cobalt, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and vanadium) in soil were evaluated using the Seasonal Soil Compartment (SESOIL) model to determine whether they could leach to, and impact, groundwater.

3.3.0.5 <u>Soil gas.</u> Two COPCs (carbon tetrachloride and chloroform) were identified in soil gas for evaluation of the indoor air pathway. Although the depths where the soil gas samples were collected were excavated, the data was used to evaluate indoor air exposures.

3.3.0.6 Assumed exposures to two different soil depth intervals were evaluated for the receptors at the site. The current on-site worker and future resident were evaluated using an exposure interval of 0 to 2 ft bgs, to represent routine landscaping and gardening activities. Additionally, current and future residents and future on-site workers were evaluated for assumed exposures to mixed soil, 0 to 12 ft bgs. This depth interval takes into account soil mixing that may occur due to regular outdoor activities (e.g., gardening, lawn maintenance, etc.). Construction workers may encounter soil deeper than 2 ft bgs during excavation activities. Therefore, the exposure parameters selected for the outdoor worker are anticipated to be protective of construction or excavation workers, as well. The future recreational green space user was evaluated using an exposure interval of 0 to 0.5 ft bgs based on the anticipated activities of the receptor.

3.3.0.7 Each of these exposure pathways is discussed in detail below.

3.4 QUANTIFICATION OF EXPOSURE

3.4.0.1 Human intake over a long-term exposure period, called the chronic daily intake (CDI), was calculated for each COPC. Intake is defined as "a measure of exposure expressed as the mass of a substance in contact with the exchange boundary per unit body weight per unit time (e.g., mg chemical/kg body weight-day)" (USEPA 1989a). The CDI also takes into account exposure variables (i.e., assumptions about patterns of exposure to contaminated media), and whether the chemical is a carcinogen or a noncarcinogen. The total exposure is divided by the time period of interest to obtain an average exposure over time. The averaging time is a function of the toxic endpoint; i.e., for carcinogenic effects, it is the lifetime of an individual but for noncarcinogenic effects, it is the exposure duration.

3.4.0.2 The following subsections provide the exposure equations for each of the exposure pathways evaluated in this HHRA. Appendix F provides the detailed calculations using these equations for each receptor.

3.4.1 Incidental Ingestion of Contaminants in Soil

To estimate an oral CDI for the incidental ingestion of COPCs in soil, the following equation (USEPA, 1989a) was used:

$$\mathrm{CDI} = \frac{\mathrm{EPC} \times \mathrm{IR} \times \mathrm{FI} \times \mathrm{EF} \times \mathrm{ED} \times \mathrm{CF}}{\mathrm{BW} \times \mathrm{AT}}$$

Where:

CDI	=	Chronic daily intake (mg/kg-d)
EPC	=	Exposure point concentration in soil (mg/kg)
IR	=	Soil ingestion rate (mg/day)
FI	=	Fraction ingested from contaminated source (unitless)
EF	=	Exposure frequency (days/yr)
ED	=	Exposure duration (yrs)
CF	=	Conversion factor, 1E-06 (kg/mg)
BW	=	Body weight (kg)
AT	=	Averaging time (days)

3.4.2 Ingestion of Homegrown Vegetables

3.4.2.1 USEPA Region III (2008) guidance states "All bioaccumulative compounds need to be assessed in the food chain exposure evaluation." According to bioaccumulative studies performed for soil (Battelle, 2003), arsenic is the only COPC identified in soils at the site that is bioaccumulative. Therefore, exposures from the ingestion homegrown vegetables were assessed only for arsenic. The other COPCs were not evaluated for exposures via the ingestion of homegrown vegetables.

3.4.2.2 To estimate an oral CDI for the ingestion of COPCs in home-grown vegetables by residential receptors, the following equation (USEPA, 2004b) was used:

$$CDI = \frac{EPC \times IR_{veg} \times DW \times (1 - PL) \times EF \times ED \times CF}{AT}$$

Where:

CDI	=	Chronic daily intake (absorbed dose) (mg/kg-day)
EPC	=	Exposure point concentration in vegetables (mg/kg)
IR_{veg}	=	Home-grown vegetable ingestion rate (mg/kg-day)
DW	=	Dry weight percentage (%)
PL	=	Preparation and cooking loss (%)
EF	=	Exposure frequency (days/yr)
ED	=	Exposure duration (yrs)
CF	=	Conversion factor, 1E-06 (kg/mg)
AT	=	Averaging time (days)

3.4.2.3 Note that home-grown vegetable intake rates are available on a per capita basis on a "consumer only" basis. The "consumer only" intake rates exclude individuals that do not consume home-grown vegetables. To provide a health-protective risk assessment, the home-grown vegetable intake rates used here are the consumer only home-grown vegetable ingestion rates for the south from USEPA (1997a; Table 13-16). Following USEPA (2004b) guidance, the intake rates are multiplied by the average percent of individuals "consuming homegrown vegetables during the survey period." The vegetable intake rates were calculated as follows:

- RME
  - 95^{th} percentile consumption rate for central cities in the south = 3.7 g/kg-day
  - Percent consuming: 6.63%
  - Consumption rate = 3.7 g/kg-day x 6.63% = 0.245 g/kg-day or 245 mg/kg-day
- CT
  - 50^{th} percentile consumption rate for central cities in the south = 0.615 g/kg-day
  - Percent consuming: 6.63%
  - Consumption rate = 0.615 g/kg-day x 6.63% = 0.041 g/kg-day or 41 mg/kg-day

3.4.2.4 Since vegetable intake rates have been provided by USEPA (1997a) in terms of wet weight, the intake rates must be converted to dry weight, as the soil and vegetable EPCs are in terms of dry weight. This is accomplished in the equation above by multiplying the vegetable ingestion rate by the average dry weight percentage of vegetables (15.57%; see Appendix E). Additionally, the vegetable intake rates from USEPA (1997a) are for raw vegetables. To account for the weight of the food item lost in preparation, the vegetable intake rate is multiplied by the percentage lost during preparation/cooking. For homegrown vegetables, USEPA (2004b) provides a preparation loss of 12 percent.

3.4.3 Dermal Contact with Contaminants in Soil

To estimate a dermal CDI for COPCs in soil, the following equation was used (USEPA, 2004a):

$$CDI = \frac{EPC \times AF \times DAF \times CF \times EV \times EF \times ED \times SA}{BW \times AT}$$

Where:

CDI	=	Chronic daily intake (absorbed dose) (mg/kg-day)
EPC	=	Exposure point concentration in soil (mg/kg)
AF	=	Soil-to-skin adherence factor (mg/cm^2-day)
DAF	=	Dermal absorption fraction (unitless)
CF	=	Conversion factor (1E-06 kg/mg)
EV	=	Event frequency (events/day)
EF	=	Exposure frequency (days/yr)
ED	=	Exposure duration (yrs)
SA	=	Skin surface area available for contact (cm^2)
BW	=	Body weight (kg)
AT	=	Averaging time (days)

3.4.4 Inhalation

Although body weight normalized CDIs (i.e., mg/kg-day) are used to estimate intakes for ingestion and dermal absorption, current USEPA (1996, 2002a, 2009, 2011a) guidance does not recommend this approach for estimating inhalation exposures. Instead, current guidance (USEPA 1996, 2002a, 2009, 2011a) recommends that risks and hazards be estimated from exposure frequency and duration normalized air concentrations. This is presented in detail in Sections 5.1 and 5.2.

3.4.5 Inhalation of Volatiles in Indoor Air

The risks associated with the inhalation of volatiles emitted to indoor air for future residents were estimated using the advanced version of the Johnson and Ettinger soil gas model (USEPA 2004c). The Johnson and Ettinger model (USEPA 2004b) uses a one-dimensional analytical solution to simulate the convective and diffusive processes that drive vapor intrusion into buildings. The model also accounts for the concentration, source depth, and physical properties of each COPC, soil physical properties, and building characteristics. The model, including all equations, is shown in detail in the Johnson and Ettinger model user's guide (USEPA 2004c). The model spreadsheets and the input parameter summary table are presented in Appendix D.

3.5 EXPOSURE PARAMETERS AND ASSUMPTIONS

3.5.0.1 USEPA (1992c, 1995b) typically requires two types of exposure evaluations: an RME and average, or CT, estimate. The RME is defined as the maximum level of exposure reasonably expected to occur (USEPA, 1989a), whereas the CT is the typical level of exposure expected to occur. In accordance with USEPA (1992c) recommendations, exposure parameters were chosen with the understanding that the combination of variables for a given pathway would result in an estimate of the RME for that pathway. Under this approach, some variables may not be at their individual maximum values, but when combined with other variables they will result in estimates of the RME. Studies of the compounding of conservatism in probabilistic risk assessments show that setting as few as two factors at RME levels or high end (e.g., near the 90^{th} percentile), while the remaining variables are set at less conservative, typical or CT values, results in a product of all input variables at an approximate RME level (e.g., 99^{th} percentile value) (Cullen, 1994). CT risk estimates were calculated using central tendency estimates for each of the exposure parameters (USEPA, 1992c, 1995b).

3.5.0.2 Generally, contact rate, exposure frequency, and exposure duration are the most sensitive parameters (i.e., most likely to drive exposure estimates). When statistical data were available, 90^{th} or 95^{th} percentile values were used for exposure duration. If distributions were not available (e.g., for workers), high-end estimates were made using best professional judgment. Typically, distributional data are not available for exposure frequency; therefore, high-end estimates have been made using available site-specific information and best professional judgment. The following subsections discuss the justification for each parameter.

Table 3-1 summarizes the RME and CT exposure parameters used to evaluate receptors at the site.

3.5.1 Exposure-Point Concentrations

Exposure-point concentrations (EPCs) are intended to be representative of the concentrations of chemicals in a given medium to which a receptor may be exposed at the site (i.e., the exposure point). EPCs were calculated for RME and CT scenarios using ProUCL (see Section 2.3). For incidental ingestion and dermal contact with soils, soil data collected at the site were used to calculate the EPCs, as described below. For the inhalation of COPCs in dusts and the ingestion of COPCs in homegrown vegetables, fate and transport models were used to estimate the EPCs, as described below.

3.5.1.1 Exposure-Point Concentrations for Airborne Fugitive Dust

3.5.1.1.1 Following USEPA (1996, 2002a) guidance, EPCs for COPCs in airborne fugitive dust should be based on soil EPCs and estimated using the following equation:

$$C_{air} = \frac{EPC}{PEF}$$

Where:

C_{air}	=	COPC concentration in air at the exposure point (mg/m^3);
EPC	=	Exposure point concentration in soil (mg/kg)
PEF	=	Particulate emission factor (m^3/kg).

Table 3-1
RME and CT Exposure Parameters
4825 Glenbrook Road
Spring Valley, Washington, D.C.

Parameter			RME Value	CT Value	Units	RME Source	CT Source
AF_s	Soil adherence factor						
		Ourdoor Worker	0.2	0.02	mg/cm^2	USEPA (2004a)	USEPA (2004a)
		Residential					
		adult	0.07	0.01	mg/cm^2	USEPA (2004a)	USEPA (2004a)
		child	0.2	0.04	mg/cm^2	USEPA (2004a)	USEPA (2004a)
AT	Averaging time						
	Carcinogens (AT_c)		25,550	25,550	days	Lifetime of 70 years (USEPA 1989a)	
	Noncarcinogens (AT_{nc})						
		Ourdoor Worker	9,125	3,285	days	ED x 365 days/yr (USEPA 1989a)	
		Residential					
		adult	8,760	3,285	days	ED x 365 days/yr (USEPA 1989a)	
		child	2,190	2,190	days	ED x 365 days/yr (USEPA 1989a)	
BW	Body weight						
		Outdoor Worker	70	70	kg	USEPA (1997a)	USEPA (1997a)
		Residential					
		adult	70	70	kg	USEPA (1997a)	USEPA (1997a)
		child	15	15	kg	USEPA (2008)	USEPA (2008)
C_{air}	Concentration in air		chemical-specific		ug/m^3	see Table 2-3	see Table 2-3
C_{soil}	Concentration in soil		chemical-specific		mg/kg	see Table 2-3	see Table 2-3
DAF	Dermal absorption fraction		chemical-specific		unitless	see Table 4-2	see Table 4-2
DW	Dry weight		0.16	0.16	unitless	see Appendix F	see Appendix F
ED	Exposure duration						
		Outdoor Worker	25	9	yrs	USEPA (1989a)	USEPA (2004a)
		Residential					
		adult	24	9	yrs	USEPA (1997a)	USEPA (2004a)
		child	6	6	yrs	USEPA (1997a)	USEPA (2004a)
EF	Exposure frequency						
		Outdoor Worker	250	219	days/yr	USEPA (1991a)	USEPA (2004a)
		Residential	350	350	days/yr	USEPA (1991a)	USEPA (2004a)
		Green Space User (child)	52	52	days/yr	Professional judgment	Professional judgment
ET	Fraction of EF breathing contaminated outdoor air						
		Outdoor Worker	1	0.333	unitless	Assumes on 100% of the day spent outdoors	Assumes 7.9 hrs/day spent outdoors
		Residential					
		adult	0.0625	0.0625	unitless	1.5 hrs/day spent outdoors (USEPA 1997a)	
		child	0.074	0.074	unitless	1.776 hrs/day spent outdoors; USEPA (2008)	
FI	Fraction Ingested						
		Outdoor Worker	1	1	unitless	Conservative assumption	Conservative assumption
		Residential					
		adult	1	1	unitless	Conservative assumption	Conservative assumption
		child	1	1	unitless	Conservative assumption	Conservative assumption
IR_{soil}	Soil ingestion rate						
		Outdoor Worker	330	330	mg/day	USEPA (2002)	USEPA (2002)
		Residential					
		adult	100	50	mg/day	USEPA (1997a)	USEPA (1997a)
		child	100	100	mg/day	USEPA (2008)	USEPA (2008)
IR_{veg}	Homegrown vegetable intake rate						
		Residential	245	41	mg/kg/day	USEPA (1997a, 2004b)	USEPA (1997a, 2004b)
PEF	Particulate emissions factor		1.27E+09	1.27E+09	m^3/kg	See Appendix C	See Appendix C
PL	Vegetable preparation loss		0.12	0.12	unitless	USEPA (2004b)	USEPA (2004b)
SA_{soil}	Skin surface area for soil						
		Outdoor Worker	3,300	3,300	cm^2	USEPA (2004a)	USEPA (2004a)
		Residential					
		adult	5,700	5,700	cm^2	USEPA (2004a)	USEPA (2004a)
		child	2,920	2,920	cm^2	USEPA 2008, Table 7-2.	USEPA 2008, Table 7-2.

3.5.1.1.2 The PEF relates the concentration of soil COPCs to the concentration in airborne dust particles air. This calculation addresses dust generated from open sources, which is termed "fugitive" because it is not discharged into the atmosphere in a confined flow. PEF calculations include the Q/C term (i.e., dispersion) specific to the site's size and meteorological conditions. The PEF is calculated using the following equation (USEPA 1996, 2002a):

$$PEF = Q/C_{wind} \times \frac{3{,}600\text{s/h}}{0.036 \times (1 - V) \times \left(\frac{U_m}{U_t} \right)^3 \times F(x)}$$

Where:

Q/C_{wind}	= 87.37 g/m^2-s per kg/m^3, based on a 0.5 acre source in Philadelphia, PA (USEPA 2002a) (the closest city with published data)
V	= 0.5, fraction of vegetative cover (USEPA, 1996, 2002a)
U_m	= 4.69 m/s, mean annual wind speed in Philadelphia, PA (USEPA, 1996, 2002a)
U_t	= 11.32 m/s, equivalent threshold value of windspeed at 7 m (USEPA, 1996, 2002a)
F(x)	= 0.194, windspeed distribution function for Philadelphia, PA (USEPA, 1996, 2002a).

3.5.1.1.3 Using this equation results in a PEF of 1.27 x 10^9 m^3/kg (see Appendix C). The EPCs for COPCs in dust estimated using this PEF are presented in Table 2-6.

3.5.1.2 Exposure-Point Concentrations for Homegrown Vegetables

3.5.1.2.1 To predict the concentrations of chemicals in homegrown produce at the site, screening-level bioaccumulation models were used. These models were selected from the following hierarchy of sources:

- USEPA's (2007) ecological soil screening levels (Eco-SSLs)
- Bechtel Jacobs (1998)
- USEPA's (1999d) screening level ecological risk assessment protocol for hazardous waste combustion facilities
- Baes et al. (1984)

3.5.1.2.2 The selected bioaccumulation models are shown in Table 3-2 and the EPCs calculated using these models are shown in Table 2-6.

3.5.1.3 Soil to Groundwater Leaching Evaluation

3.5.1.3.1 COPCs in soil identified for their potential to leach to groundwater include two VOCs (chloroform and carbon tetrachloride) and fourteen metals (aluminum, antimony, arsenic, cadmium, cobalt, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and vanadium). These COPCs were evaluated using the SESOIL model, a one-dimensional vertical transport model for the unsaturated zone that estimates concentrations of COPCs in groundwater due to leaching. The model simulates both hydrologic (e.g., rainfall and infiltration) and pollutant transport processes (e.g., volatilization, biodegradation, and adsorption). SESOIL was implemented from within SEVIEW version 6.3.10. The maximum detected COPC concentrations in soil were used in the model to predict groundwater concentrations. The site-specific SESOIL modeling results indicate that it is unlikely that the COPCs detected in soil will impact groundwater beneath the Site. The SESOIL modeling results are included in Appendix F.

3.5.1.3.2 URS performed groundwater sampling and monitoring at Spring Valley. Although no monitoring wells are located on the 4825 GR property, two monitoring wells (MW-24 and MW-25) are located down-gradient of the 4825 GR source area and two piezometer (PZ-4S and PZ-4D) are located up-gradient of the site. Groundwater samples have been collected periodically from these wells. The groundwater data from the two down-gradient wells show that only arsenic and perchlorate were detected at concentrations exceeding the drinking water standards and no other compounds were detected. Arsenic was detected in 2005 and 2006 at concentrations slightly exceeding the drinking water standard and the concentrations in 2007 and 2009 were below the drinking water standard in MW-24. Perchlorate was not detected in any soil samples collected from 4825 GR. Perchlorate was detected in the up-gradient wells at higher concentrations, which indicates that the site is unlikely to be a source of this contamination. The groundwater data from the down gradient wells support the SESOIL modeling prediction results.

Table 3-2
Homegrown Vegetables Bioaccumulation Factors
4825 Glenbrook Road
Spring Valley, Washington, D.C.

	Bioaccumulation Factors for Vegetables	
COPC	**Transfer Equation**	**Source**
Arsenic	Cp = 0.03752 * Cs	USEPA (2007)

Notes:

Cp - Concentration of contaminant in the homegrown vegetables
Cs - Concentration of contaminants in soil

SECTION 4
TOXICITY ASSESSMENT

The third step of the HHRA is the toxicity assessment. The objective of the toxicity assessment is to weigh available evidence regarding the potential for particular chemicals to cause adverse effects in exposed individuals and to provide, where possible, an estimate of the relationship between the extent of exposure to a chemical and the increased likelihood and/or severity of adverse effects. The types of toxicity values used in risk assessment include oral reference doses (RfDs), inhalation reference concentrations (RfCs), oral slope factors (SFs), and inhalation unit risk factors (URFs). SFs and URFs are used to evaluate carcinogenic effects. RfDs and RfCs are used to evaluate noncarcinogenic effects.

4.1 TOXICITY VALUES FOR CARCINOGENIC EFFECTS

4.1.0.1 The SF is the toxicity value used to estimate the lifetime excess cancer risk associated with oral (i.e., ingestion) and dermal exposure to a known or suspected carcinogen (assuming a 70-year average life span). SFs are derived for those chemicals shown to cause an increased incidence of tumors in either human or animal studies. A dose-response relationship between tumor incidence and exposure using human epidemiologic or animal studies is used to derive the SF. This dose-response curve is then assumed to be linear at low doses (e.g., those found in situations of environmental contamination) and is used to predict tumor incidence at low exposure levels.

4.1.0.2 In this HHRA, chemical-specific SFs for COPCs were used to evaluate potential carcinogenic risk due to incidental ingestion of soil and dermal exposure to individual COPCs in soil. The SF is reported in terms of risk per milligrams (of chemical) per kilogram (unit body weight) per day $(mg/kg\text{-}d)^{-1}$. In addition, chemical specific URFs were used to evaluate the potential carcinogenic risk due to inhalation of COPCs. The URF is reported in terms of risk per milligrams (of chemical) in a cubic meter of air $(mg/m^3)^{-1}$.

4.1.0.3 Following USEPA (2003, 2011a) guidance, SFs and URFs were obtained from the following hierarchy of primary sources:

- USEPA's IRIS (USEPA 2011b)
- USEPA's Provisional Peer Reviewed Toxicity Values
- Office of Environmental Health Hazard Assessment (OEHHA) (2011) Toxicity Criteria Database
- ORNL's (2007) Health-based environmental screening levels (HBESLs) for chemical warfare agents
- USEPA's Health Effects Summary Tables (USEPA 1997b)

4.1.0.4 The SFs and URFs used in this evaluation are shown in Tables 4-1 and 4-2.

Table 4-1
Oral and Inhalation Toxicity Values
4825 Glenbrook Road
Spring Valley, Washington, D.C.

	SF_o	URF			RfD_o			RfC		
COPC	**$(mg/kg\text{-}day)^{-1}$**	**$(\mu g/m^3)^{-1}$**	**Source**	**Date**	**(mg/kg-day)**	**Source**	**Date**	**$(\mu g/m^3)$**	**Source**	**Date**
Aluminum	-	-	-	-	1.00E+00	PPRTV	Oct-06	5.00E+00	PPRTV	Oct-06
Arsenic	1.5	4.30E-03	IRIS	Mar-11	3.00E-04	IRIS	Mar-11	1.50E-02	Cal EPA	Mar-11
Cobalt	-	9.00E-03	PPRTV	Aug-08	3.00E-04	PPRTV	Aug-08	6.00E-03	PPRTV	Aug-08
Manganese	-	-	-	-	1.40E-01	IRIS	Mar-11	5.00E-02	IRIS	Mar-11
Thallium	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-
Chloroform	0.019	2.30E-05	OEHHA/IRIS	Mar-11	1.00E-02	IRIS	Mar-11	97.66	ATSDR	Mar-11
Carbon tetrachloride	0.07	6.00E-06	IRIS	Mar-11	4.00E-03	IRIS	Mar-11	100	IRIS	Mar-11
Lewisite	-	-	-	-	1.00E-04	ORNL	May-07	3.00E+00	ORNL	May-07

Definitions:

ATSDR	Agency for Toxic Substances and Disease Registry Minimal Risk Levels. Available online at: http://www.atsdr.cdc.gov/mrls/index.html
HEAST	USEPA (1997b) Health Effects Assessment Tables
IRIS	USEPA's Integrated Risk Information System. Available online at: http://cfpub.epa.gov/ncea/iris/index.cfm
OEHHA	Office of Environmental Health Hazard Assessment Toxicity Criteria Database. Available online at: http://www.oehha.org/risk/chemicalDB/index.asp
PPRTV	USEPA Provisional Peer Reviewed Toxicity Values
RfC	Reference concentation
RfD	Reference dose
SF	Slope factor
URF	Inhalation unit risk

Table 4-2
Dermal Toxicity Values
4825 Glenbrook Road
Spring Valley, Washington, D.C.

	SF_d	RfD_d	DAF[1]	OAF	
COPC	**$(mg/kg\text{-}day)^{-1}$**	**(mg/kg-day)**	**(unitless)**	**(unitless)**	**Source**
Aluminum	-	1.00E-01	-	0.1	Bast and Borges (1996)
Arsenic	1.50E+00	3.00E-04	0.03	1	USEPA (2004a)
Cobalt	-	3.00E-04	-	1	USEPA (2004a)
Manganese	-	5.60E-03	-	0.04	USEPA (2004a)
Thallium	-	-	-	1	USEPA (2004a)
Vanadium	-	-	-	0.026	USEPA (2004a)
Lewisite	-	1.70E-06	0.1	0.017	ORNL (2007)

Notes:
1 - From USEPA (2004a).

Definitions:

DAF Dermal absorption fraction from soil
OAF Oral absorption fraction
RfD_d Dermal reference dose, which equals RfD_o x OAF
RfD_o Oral reference dose
SF_d Dermal slope factor, which equals SF_o/OAF
SF_o Oral slope factor

4.2 TOXICITY VALUES FOR NONCARCINOGENIC EFFECTS

4.2.0.1 For chemicals that exhibit noncarcinogenic effects, the USEPA assumes that organisms have repair and detoxification capabilities that must be exceeded by some critical concentration (threshold) before the health effect is manifested. This threshold theory assumes the receptor can tolerate a range of exposures from zero to some finite value with no appreciable risk of adverse effects.

4.2.0.2 Toxicity values for chemicals exhibiting noncarcinogenic effects are developed using RfDs. The RfD provides an estimate of an average daily exposure to an individual (including sensitive individuals) below which there will not be an appreciable risk of adverse health effects. The RfD is derived using uncertainty factors (e.g., to adjust from animals to humans and to protect sensitive populations) to ensure it is unlikely to underestimate the potential for adverse noncarcinogenic effects. The purpose of the RfD is to provide a value against which the sum of other doses (i.e., those projected from human exposure to various environmental conditions) is compared. Doses significantly higher than the RfD may indicate that an inadequate margin of safety exists for exposure to that substance and that an adverse health effect could occur. The RfD is expressed in terms of mg/kg-d. In addition, chemical specific RfCs (inhalation reference concentration) were used to evaluate the potential noncarcinogenic effects due to inhalation of COPCs. The RfC is reported in terms mg/m^3.

4.2.0.3 Following USEPA (2003, 20011a) guidance, RfDs and RfCs were obtained from the following hierarchy of primary sources:

- USEPA's IRIS (USEPA 2011b)
- USEPA's Provisional Peer Reviewed Toxicity Values
- Agency for Toxic Substances and Disease Registry's (ATSDR) Minimal Risk Levels (MRLs) (ATSDR 2011)
- OEHHA's (2011) Toxicity Criteria Database
- ORNL's (2007) Health-based environmental screening levels (HBESLs) for chemical warfare agents
- USEPA's Health Effects Summary Tables (USEPA 1997b)

4.2.0.4 The RfDs and RfCs used in this evaluation are shown in Tables 4-1 and 4-2.

4.3 DERMAL TOXICITY VALUES

4.3.0.1 Oral toxicity values were also used to assess risks and/or hazards associated with the incidental dermal contact exposure pathway (USEPA 2004a). Oral toxicity values reflect administered-dose values, which represent concentrations protective of ingestion. The dermal exposure route, however, evaluates the toxicity of concentrations of chemicals in the blood (absorbed dose). Therefore, the absorbed-dose concentrations identified for dermal exposure must be compared to toxicity values adjusted for gastrointestinal absorption (USEPA 2004a). Oral toxicity values were adjusted for gastrointestinal absorption by applying oral absorption factors to administered-dose toxicity values.

4.3.0.2 Oral slope factors (SF) and/or reference doses (RfD) were adjusted to estimate dermal toxicity values when the following conditions were met (USEPA 2004a):

- The critical study upon which the toxicity value is based employed an administered dose (e.g., delivery in diet or by gavage) in its study design;
- A scientifically defensible database exists and demonstrates that the gastrointestinal absorption of the chemical from a medium (e.g., water and feed) similar to the one employed in the critical study is less than 100 percent; and
- Oral absorption factors are available from either USEPA (2004a) or the scientific literature.

The oral absorption factors used in this risk assessment are shown in Table 4-2, as are the dermal SFs (SF_d) and RfDs (RfD_d).

4.4 TOXICITY INFORMATION FOR MUSTARD AND LEWISITE AGENT

4.4.0.1 Mustard is a blister agent. Mustard agent is also a known human carcinogen and classified by the International Agency for Research on Cancer (IARC) as carcinogenic to humans. Studies in humans indicate that long-term exposure to mustard agent may lead to cancer of the upper respiratory airways. The primary routes of potential human exposure to mustard agent are inhalation and dermal contact. In the short term, mustard agent can cause eye burns, skin burns, eyelid swelling, coughing, and blisters and damage to the respiratory tract within a few days of exposure. Exposures to high concentrations of mustard agent can eventually cause death. Long term exposures to mustard agent can cause bronchitis and long-term respiratory disease (ATSDR 2003).

4.4.0.2 Lewisite is also a blister agent. The Department of Health and Human Services (DHHS), IARC, and the USEPA have not classified lewisite as to its carcinogenicity. Breathing lewisite vapors will immediately cause irritated airways, burning pain in the nose and sinuses, laryngitis, coughing, shortness of breath, nausea, and vomiting. Airway tissue damage and the accumulation of fluid in the lungs could result in death. Dermal contact with lewisite vapor/liquid will result in local pain, swelling, and a rash, followed by blistering that might be delayed for hours. If lewisite vapor/liquid contacts an individual’s eyes, the individual will suffer immediate pain and rapid swelling, as well as serious damage to the cornea and other parts of the eye. Ingestion of lewisite will burn the mouth and throat, and cause severe stomach pain, nausea, vomiting, and bloody stools. If lewisite makes it into the blood stream, it can cause bone marrow damage and fluid loss from the blood vessels, which could result in low blood pressure and damage to the rest of the body (ATSDR 2002).

4.5 CHEMICALS WITHOUT TOXICITY VALUES

4.5.0.1 For vanadium compounds, USEPA provides a PPRTV, which is one of the approved primary sources of toxicity values (USEPA 2003). However, the provisional RfD (i.e., PPRTV) for metallic vanadium is being suspended, and the IRIS file for vanadium pentoxide will soon be withdrawn1. Therefore, there are no toxicity values for vanadium that are appropriate for risk assessment.

4.5.0.2 Vanadium occurs in nature as vanadium compounds with vanadium valence states from -1 to +5 with the pentavalent state (e.g., vanadium oxide [V_2O_5]) being the most toxic. Based on occupational exposure studies, human experimental studies, and studies in laboratory animals, the respiratory tract following inhalation exposure and the gastrointestinal tract, hematological system, and developing organism following oral exposure are the primary targets of toxicity. Adverse respiratory effects have been reported in humans and animals exposed to vanadium compounds at concentrations much higher than those typically found in the environment. Although the available data in humans are limited, signs of airway irritation (e.g., coughing, wheezing, sore throat) have been reported in subjects acutely exposed to 0.6 mg vanadium/m^3 and in workers exposed to vanadium pentoxide dust. Other sensitive targets of vanadium toxicity include the gastrointestinal system following oral exposure and hematological system following inhalation or oral exposure. Symptoms of gastrointestinal irritation (diarrhea, cramps, nausea) have been observed in humans following bolus administration of sodium metavanadate or vanadyl sulfate (dietary supplements) The Department of Health and Human Services and EPA have not classified the carcinogenicity of vanadium. (ATSDR, 2009)

4.5.0.3 For thallium compounds, the only toxicity values available from the hierarchy of toxicity sources specified by USEPA (2003) were developed by California EPA for public health goals for chemical substances in drinking water. However, the principal study used by California EPA (a study from 1986 by MRI) was reviewed by USEPA's IRIS (2011b) program and found to be inappropriate for the development of toxicity values; i.e., the principal study "suffers from certain critical limitations (e.g., high background incidence of alopecia, lack of histopathological examination of skin tissue in low- and mid-dose groups, and inadequate examination of objective measures of neurotoxicity), and there are particular difficulties in the selection of appropriate endpoints." For this reason, the toxicity values available for thallium are deemed inappropriate, and are not used for quantitation in the risk assessment presented for 4825 Glenbrook Road.

4.5.0.4 The primary targets of thallium toxicity are the nervous, integumentary, and reproductive systems. In humans, acute exposures produce paresthesia, retrobulbar neuritis, ataxia, delirium, tremors, and hallucinations. This implies central, peripheral, and autonomic nervous system involvement. Human and animal chronic exposures result in alterations of the brain, spinal cord, and peripheral nerves. In both humans and animals, alopecia is the most common indicator of long-term thallium poisoning (RAIS, 1994).

4.5.0.5 For effects of the 4-nitrophenol, all information comes from animal studies and no human studies are available (ATSDR, 1992). Rats that breathed moderate levels of 4-nitrophenol for two weeks developed a blood disorder that reduced the ability of the blood to carry oxygen to tissues and organs. However, these abnormalities disappeared a few days after exposure stopped. No other harmful effects to other systems or organs were seen. Skin irritation has been noted in animals that had large amounts of 4-nitrophenol applied to their skin, and eye irritation when it was applied to the eye. These effects are most likely due to the large amount used and not to a specific harmful effect of 4-nitrophenol. No birth defects were seen in the offspring of animals that ingested large quantities of 4-nitrophenol. There is no information from animal studies on the effects of ingesting low levels of 4-nitrophenol. The amounts given to animals that produce the harmful effects are several hundred to several thousand times higher than those people are generally exposed to. An animal study found no evidence of cancer when 4-nitrophenol was applied to the skin of mice.

4.5.0.6 Information on health effects of iodine pentafluoride is limited. Material safety data show that iodine pentafluoride is corrosive to mucous membranes, eyes, skin. The seriousness of the lesions and the prognosis of intoxication depend directly on the concentration and duration of exposure.

4.5.0.7 Information on health effects of phenyl isocyanate is also generated via non-human studies (Engel Hansen L and Nordic chemicals group, 1993). Phenyl isocyanate has been found to cause serious lung damage, including lung fibrosis, to rats after exposure to 0.5 ppm (0.0024 mg/l) for 6 hours per day for 10 days. Bacteria tests show that phenyl isocyanate had no mutagenic activity. No activity was found in an in vivo study of chromosome aberrations in the bone marrow of mice after oral administration. From the available data the critical effects of phenyl isocyanate appear to be high acute toxicity after oral and inhalation exposure, irritation of the respiratory tract, and lung fibrosis resulting from repeated inhalation exposure to very low air concentrations of phenyl isocyanate.

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[1] - E-mail from Dawn Ioven, USEPA Region 3, dated April 19, 2011 (Appendix G).

SECTION 5
RISK CHARACTERIZATION

The final step in the HHRA process is risk characterization. The purpose of the risk characterization step is to 1) review the results from the exposure and toxicity assessments; 2) quantitatively estimate the potential for cancer (i.e., risk) and noncancer (i.e., hazard) effects; and 3) assess and discuss uncertainties associated with each of the aforementioned steps. To characterize potential noncarcinogenic effects, estimated exposure levels were compared with their respective toxicity values. To characterize potential carcinogenic effects, the incremental probability of an individual developing cancer over a lifetime was calculated from the estimated exposure levels and chemical-specific dose/response information (i.e., carcinogenic toxicity factors). Cancer risk (for carcinogens) and hazard quotient (HQ; for noncarcinogens) estimates were calculated as described below for each COPC. Cancer risk and HQ were calculated for both RME and CT exposure scenarios. The RME exposure represents the conservative scenario. If the risk and HQ for the RME scenario are within the USEPA acceptable risk range and below the acceptable hazard level, the public will be protected. It is also protected if the risk and HQ for the CT exposure are within the acceptable risk and hazard levels, but with less certainty.

5.1 CARCINOGENIC EFFECTS

5.1.0.1 For carcinogens, risks are estimated as the incremental probability of an individual developing cancer over a lifetime (assumed to be 70 years) as a result of exposure to the potential carcinogen (i.e., incremental or excess individual lifetime cancer risk). For example, an excess lifetime cancer risk of 1 x 10^{-6} indicates an individual has a one-in-one-million probability of developing cancer over a lifetime as a result of site-related exposures to a specific COPC. Carcinogenic risk probabilities were estimated by multiplying the exposure level calculated for each exposure route by the corresponding cancer toxicity value (i.e., SF or URF) (USEPA 1989a, 1996, 2004a, 2009) as follows:

$$Risk_{oral} = CDI_{oral} \times SF_o$$

$$Risk_{dermal} = CDI_{dermal} \times SF_d$$

$$Risk_{inhalation} = \frac{C_{air} \times EF \times ED \times ET \times URF \times CF}{AT \times 365 \text{ days/year}}$$

where:

AT	= Averaging time (years)
C_{air}	= COPC concentration in airborne dust or outdoor air (mg/m^3)
$CDI_{oral,dermal}$	= Chronic daily intake for each COPC via pathway indicated (mg/kg-day)
CF	= Conversion factor (1,000 µg/mg)
ED	= Exposure duration (years)
EF	= Exposure frequency (days/year)
ET	= Exposure time; i.e., the fraction of the day spent at the site (unitless)
OAF	= Oral absorption factor (unitless) – an adjustment factor for dermal toxicity values

Risk = Incremental or excess individual lifetime cancer risk for each COPC (unitless)
SF_o = Chemical specific oral slope factor ((mg/kg-day)$^{-1}$)
SF_d = SF_o/OAF
URF = Chemical specific inhalation unit risk factor ((µg/m^3)$^{-1}$)

5.1.0.2 Risk probabilities are assumed to be additive for all COPCs across all exposure pathways to estimate a total excess cancer risk. After summing all of the risks, the total excess cancer risk estimates are then compared to the point of departure of 1 x 10^{-6} (USEPA, 1990). In general, total risks greater than 1 x 10^{-4} require action; risks between 1 x 10^{-6} and 1 x 10^{-4} are in the risk management range and require the stakeholders to discuss and decide whether the risk estimates are acceptable; and risks less than 1 x 10^{-6} are generally considered acceptable.

5.2 NONCARCINOGENIC EFFECTS

5.2.0.1 For exposure to noncarcinogens, adverse effects are not assumed to occur below a certain threshold (i.e., the RfD or RfC). The potential for adverse noncarcinogenic effects (i.e., the hazard quotient or HQ) was estimated by dividing the exposure level calculated for each exposure route by the corresponding noncancer toxicity value (i.e., RfD or RfC) (USEPA 1989a, 1996, 2004a, 2009) as follows:

$$HQ_{oral} = \frac{Intake_{oral}}{RfD_o}$$

$$HQ_{dermal} = \frac{Intake_{dermal}}{RfD_d}$$

$$HQ_{inhalation} = \frac{C_{air} \times EF \times ED \times ET \times CF}{RfC \times AT \times 365 \text{ days/year}}$$

where:

AT = Averaging time (years)
C_{air} = COPC concentration in airborne dust or outdoor air (mg/m^3)
ED = Exposure duration (years)
EF = Exposure frequency (days/year)
ET = Exposure time; i.e., the fraction of the day spent at the site (unitless)
CF = Conversion factor (1,000 µg/mg)
HQ = Hazard quotient for each COPC (unitless)
$Intake_{oral,dermal}$ = Oral and dermal exposure for each COPC (mg/kg-day)
OAF = Oral absorption factor (unitless)
RfD_o = Chemical specific oral reference dose (mg/kg-day)
RfD_d = RfD_o x OAF
RfC = inhalation reference concentration (µg/m^3)

5.2.0.2 After summing all the HQs for all COPCs across all exposure pathways, the sum (called a hazard index or HI) is then compared to the USEPA acceptable hazard level of 1. An HQ or HI less than 1 indicates a very low threat of adverse health effects, whereas an HQ or HI in excess of 1 indicates the potential for noncancer effects (USEPA 1989a). It is important to consider that a HQ or HI above 1 only indicates a potential for noncarcinogenic adverse health effects for the receptor. It does not predict the incidence, or severity, of effects (USEPA 1989a).

5.3 RISK CHARACTERIZATION RESULTS

Tables 5-1 through 5-4 summarize the human health risk/hazard results for assumed exposures to soil at both 0-2 and 0-12 ft bgs for residents and outdoor workers, and exposures to soil at 0-0.5 ft bgs for recreational green space users. Appendix H provides the supporting calculations for the results presented in these tables.

5.3.1 Residents – Excess Cancer Risks

5.3.1.1 Total excess cancer risks for assumed adult residential exposures to surface soil (through incidental ingestion of soil, ingestion of homegrown vegetables, dermal contact with soil, the inhalation of outdoor dusts, and inhalation of site-related volatile compounds in indoor air) were estimated using the EPCs shown in Table 2-6. This results in total risk estimates of 6 x 10^{-6} to 9 x 10^{-5}, depending on depth interval and whether RME or CT exposures are assumed (Table 5-1).

5.3.1.2 Total excess cancer risks for assumed child residential exposures to soil (through incidental ingestion of soil, ingestion of homegrown vegetables, dermal contact with soil, the inhalation of outdoor dusts, and inhalation of site-related volatile compounds in indoor air) were estimated using the EPCs shown in Table 2-6. This results in total risk estimates of 8 x 10^{-6} to 7 x 10^{-5}, depending on depth interval and whether RME or CT exposures are assumed (Table 5-2).

5.3.1.3 The total excess cancer risk for a resident (adult plus child) with 30 years exposures to soil were estimated to be ranged between 1 x 10^{-5} to 2 x 10^{-4}, depending on depth interval and whether RME or CT exposures are assumed. Compared to the USEPA (1990) acceptable target risk range of 1 x 10^{-6} to 1 x 10^{-4}, the cumulative cancer risk estimate of 2 10^{-4} for residents exposed to arsenic in mixed soil exceeds 1 x 10^{-4}.

5.3.2 Residents – Non-Cancer Risks

5.3.2.1 Assumed adult residential exposures to these COPCs in surface soil resulted in total HIs of approximately 0.09 to 0.7, depending on depth interval and whether RME or CT exposures are assumed (Table 5-1). The estimates for the RME and CT scenarios are below 1, the benchmark level of concern for noncarcinogenic effects for both the 0-2 ft and 0-12 ft soil intervals. This indicates that assumed exposures will not result in adverse health effects.

5.3.2.2 Assumed child residential exposures to these COPCs resulted in total HIs of approximately 1 to 3, depending on depth interval and whether RME or CT exposures are assumed (Table 5-2). The HI for arsenic (HQ of 2) at depths between 0 to 12 ft bgs was greater than one under the RME exposure scenario. The sum of the remaining HIs for this exposure scenario do not exceed one. This indicates that assumed exposures to arsenic may result in adverse health effects.

5.3.3 Outdoor Workers

5.3.3.1 Total excess cancer risks for assumed outdoor worker exposures to soil (through incidental ingestion of soil, dermal contact with soil, and the inhalation of outdoor dust) were estimated using the EPCs shown in Table 2-6. This results in total risk estimates of 4 x 10^{-6} to 1 x 10^{-4}, depending on depth interval and whether RME or CT exposures are assumed (Table 5-3). These risk estimates are within the USEPA (1990) target risk range of 1 x 10^{-6} to 1 x 10^{-4}.

5.3.3.2 Assumed outdoor worker exposures to these COPCs resulted in total HIs of 0.3 to 0.5 (depending on depth interval) for both RME and CT (Table 5-3). The HIs do not exceed one. This indicates that assumed exposures will not result in adverse health effects.

5.3.4 Child Recreational Green Space Users

5.3.4.1 Total excess cancer risks for assumed child recreational green space user exposures to soil (through incidental ingestion of soil, dermal contact with soil, and the inhalation of outdoor dusts) were estimated using the EPCs shown in Table 2-6. This results in total risk estimates of 9 x 10^{-7} to 1 x 10^{-6}, depending on whether RME or CT exposures are assumed (Table 5-4). These risk estimates do not exceed 1 x 10^{-6} and the USEPA (1990) target risk range of 1 x 10^{-6} to 1 x 10^{-4}.

5.3.4.2 Assumed child recreational green space user exposures to these COPCs resulted in total HIs of approximately 0.1 for RME and CT scenarios (Table 5-4). The HIs estimated for a child recreational green space user are below the benchmark of 1 under the RME and CT scenarios. This indicates that assumed exposures will not result in adverse health effects.

Table 5-1
Adult Resident Risk Estimates
Surface Soils (0-2 ft bgs) and Mixed Soils (0-12 ft bgs)
4825 Glenbrook Road
Spring Valley, Washington, D.C.

	RME Risk Probabilities													
	Surface Soils (0-2 ft bgs)							Mixed Soils (0-12 ft bgs)						
COPC	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Inhalation of Indoor Air	Ingestion of Home-Grown Vegetables	Summation	Percent Contribution	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Inhalation of Indoor Air	Ingestion of Home-Grown Vegetables	Summation	Percent Contribution
Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	6.99E-06	8.36E-07	6.90E-10	-	6.14E-06	1.40E-05	77%	4.30E-05	5.15E-06	4.25E-09	-	3.78E-05	8.60E-05	95%
Cobalt	-	-	3.42E-09	-	-	3.42E-09	0%	-	-	3.32E-09	-	-	3.32E-09	0%
Manganese	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	-	-	-	2.20E-06	-	2.20E-06	12%	-	-	-	2.20E-06	-	2.20E-06	2%
Carbon Tetrachl	-	-	-	2.00E-06	-	2.00E-06	11%	-	-	-	2.00E-06	-	2.00E-06	2%
Summation	7E-06	8E-07	4E-09	4E-06	6E-06	2E-05		4E-05	5E-06	8E-09	4E-06	4E-05	9E-05	

	RME Hazard Index (HI)													
	Surface Soils (0-2 ft bgs)							Mixed Soils (0-12 ft bgs)						
COPC	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Inhalation of Indoor Air	Ingestion of Home-Grown Vegetables	Summation	Percent Contribution	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Inhalation of Indoor Air	Ingestion of Home-Grown Vegetables	Summation	Percent Contribution
Aluminum	4.19E-02	-	2.89E-04	-	-	4.22E-02	17%	4.05E-02	-	2.79E-04	-	-	4.08E-02	5%
Arsenic	4.53E-02	5.42E-03	3.12E-05	-	3.98E-02	9.05E-02	37%	2.79E-01	3.34E-02	1.92E-04	-	2.45E-01	5.57E-01	75%
Cobalt	1.07E-01	-	1.85E-04	-	-	1.07E-01	43%	1.04E-01	-	1.79E-04	-	-	1.04E-01	14%
Manganese	6.24E-03	-	6.02E-04	-	-	6.84E-03	3%	7.86E-03	-	7.58E-04	-	-	8.61E-03	1%
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	-	-	-	2.90E-03	-	2.90E-03	1%	-	-	-	2.90E-03	-	2.90E-03	0%
Carbon Tetrachl	-	-	-	9.90E-03	-	9.90E-03	4%	-	-	-	9.90E-03	-	9.90E-03	1%
Lewisite	-	-	-	-	-	-	-	9.59E-04	2.25E-02	1.10E-09	-	-	2.35E-02	3%
Summation	2E-01	5E-03	1E-03	1E-02	4E-02	2E-01		4E-01	6E-02	1E-03	1E-02	2E-01	7E-01	

	CT Risk Probabilities													
	Surface Soils (0-2 ft bgs)							Mixed Soils (0-12 ft bgs)						
COPC	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Inhalation of Indoor Air	Ingestion of Home-Grown Vegetables	Summation	Percent Contribution	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Inhalation of Indoor Air	Ingestion of Home-Grown Vegetables	Summation	Percent Contribution
Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	9.49E-07	3.24E-08	1.87E-10	-	2.77E-07	1.26E-06	100%	2.88E-06	9.87E-08	5.70E-10	-	3.78E-05	4.08E-05	95%
Cobalt	-	-	1.06E-09	-	-	1.06E-09	0%	-	-	1.09E-09	-	-	1.09E-09	0%
Manganese	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	-	-	-	5.50E-07	-	5.50E-07	3%	-	-	-	5.50E-07	-	5.50E-07	1%
Carbon Tetrachl	-	-	-	1.60E-06	-	1.60E-06	9%	-	-	-	1.60E-06	-	1.60E-06	4%
Summation	9E-07	3E-08	1E-09	2E-06	3E-07	1E-06		3E-06	1E-07	2E-09	2E-06	4E-05	4E-05	

	CT Hazard Index (HI)													
	Surface Soils (0-2 ft bgs)							Mixed Soils (0-12 ft bgs)						
COPC	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Inhalation of Indoor Air	Ingestion of Home-Grown Vegetables	Summation	Percent Contribution	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Inhalation of Indoor Air	Ingestion of Home-Grown Vegetables	Summation	Percent Contribution
Aluminum	1.74E-02	-	2.40E-04	-	-	1.77E-02	19%	1.86E-02	-	2.57E-04	-	-	1.89E-02	14%
Arsenic	1.64E-02	5.61E-04	2.26E-05	-	4.79E-03	2.18E-02	24%	4.99E-02	1.71E-03	6.87E-05	-	1.46E-02	6.62E-02	48%
Cobalt	4.44E-02	-	1.53E-04	-	-	4.45E-02	48%	4.55E-02	-	1.57E-04	-	-	4.57E-02	33%
Manganese	2.48E-03	-	4.79E-04	-	-	2.96E-03	3%	2.32E-03	-	4.48E-04	-	-	2.77E-03	2%
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	-	-	-	7.10E-04	-	7.10E-04	1%	-	-	-	7.10E-04	-	7.10E-04	0%
Carbon Tetrachl	-	-	-	5.00E-03	-	5.00E-03	5%	-	-	-	5.00E-03	-	5.00E-03	1%
Lewisite	-	-	-	-	-	-	-	4.01E-04	2.69E-03	9.20E-07	-	-	3.09E-03	0%
Summation	8E-02	6E-04	9E-04	6E-03	5E-03	9E-02		1E-01	4E-03	9E-04	6E-03	1E-02	1E-01	

Table 5-2
Child Resident Risk Estimates
Surface Soils (0-2 ft bgs) and Mixed Soils (0-12 ft bgs)
4825 Glenbrook Road
Spring Valley, Washington, D.C.

	RME Risk Probabilities													
	Surface Soils (0-2 ft bgs)							Mixed Soils (0-12 ft bgs)						
COPC	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Inhalation of Indoor Air	Ingestion of Home-Grown Vegetables	Summation	Percent Contribution	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Inhalation of Indoor Air	Ingestion of Home-Grown Vegetables	Summation	Percent Contribution
Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	8.15E-06	1.43E-06	2.04E-10	-	1.53E-06	1.11E-05	79%	5.02E-05	8.80E-06	1.26E-09	-	9.45E-06	6.84E-05	96%
Cobalt	-	-	1.01E-09	-	-	1.01E-09	0%	-	-	9.81E-10	-	-	9.81E-10	0%
Manganese	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	-	-	-	5.50E-07	-	5.50E-07	4%	-	-	-	5.50E-07	-	5.50E-07	1%
Carbon Tetrac	-	-	-	2.40E-06	-	2.40E-06	17%	-	-	-	2.40E-06	-	2.40E-06	3%
Summation	8E-06	1E-06	1E-09	3E-06	2E-06	1E-05		5E-05	9E-06	2E-09	3E-06	9E-06	7E-05	

	RME Hazard Index (HI)													
	Surface Soils (0-2 ft bgs)							Mixed Soils (0-12 ft bgs)						
COPC	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Inhalation of Indoor Air	Ingestion of Home-Grown Vegetables	Summation	Percent Contribution	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Inhalation of Indoor Air	Ingestion of Home-Grown Vegetables	Summation	Percent Contribution
Aluminum	1.96E-01	-	3.42E-04	-	-	1.96E-01	19%	1.89E-01	-	3.31E-04	-	-	1.89E-01	8%
Arsenic	2.11E-01	3.70E-02	3.69E-05	-	3.98E-02	2.88E-01	28%	1.30E+00	2.28E-01	2.28E-04	-	2.45E-01	1.77E+00	71%
Cobalt	5.00E-01	-	2.19E-04	-	-	5.00E-01	49%	4.85E-01	-	2.12E-04	-	-	4.85E-01	20%
Manganese	2.91E-02	-	7.13E-04	-	-	2.98E-02	3%	3.67E-02	-	8.97E-04	-	-	3.76E-02	2%
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	-	-	-	2.90E-03	-	2.90E-03	0%	-	-	-	2.90E-03	-	2.90E-03	0%
Carbon Tetrac	-	-	-	9.90E-03	-	9.90E-03	1%	-	-	-	9.90E-03	-	9.90E-03	0%
Lewisite	-	-	-	-	-	-	-	4.47E-03	1.54E-01	1.30E-09	-	-	1.58E-01	6%
Summation	9E-01	4E-02	1E-03	1E-02	4E-02	1		2E+00	2E-01	2E-03	1E-02	2E-01	2	

	CT Risk Probabilities													
	Surface Soils (0-2 ft bgs)							Mixed Soils (0-12 ft bgs)						
COPC	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Inhalation of Indoor Air	Ingestion of Home-Grown Vegetables	Summation	Percent Contribution	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Inhalation of Indoor Air	Ingestion of Home-Grown Vegetables	Summation	Percent Contribution
Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	5.90E-06	2.07E-07	1.48E-10	-	1.85E-07	6.29E-06	82%	1.80E-05	6.29E-07	4.50E-10	-	5.62E-07	1.91E-05	93%
Cobalt	-	-	8.37E-10	-	-	8.37E-10	0%	-	-	8.59E-10	-	-	8.59E-10	0%
Manganese	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	-	-	-	1.40E-07	-	1.40E-07	2%	-	-	-	1.40E-07	-	1.40E-07	1%
Carbon Tetrac	-	-	-	1.20E-06	-	1.20E-06	16%	-	-	-	1.20E-06	-	1.20E-06	6%
Summation	6E-06	2E-07	1E-09	1E-06	2E-07	8E-06		2E-05	6E-07	1E-09	1E-06	6E-07	2E-05	

	CT Hazard Index (HI)													
	Surface Soils (0-2 ft bgs)							Mixed Soils (0-12 ft bgs)						
COPC	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Inhalation of Indoor Air	Ingestion of Home-Grown Vegetables	Summation	Percent Contribution	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Inhalation of Indoor Air	Ingestion of Home-Grown Vegetables	Summation	Percent Contribution
Aluminum	1.63E-01	-	2.84E-04	-	-	1.63E-01	21%	1.74E-01	-	3.04E-04	-	-	1.74E-01	15%
Arsenic	1.53E-01	5.36E-03	2.68E-05	-	4.79E-03	1.63E-01	21%	4.65E-01	1.63E-02	8.14E-05	-	1.46E-02	4.96E-01	43%
Cobalt	4.14E-01	-	1.81E-04	-	-	4.14E-01	54%	4.25E-01	-	1.86E-04	-	-	4.25E-01	37%
Manganese	2.32E-02	-	5.67E-04	-	-	2.37E-02	3%	2.17E-02	-	5.30E-04	-	-	2.22E-02	2%
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	-	-	-	7.10E-04	-	7.10E-04	0%	-	-	-	7.10E-04	-	7.10E-04	0%
Carbon Tetrac	-	-	-	5.00E-03	-	5.00E-03	1%	-	-	-	5.00E-03	-	5.00E-03	0%
Lewisite	-	-	-	-	-	-	-	3.74E-03	2.57E-02	1.09E-06	-	-	2.94E-02	1%
Summation	8E-01	5E-03	1E-03	6E-03	5E-03	1		1E+00	4E-02	1E-03	6E-03	1E-02	1	

Table 5-3
Outdoor Worker Risk Estimates
Surface Soils (0-2 ft bgs) and Mixed Soils (0-12 ft bgs)
4825 Glenbrook Road
Spring Valley, Washington, D.C.

	RME Risk Probabilities									
	Surface Soils (0-2 ft bgs)					Mixed Soils (0-12 ft bgs)				
COPC	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Summation	Percent Contribution	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Summation	Percent Contribution
Aluminum	-	-	-	-	-	-	-	-	-	-
Arsenic	1.72E-05	1.03E-06	8.21E-09	1.82E-05	100%	1.06E-04	6.34E-06	5.06E-08	1.12E-04	100%
Cobalt	-	-	4.07E-08	4.07E-08	0%	-	-	3.95E-08	3.95E-08	0%
Manganese	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-
Summation	2E-05	1E-06	5E-08	2E-05		1E-04	6E-06	9E-08	1E-04	

	RME Hazard Index (HI)									
	Surface Soils (0-2 ft bgs)					Mixed Soils (0-12 ft bgs)				
COPC	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Summation	Percent Contribution	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Summation	Percent Contribution
Aluminum	9.88E-02	-	3.30E-03	1.02E-01	21%	9.55E-02	-	3.19E-03	9.87E-02	9%
Arsenic	1.07E-01	6.40E-03	3.56E-04	1.13E-01	23%	6.57E-01	3.94E-02	2.20E-03	6.99E-01	63%
Cobalt	2.53E-01	-	2.11E-03	2.55E-01	52%	2.45E-01	-	2.05E-03	2.47E-01	22%
Manganese	1.47E-02	-	6.88E-03	2.16E-02	4%	1.85E-02	-	8.66E-03	2.72E-02	2%
Thallium	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-
Lewisite						2.26E-03	2.66E-02	1.26E-08	2.89E-02	3%
Summation	5E-01	6E-03	1E-02	5E-01		1E+00	7E-02	2E-02	1E+00	

	CT Risk Probabilities									
	Surface Soils (0-2 ft bgs)					Mixed Soils (0-12 ft bgs)				
COPC	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Summation	Percent Contribution	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Summation	Percent Contribution
Aluminum	-	-	-	-	-	-	-	-	-	-
Arsenic	3.92E-06	2.35E-08	6.25E-10	3.94E-06	100%	1.19E-05	7.15E-08	1.90E-09	1.20E-05	100%
Cobalt	-	-	3.54E-09	3.54E-09	0%	-	-	3.63E-09	3.63E-09	0%
Manganese	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-
Summation	4E-06	2E-08	4E-09	4E-06		1E-05	7E-08	6E-09	1E-05	

	CT Hazard Index (HI)									
	Surface Soils (0-2 ft bgs)					Mixed Soils (0-12 ft bgs)				
COPC	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Summation	Percent Contribution	Ingestion	Dermal Contact	Inhalation of VOC/Dust in Outdoor Air	Summation	Percent Contribution
Aluminum	7.19E-02	-	8.00E-04	7.27E-02	22%	7.70E-02	-	8.56E-04	7.79E-02	16%
Arsenic	6.77E-02	4.06E-04	7.53E-05	6.82E-02	20%	2.06E-01	1.24E-03	2.29E-04	2.07E-01	42%
Cobalt	1.83E-01	-	5.09E-04	1.84E-01	55%	1.88E-01	-	5.23E-04	1.88E-01	39%
Manganese	1.03E-02	-	1.60E-03	1.19E-02	4%	9.59E-03	-	1.49E-03	1.11E-02	2%
Thallium	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-
Lewisite						1.65E-03	1.95E-03	3.07E-09	3.60E-03	1%
Summation	3E-01	4E-04	3E-03	3E-01		5E-01	3E-03	3E-03	5E-01	

Table 5-4
Child Green Space User Risk Estimates
Surface Soils (0-0.5 ft bgs)
4825 Glenbrook Road
Spring Valley, Washington, D.C.

	RME Risk Probabilities				
	Surface Soils (0-0.5 ft bgs)				
COPC	**Ingestion**	**Dermal Contact**	**Inhalation of VOC/Dust in Outdoor Air**	**Summation**	**Percent Contribution**
Aluminum	-	-	-	-	-
Arsenic	1.07E-06	1.88E-07	2.69E-11	1.26E-06	100%
Cobalt	-	-	1.77E-10	1.77E-10	0%
Manganese	-	-	-	-	-
Thallium	-	-	-	-	-
Vanadium	-	-	-	-	-
Summation	1E-06	2E-07	2E-10	1E-06	

	RME Hazard Index (HI)				
	Surface Soils (0-0.5 ft bgs)				
COPC	**Ingestion**	**Dermal Contact**	**Inhalation of VOC/Dust in Outdoor Air**	**Summation**	**Percent Contribution**
Aluminum	2.28E-02	-	3.99E-05	2.29E-02	16%
Arsenic	2.78E-02	4.87E-03	4.86E-06	3.27E-02	22%
Cobalt	8.73E-02	-	3.82E-05	8.74E-02	59%
Manganese	4.17E-03	-	1.02E-04	4.27E-03	3%
Thallium	-	-	-	-	-
Vanadium	-	-	-	-	-
Summation	1E-01	5E-03	2E-04	1E-01	

	CT Risk Probabilities				
	Surface Soils (0-0.5 ft bgs)				
COPC	**Ingestion**	**Dermal Contact**	**Inhalation of VOC/Dust in Outdoor Air**	**Summation**	**Percent Contribution**
Aluminum	-	-	-	-	-
Arsenic	9.06E-07	3.18E-08	2.27E-11	9.38E-07	100%
Cobalt	-	-	1.06E-10	1.06E-10	0%
Manganese	-	-	-	-	-
Thallium	-	-	-	-	-
Vanadium	-	-	-	-	-
Summation	9E-07	3E-08	1E-10	9E-07	

	CT Hazard Index (HI)				
	Surface Soils (0-0.5 ft bgs)				
COPC	**Ingestion**	**Dermal Contact**	**Inhalation of VOC/Dust in Outdoor Air**	**Summation**	**Percent Contribution**
Aluminum	1.90E-02	-	3.32E-05	1.90E-02	19%
Arsenic	2.35E-02	8.23E-04	4.11E-06	2.43E-02	25%
Cobalt	5.25E-02	-	2.30E-05	5.25E-02	53%
Manganese	2.87E-03	-	7.01E-05	2.94E-03	3%
Thallium	-	-	-	-	-
Vanadium	-	-	-	-	-
Summation	1E-01	8E-04	1E-04	1E-01	

Table 5-5
Risk Summary
4825 Glenbrook Road
Spring Valley, Washington, D.C.

Receptors	RME				CT			
	0-2'/0-0.5'		0-12'		0-2'/0-0.5'		0-12'	
	Cancer Risk	HQ	Cancer Risk	HQ	Cancer Risk	HQ	Cancer Risk	HQ
Residents (adult and child)	3.E-05	1	**2.E-04**	**2**	9.E-06	1	6.E-05	1
Outdoor/Construction Worker	2.E-05	0.5	1.E-04	1	4.E-06	0.3	1.E-05	0.5
Recreational Green Space Users	1.E-06	0.1			9.E-07	0.1		

5.4 UNCERTAINTY ANALYSIS

All HHRAs involve the use of assumptions, judgments, and imperfect data to varying degrees resulting in uncertainties in the final estimates of risk. These uncertainties are generally associated with the multitude of conditions that characterize each step of the HHRA process (i.e., data evaluation and identification of COPCs, exposure assessment, toxicity assessment, and risk characterization). These conditions are characteristically conservative and tend to overestimate potential site-related risks. This discussion qualitatively describes the major uncertainties in the HHRA for 4825 Glenbrook Road.

5.4.1 Uncertainty in Data Collection and Evaluation

5.4.1.1 Analysis of uncertainties focuses on determining whether the available data are representative of contaminant concentrations and site conditions, and whether the sampling, analyses, and/or statistical treatment of the data result in an over- or under-estimation of potential risk. Although most of the assumptions used to calculate risk are designed to over-predict the risk, there are a few occasions where the risk may be underestimated.

5.4.1.2 Where a chemical was not detected, USEPA's (2010a, b) ProUCL uses the Kaplan-Meier method to account for the effect of the non-detects on the estimated UCLs and central tendencies. This assumption tends to overestimate the potential risk. Nonetheless, since the chemical was not detected, there is still some uncertainty in the true UCL and central tendency.

5.4.1.3 The backfill soil data used in the excavation was treated the same as the other sampling results and included in the exposure point concentration calculations. The four samples collected from the fill material represent a larger volume of soil than the samples collected during the previous investigations and remedial actions. Therefore, the soil EPCs estimated here may not be an accurate estimate of the volume weighted concentrations at the site and the resultant EPC that is used tends to overestimate the risk. However, the EPCs used in this report should serve as a fairly accurate estimation for a small site such as 4825 Glenbrook Road.

5.4.1.4 Although the samples used in this HHRA were collected over a period of approximately 19 years by differing contractors and for different projects with different objectives, the samples collected by USACE and Parsons from 2000 to 2010 were collected following the approved site-wide QAPP. The data was validated in accordance with USEPA procedures and are all sufficient to be used to perform a risk assessment. However, it should be noted that the analytical laboratories and analytical procedures have changed over the years, which are expected to have introduced some variation into the measurements.

5.4.1.5 It should be noted that the detections of L near TP 138 in the back porch area may actually be its breakdown products chlorovinylarsenous oxide (CVAO) and/or chlorovinylarsenous acid (CVAA) because L breaks down quickly due to its physical and chemical properties.

5.4.1.6 The ECBC full scan GC/MS analysis for unknown compounds was performed for qualitative identification of the sample. Quantitative evaluations for exposure and risk to these compounds, especially CWM-related compounds, cannot be performed because they lack toxicity values; however these unknown compounds were all detected in intact containers. The effect on not being able to address the unknown compounds may result in underestimation of risk. Potential risk of encountering containerized CWM remains in uninvestigated area, especially near TPs 120 and 134 where containerized CWM was uncovered and work halted due to detection of arsenic trichloride in a container.

5.4.1.7 Six geotechnical borings were advanced in the basement. Although no MEC, CWM containers, agent/ABP impacted soil, and suspected AUES-related debris were encountered in those borings, bedrock was not encountered in the mid to front portions of the house and the spacing of the borings did not eliminate the potential that there may be undiscovered containerized CWM, AUES-related debris, and agent/ABP impacted soil beneath the building.

5.4.1.8 For some of the older data (e.g., EMS 1992; and EPA 1999), detection limits for non-detects were not provided. Thus, there is some uncertainty as to whether the detection limits were adequate for all of the non-detects.

5.4.1.9 Steady-state conditions were assumed for evaluation of potential future exposures, that may tend to overestimate long-term exposures and health risks since contaminant concentrations may decrease over time due to biodegradation, volatilization, and leaching among other factors.

5.4.1.10 Site-related compounds were evaluated to determine whether contaminates in soils could potentially impact groundwater via leaching. Methylene chloride was not considered as a COPC for protection of groundwater. Per USEPA Guidance (USEPA, 1989a), certain organic chemicals such as acetone, 2-butanone, and methylene chloride are commonly used in the laboratory and thus may be introduced into a sample from laboratory cross-contamination. Therefore, the detection of these compounds may not be from the site.

5.4.1.11 Lewisite was not quantified for the inhalation of ambient air exposure pathway because the molecular weight of lewisite is more than 200 g/mole, which is not defined as a VOC by USEPA (USEPA, 2011a). This may results in underestimation of the risk from lewisite.

5.4.1.12 Cobalt is one of the COPCs, but it was not considered bioaccumulative because there are several conflicting bioaccumulative studies for cobalt. Cobalt is currently under review for whether it is bioaccumulative. Not considering cobalt as a bioaccumulative compound for the risk assessment may under estimate the risk if cobalt is bioaccumulative.

5.4.1.13 The HHRA Conceptual Site Model was based on historical information and photographic interpretation. Further, it was assumed any burial pit(s) could be located and remediated. Throughout the investigations, however, it became clear that during development of the property, contents of the original pit(s) were disturbed and pit contents were distributed across the property as evidenced by the items uncovered during the RI:

- TP 138 and vicinities, located near the back porch - mustard/ABPs and/or lewisite detected in soil,
- TPs 120 and 134 and vicinities, located near the front door of the house - two MEC items containerized CWM mustard/ABPs and/or lewisite were detected in soil, and
- Two soil samples located beneath the back porch - mustard/ABPs and/or lewisite detected in soil

5.4.1.14 The excavation of TPs 120 and 134 was halted when arsenic trichloride was discovered in AUES-related glassware at the bottom of the excavation. Therefore, these TPs may not be cleared of MEC, CWM containers, and agent/ABPs impacted soil. No soil confirmation samples were collected.

5.4.1.15 The following were found and removed in TPs 120 and 134

- H, L, and ABPs impacted soils
- Intact containers containing the following:
  - CN - a tearing agent;
  - DA - a vomiting agent;
  - hexachloroethane - used in smoke munitions; and
  - arsenic trichloride - extremely hazardous in case of skin contact (corrosive, irritant)

Since the excavation of TPs 120 and 134 was halted when arsenic trichloride was discovered, these toxic or harmful compounds present potential risk to human receptors.

5.4.1.16 Six borings were advanced in the basement and although no MEC, CWM containers, agent/ABP impacted soil, and suspected AUES-related debris were encountered in those borings. However, bedrock was not encountered in the mid to front portions of the house and the spacing of the borings did not eliminate the potential that there may be undiscovered MEC, containerized CWM, AUES-related debris, and agent/ABP impacted soil beneath the building. Based on findings uncovered from the TPs 120 and 134 in the front yard and TP 183 in the back yard, similar AUES-related items may extend beneath the building.

5.4.1.17 During the sewer line restoration in 2011,a 75mm projectile and an intact glass flask with a dirt or cork plug containing a small quantity of brown solids were uncovered in an area adjacent to a previously excavated area in 2001. L was detected in the solid sample collected from the flask. Therefore, potential risk exists for encountering these items in uninvestigated areas at the site.

5.4.1.18 Based on these findings and others, the uncertainty is high for finding additional CWM and AUES-related items remain in areas not completely excavated to bedrock or competent saprolite.

5.4.2 Uncertainty in Exposure Assessment

5.4.2.1 There is uncertainty associated with how well an exposure scenario approximates the precise conditions to which a receptor may be exposed at a given site. Potential human exposures could deviate from those estimated in this HHRA through differences in exposure frequency, contact rate, exposure duration, body weight, and life span. However, because the RME exposure parameter values generally consist of upper bound (i.e., 95^{th} percentile) estimates, it is likely the RME exposure and risk estimates presented here are upper-bound estimates that overestimate exposures (and risks) for the average receptor.

5.4.2.2 Generic models were used to estimate the concentrations of COPCs in vegetables grown at the site. However, bioaccumulation from soil to plants is dependent on multiple factors, including soil pH, metal species present in the soil, plant species, part of the plant measured/consumed, etc. Thus, the predicted concentrations in vegetables presented here are subject to uncertainty.

5.4.2.3 The soil ingestion rates assumed in this HHRA are incidental soil ingestion rates; i.e., ingestion of soil or dust particles that adhere to food, cigarettes, objects that are mouthed, or hands. However, some children are known to exhibit a behavior called soil-pica, which "…is the recurrent ingestion of unusually high amounts of soil" (USEPA 2008). Children who exhibit soil-pica behavior have much higher soil ingestion rates than assumed here; i.e., 1,000 to 5,000 mg/day or more (USEPA, 2008) vs. 100 mg/day. Thus, soil-pica children would be expected to have correspondingly higher (i.e., 10 to 50x) exposures, and risks, than were estimated here.

5.4.2.4 Due to the numerous test pits and sampling activities that have taken place at the site, some of the samples categorized as "surface" may no longer be near the soil surface and may currently be in deeper soil. However, assumed exposures to both 0-2 and 0-12 ft bgs were evaluated at the site. Therefore, the uncertainty associated with the current depth of the samples is expected to be small.

5.4.2.5 USEPA (1995c, 1996, 2002a), does not provide guidance on estimating dust emissions from lawn mowing, leaf blowing, soil tilling, or similar activities, therefore, outdoor workers were assumed to be exposed to the same level of dust as were residents. The PEF used in the risk assessment was selected to be consistent with the USEPA risk assessment guidance documents for Superfund. For a small site, USEPA default PEF was appropriate to estimate the exposure for an outdoor worker. However, site-specific PEF may be higher than the default level based on site-specific activities. Therefore, it is likely outdoor worker exposures to dusts at the site have been underestimated; however, outdoor workers would have sporadic and infrequent exposures.

5.4.2.6 Soil gas samples were used for the indoor air evaluation although the soils in which the soil gas samples were collected have been removed during the excavation activities. There is also a large degree of uncertainty associated with vapor intrusion modeling. However, the Johnson and Ettinger model (USEPA 2004c) should generally estimate upper bound concentrations of VOCs in indoor air due to subsurface intrusion in one story houses with basements, as assumed here.

5.4.2.7 The assumptions used in SESOIL model are very conservative. The modeling assumed groundwater was present at 13 feet bgs, which represents a discontinuous perched aquifer that occurs in the general area of the site. The depth to shallow groundwater measured in the nearby well was at approximately 13 ft bgs. Whether this shallow aquifer is suitable for use as a drinking water source is unknown. While the SESOIL model predicted that the COPCs in soil at the site would not affect the shallow aquifer, it should be noted that the generic soil properties for silty clay were used in the model. The soil properties used are assumed to be a fairly accurate representation of the soil at the site. Thus, there should be a low degree of uncertainty associated with the soil properties used in the model. It should also be noted that there are no drinking water wells are located in the area and that municipal water is used as drinking water.

5.4.3 Uncertainty in Toxicity Assessment

5.4.3.1 Some uncertainty is also inherent in the toxicity values used in the HHRA. Carcinogenic SFs are route-specific values derived only for compounds shown to cause an increased incidence of tumors in either human or animal studies. Dose-response relationships between tumor incidence and exposure using human epidemiologic or animal studies are used to derive the SF. This dose-response curve is then assumed to be linear at low doses (e.g., those found in situations of environmental contamination) and is used to predict tumor incidence at low exposure levels. When an animal study is used, the final SF is adjusted to account for extrapolation of animal data to humans. If the studies used to derive the SF were conducted for less than the life span of the test organism, the final SF has also been adjusted to reflect risk associated with lifetime exposure.

5.4.3.2 The SF is generally an upper 95th percentile confidence limit of the probability of a response based on experimental animal data in the multistage model. This means that the site-specific chemical risk is not likely to exceed the risk estimate derived through the model and is likely to be less than the predicted risk.

5.4.3.3 The chronic RfD for a compound is based on studies where either human or animal populations were exposed to a given compound by a given route of exposure for the major portion of the life span (as a USEPA guideline, seven years to a lifetime) (USEPA 1989a). RfDs are derived by determining dose-specific effect levels from all available quantitative studies and applying uncertainty factors to the most appropriate effect level to determine a RfD for humans. Uncertainty factors are generally applied as multiples of 10 to represent specific areas of uncertainty in the data. Typically, an uncertainty factor of 100 to 1,000 is used in the adjustments. In addition, USEPA may use a modifying factor of up to 10 that applies to professional judgment of uncertainties. General uncertainties in the derivation of RfDs may be associated with factors such as: (1) variations in the general population (to protect sensitive receptors); (2) extrapolation of animal data to humans; (3) use of a subchronic study versus a chronic study to determine the no-observed-adverse-effect level (NOAEL); or (4) use of a lowest-observed-adverse-effect level (LOAEL) versus a NOAEL. Both the uncertainty and modifying factors are conservative in nature and tend to overestimate risk.

5.4.3.4 As indicated above, toxicity factors are generally route specific (i.e., they are either for inhalation or oral exposure to a given chemical). In this risk assessment, oral RfDs and CSFs were used to evaluate the risk associated with ingestion of a given chemical. RfCs and inhalation URFs were used to evaluate the risk associated with inhalation of chemicals. Due to differences in the exposure pathways, route-to-route extrapolation was not performed between oral and inhalation pathways (USEPA, 2009). In other words, if an inhalation toxicity factor did not exist, the oral RfD or CSF was not used to calculate one. For analytes that are inhaled, absorbed through the lungs, and have systemic toxic effects, the absence of route-to-route extrapolation will tend to underestimate the risk associated with inhalation exposure to a given chemical. Conversely, for chemicals that have only portal of entry effects, and not systemic effects, the use of route-to-route extrapolation would tend to overestimate the risks.

5.4.3.5 The following chemicals detected in soil at the site do not have toxicity values and could not be evaluated quantitatively in this HHRA:

- Vanadium
- Thallium
- 4-Nitrophenol
- Iodine pentafluoride
- Phenyl isocyanate

5.4.3.6 Risks were not estimated for vanadium and thallium because no toxicity values considered appropriate for risk assessment are available for these two metals (see Section 4.5).

Thus, the potential hazards from assumed exposures to these metals may have been underestimated. However, since there metals are not assumed to be carcinogenic, the potential cancer risks from assumed exposures to these metals are not likely to have been underestimated. Although some samples are higher than 2 times the background level, there is no toxicity data to support removal.

5.4.3.7 4-Nitrophenol is not on the AUES specific compounds list. It is unknown what, if any, past releases by the Department of Defense contributed to the presence of 4-nitrophenol in soils at the site.

5.4.3.8 Iodine pentafluoride (as iodate) was detected in several soil samples. Although the lab reported the detection was iodine pentafluoride, it is more likely that an iodate salt was detected; e.g., sodium iodate ($NaIO_3$), silver iodate ($AgIO_3$), and calcium iodate ($Ca(IO_3)_2$). In addition to the uncertain identity of the actual iodate present, there are no toxicity values available from the approved sources listed in USEPA (2003, 2011a) guidance. Thus, the effects from assumed exposures to iodates cannot be quantified.

5.4.3.9 Phenyl isocyanate was detected in two samples on the AUES specific compound list. However, no toxicity values are available and the effects from exposures to this compound cannot be quantified.

5.4.4 Uncertainty in Estimating Chemical Risk

5.4.4.1 The expression of the potential risk associated with contaminants detected at the site is a result of the combined steps of data evaluation, exposure assessment, and toxicity assessment. This combination provides the potential to magnify the uncertainties present in these steps of the HHRA process.

5.4.4.2 The chemical risk calculations include the risk associated with exposure to all COPCs evaluated at the site. Whenever carcinogenic and non-carcinogenic toxicity factors are available for a given chemical, the risk and hazard are both calculated. Cumulative risk is calculated using all available analytes. However, the risks are not necessarily additive; e.g., the risks could be synergistic or even antagonistic. When the non-carcinogenic hazard quotient is greater than 1, potential target organ effects were considered. Only those chemicals that affected the same target organ, as indicated by the critical study for calculating the RfD, were considered to have a cumulative toxicity. This assumption may tend to underestimate the hazard, should a chemical effect multiple target organs not represented in the critical study or should there by synergistic effects among the COPCs.

5.4.4.3 Mustard, lewisite, and ABPs were detected in the vicinity of TP 138, located near the back porch, and TPs 120 and 134, located near the front door of the house. Agent impacted soil detected in the vicinity of TP 138 was removed and disposed at an incineration facility. TP 138 was cleared of containerized agent/ABP and no agent or ABPs were detected in the sidewall and floor soil confirmation samples for TP 138. However, the excavation of TPs 120 and 134 was not cleared of MEC, CWM containers, and agent/ABPs impacted soil, and no soil confirmation samples were collected as work on this excavation was halted when arsenic trichloride was discovered in AUES-related glassware at the bottom of the excavation. Therefore, it is unknown whether containerized CWM, and agent/ABP impacted soil extend beyond the boundaries of the excavation containing TPs 120 and 134. Potential risk of encountering MEC, containerized

CWM, ABPs and agent/hazardous toxic waste (HTW) contaminated soil remains in the uninvestigated area of TPs 120 and 134, which cannot be quantitatively evaluated.

5.5 RISK SUMMARY

5.5.0.1 The carcinogenic risks estimated for the four receptor groups (adult residents, child residents, child recreational green space users, and outdoor workers) assumed to be exposed to COPCs in soils (via ingestion, dermal contact, the inhalation of dusts, and the inhalation of volatiles in indoor air, as well as homegrown vegetable ingestion) at the site are summarized in Tables 5-1 through 5-4. The carcinogenic risks estimated for adult residents, child residents, child recreational green space users, and outdoor workers are within the USEPA acceptable risk range of 1 x 10^{-6} and 1 x 10^{-4}, regardless of depth interval (i.e., 0-2 vs. 0-12 ft bgs, 0-0.5' for child recreational green space users) to which the receptors are assumed to be exposed and exposure scenario (i.e., RME vs. CT) assumed. This indicates that assumed exposures to COPCs at the site are unlikely to result in unacceptable carcinogenic risks for the receptors evaluated. However, the cumulative cancer risk estimate of 2 x 10^{-4} for residents (adult and child) exposed to arsenic in mixed soil exceeds 1 x 10^{-4} (Table 5-5).

5.5.0.2 Tables 5-1 through 5-4 show that the non-carcinogenic HIs estimated for adult residents, child residents, child recreational green space users, and outdoor workers do not exceed do not exceed the benchmark of 1 under the RME and CT scenarios except for child residents under the 0-12 feet RME scenario.

5.5.0.3 Tables 5-2 shows that the noncarcinogenic HI under the RME exposure scenario estimated for child residents (0-12 feet bgs) assumed to be exposed to COPCs in soils (via ingestion, dermal contact, the inhalation of dusts, and volatiles in indoor air, as well as homegrown vegetable ingestion) at the site exceed USEPA's benchmark level of concern for noncarcinogenic effects of 1. Table 5-5 shows that the HI for a resident (30 years exposure) exposed to surface soil (0-2 ft bgs) is below the benchmark level of 1. However, the HI for a resident exposed to mixed soil (0-12 ft bgs) exceeds the benchmark level of 1. This indicates that assumed exposures to the COPCs at the site are likely to result in adverse noncarcinogenic health effects for a resident exposed to mixed soil. Arsenic is the COPC contribute the most hazards and identified as COC. The primary pathway of concern for arsenic is soil ingestion.

5.5.0.4 Mustard and ABPs were not selected as the COPCs in the risk assessment because they were not detected in any of the in-place soil samples. Therefore, HD and ABPs were not evaluated in the risk assessment. However, lewisite was selected as a COPC because it was detected in two of the in-place soil samples at concentrations exceeding the residential screening level, therefore, it was quantitatively evaluated in the risk assessment. The risk assessment shows that the hazards from lewisite are acceptable (i.e., < benchmark level of 1). Although HD, L and ABPs were either not detected or in the in-place samples, they are indicators of additional source of buried contamination on this property since the investigations of TPs 120 and 134 are not completed. The residential screening levels for these compounds are listed in Table 2-2.

5.5.0.5 The site-specific SESOIL modeling results indicate that it is unlikely that the COPCs detected in soil will impact groundwater beneath the site.

5.6 ADDITIONAL RISK EVALUATION FOR CHEMICAL OF CONCERN

The HHRA results show that arsenic in the mixed soil is the chemical of concern for a future resident at 4825 Glenbrook Road. Two elevated arsenic concentration areas were identified in the driveway and TP 138 location. Additional risk evaluations were performed to determine to determine the impact on remaining risks when these elevated arsenic areas are removed. The 0-12 ft exposure point concentrations were recalculated by removing the three highest arsenic samples located in the driveway and in TP 138. The EPCs for RME and CT were 7 mg/kg and 6.2 mg/kg, respectively (Appendix B), which are approximately 8.7 times and 3.5 times lower than EPCs used in risk assessment for the 0-12 ft depth interval. Both recalculated EPCs are below the Spring Valley site-specific background level of 12.6 mg/kg. Therefore, the cancer risk and hazard level for a resident are expected to be acceptable after removing the elevated arsenic concentrations.

SECTION 6
POTENTIAL RISK REMAINING IN UNINVESTIGATED AREAS

6.0.0.1 MEC, CWM including mustard, lewisite, and ABPs, and other industrial compounds, and agents/ABPs impacted soil were removed when uncovered or detected in investigated areas thus eliminating the risk in these areas. However, uninvestigated areas remain. Sections 5.4.1.13 through 5.4.1.18 discussed the uncertainties for finding additional CWM and AUES-related items in areas not completely investigated.

6.0.0.2 Arsenic has been found across the site and at least two locations containing high arsenic concentration remain. It is probable other areas of high arsenic remain posing an increased risk.

6.0.0.3 TP 120 and TP 134 were not cleared of MEC, CWM containers, and agent/ABPs impacted soil, and no soil confirmation samples were collected as work on this excavation was halted when $AsCl_3$was discovered in glassware at the bottom of the excavation. Therefore, it is likely containerized CWM, ABPs and agent/HTW contaminated soil remain in the uninvestigated area of TPs 120 and 134.

6.0.0.4 Both containerized CWM and agent/ABP-impacted soil were found in three high probability test pits (TPs 120, 134, and 138) located near the house. The CWM and industrial compounds identified in the uncovered intact containers during the high probability TPs 120 and 134 investigations include the following:

- CN - a tearing agent;
- DA - a vomiting agent;
- hexachoroethane - used in smoke munitions; and
- arsenic trichloride - extremely hazardous in case of skin contact (corrosive, irritant)

These toxic or harmful compounds present potential risk to human receptors when encountered via direct contact. However, they were found in intact containers and the potential for human direct contact is limited.

6.0.0.5 Six borings were advanced in the basement. Although no MEC, CWM, agent/ABP-impacted soil, or suspected AUES-related debris were encountered in those borings, bedrock was not encountered in the mid to front portions of the house and the spacing of the borings did not eliminate the potential for undiscovered MEC, CWM, AUES-related debris, or agent/ABP-impacted soil beneath the residence. Based on findings uncovered from the TPs 120 and 134, similar AUES-related items are likely to be extended beneath the house.

6.7.0.6 Benzene was detected at concentrations exceeding the screening levels in soil gas samples. The soil associated with these gas samples was subsequently removed. Benzene was not selected as a COPC for indoor air because it was not found in any in-place soil samples. However, benzene may remain in soil in the uninvestigated areas. Benzene is a known human carcinogen where long term exposure can lead to anemia and a compromised immune system (ATSDR, 2007). Potential exposure to benzene in the uninvestigated areas may result in unacceptable risk.

SECTION 7
CONCLUSIONS

7.0.0.1 The primary objective of this HHRA was to quantitatively characterize the human health risk associated with current and reasonably expected future exposure to contaminated soils at 4825 Glenbrook Road. Potential receptors at the site include outdoor workers, future residents, and future recreational green space users. The exposure pathways evaluated here include incidental soil ingestion, dermal contact with soil, and inhalation of particulates for all receptors. In addition, the ingestion of homegrown vegetables and inhalation of volatile compounds in indoor air were evaluated for residents (Figure 3-1). Tables 5-1 through 5-4 provide a summary of the human health risk for each COPC for each receptor. Table 5-5 is a risk summary of the total cancer risk and total hazard index for each receptor under the evaluated scenarios.

7.0.0.2 The cumulative cancer risk estimates for adult and child residents , child recreational green space users, and outdoor workers exposed to surface soil (i.e. 0-0.5 ft or 0-2 ft below ground surface (bgs)) and for outdoor workers exposed to mixed soil (0-12 ft bgs) are within the USEPA target risk range of 1×10^{-6} to 1×10^{-4}. Thus, unacceptable cancer risks to the receptors at the site are not expected from assumed exposures to COPCs in soils. However, the cumulative cancer risk estimate of 2×10^{-4} for residents exposed to arsenic in mixed soil exceeds 1×10^{-4} (Table 5-5).

7.0.0.3 The hazard indices (HI) estimated for adult and child residents, and child recreational green space users exposed to surface soil (*i.e.*, 0-0.5 feet or 0-2 ft bgs) and outdoor workers exposed to surface soil (0-2 feet bgs) or mixed soil (0-12 feet bgs) are below the benchmark of 1 under both the RME and CT exposure scenarios. Thus, unacceptable hazard to the receptors at the site are not expected from assumed exposures to COPCs in soil. However, the HI for residents exposed to mixed soil (0-12 ft) at the site exceeds the benchmark of 1 under the RME exposure scenario due to assumed exposures to arsenic.

7.0.0.4 The only COC identified from the risk assessment is arsenic based on soil samples remaining at the site. Elevated arsenic areas were identified in two locations; i.e., the driveway and TP 138 location (Figure 7-1). Additional risk evaluations show that the exposure point concentration for arsenic in soil will be less than the Spring Valley site-specific arsenic background level of 12.6 mg/kg by removing the three highest elevated arsenic concentrations.

7.0.0.5 Mustard and ABPs were not selected as the COPCs in the risk assessment because they were not detected in any of the in-place soil samples. However, lewisite was detected in two of the in-place soil samples and was, therefore, selected as a COPC. The risk assessment shows that the hazards from lewisite are acceptable (i.e., < benchmark level of 1). Although HD, L and ABPs were either not detected or in the in-place samples, they are indicators of additional source of buried contamination on this property since the investigations of TPs 120 and 134 are not completed. The residential screening levels for these compounds are listed in Table 2-2.

7.0.0.6 Mustard, lewisite, and ABPs were detected in the vicinity of TP 138, located near the back porch, and TPs 120 and 134, located near the front door of the house (Figures 7-2 and 7-3).

Agent impacted soil detected in the vicinity of TP 138 was removed and disposed at an incineration facility. TP 138 was cleared of containerized agent/ABP and no agent or ABPs were detected in the sidewall and floor soil confirmation samples for TP 138. However, the excavation of TPs 120 and 134 was not cleared of MEC, CWM containers, and agent/ABPs impacted soil, and no soil confirmation samples were collected as work on this excavation was halted when arsenic trichloride was discovered in AUES-related glassware at the bottom of the excavation. Therefore, it is unknown whether agent/ABP impacted soil and MEC extend beyond the boundaries of the excavation containing TPs 120 and 134. Based on finding from the TPs 120 and 134 investigations, it is likely to encounter MEC, containerized CWM, ABPs and agent/hazardous toxic waste (HTW) contaminated soil in the uninvestigated area of TPs 120 and 134. Further action may be warranted to mitigate any unacceptable risk and hazards.

7.0.0.7 Both containerized CWM and agent/ABP impacted soil were found in three high probability test pits (TPs 120, 134, and 138) located near the house. Two MECs were uncovered from the TPs 120 and 134 excavation. Six borings were advanced in the basement and although no MEC, CWM containers, agent/ABP impacted soil, and suspected AUES-related debris were encountered in those borings, bedrock was not encountered in the mid to front portions of the house and the spacing of the borings did not eliminate the potential that there may be undiscovered containerized CWM, AUES-related debris, and agent/ABP impacted soil beneath the building. Therefore, further action may be warranted to mitigate any unacceptable risk and hazards.

7.0.0.8 The COCs identified from the risk assessment and potential risk associated with encountering containerized CWM and agent/ABP impacted soil in uninvestigated areas in the vicinity of TPs 120 and 134 near the house and seven low probability test pits are illustrated in Figure 7-4.

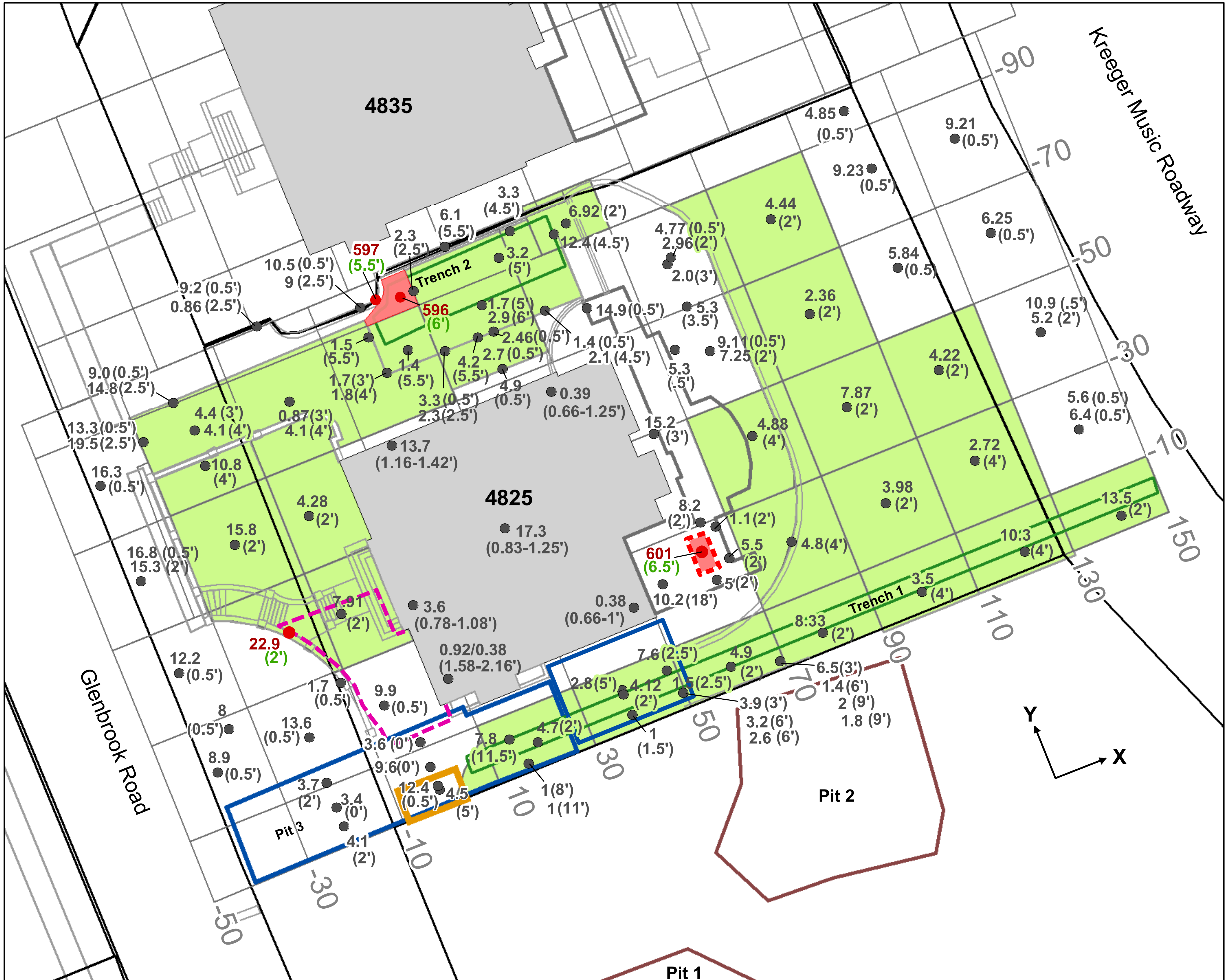

Figure 7-1
Arsenic Delineation Map
4825 Glenbrook Road

Spring Valley
Washington, D.C.

Legend

- Arsenic Sample Location (Concentration ≤20 mg/kg)
- Arsenic Sample Location (Concentration >20 mg/kg)
- Pits 1 and 2 (POI-24R)
- Property Boundaries
- Buildings
- 20' Grid
- Excavated Arsenic Grids
- Arsenic Grid to be Further Excavated
- Arsenic Impacted Soil to be Further Excavated (Test Pit 138)
- AUES Debris Area/ CWM Impacted Soil (Exact Extent Undelineated)
- ECS Footprint (Pit 3)
- Test Pit 23
- Test Trench 1 and 2

0 10 20 40 Feet

1 inch = 20 feet

Scale:	1:240
Created By:	Parsons
File:	20110309 4825 Glenbrook Arsenic Delineation.mxd
Date:	3/9/2011
Figure Number:	7-1
Page Number:	7-3

PARSONS

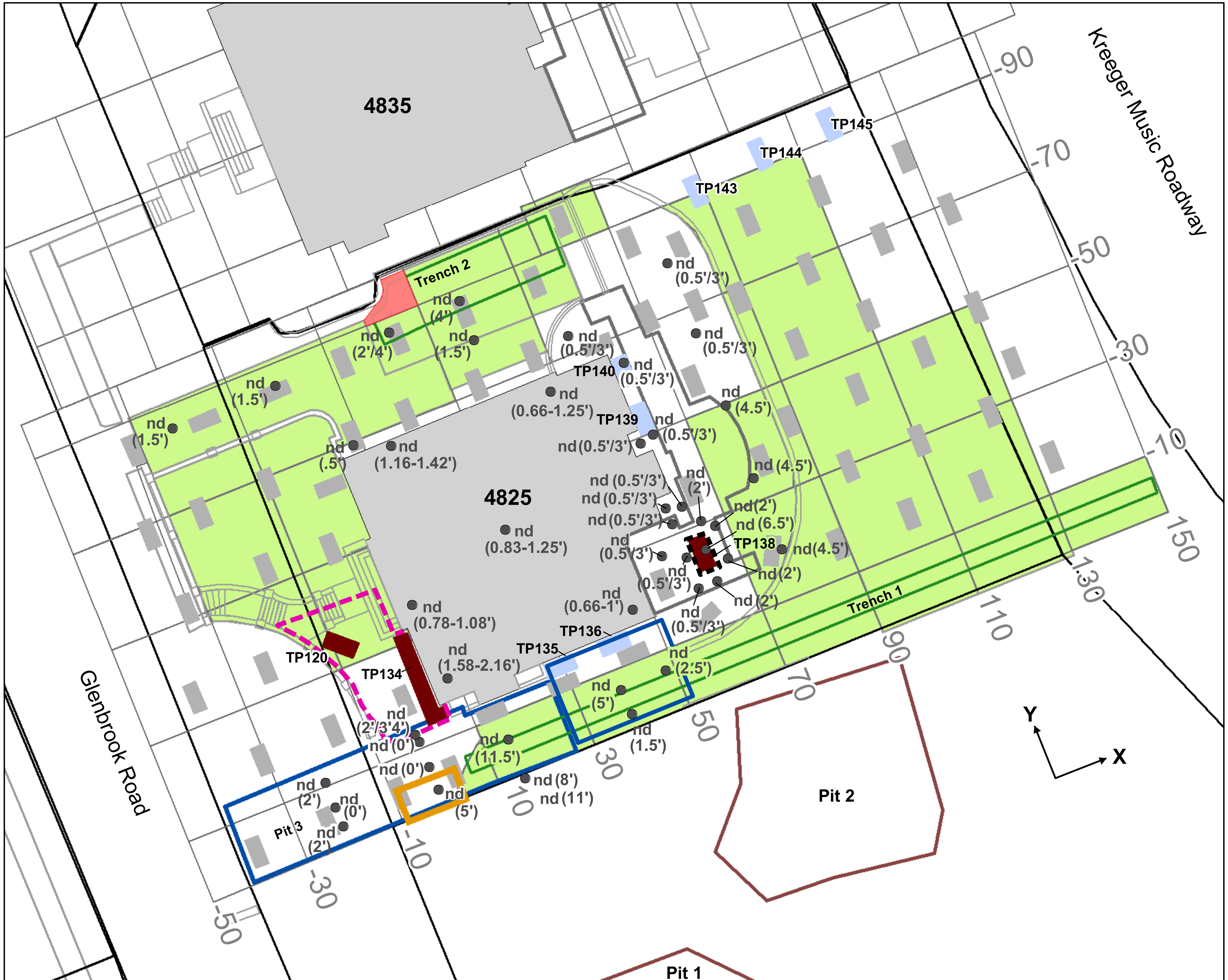

Figure 7-2
Agent Delineation Map (Mustard, 1,4-Dithiane, & 1,4-Thioxane) 4825 Glenbrook Road

Spring Valley
Washington, D.C.

Legend

- ECBC Agent/ABP Non-Detect (Mustard, 1,4-Dithiane, & 1,4-Thioxane)
- High Probability Test Pits
- Test Pits Pending Investigation
- Test Pits Investigated with No Significant Finds
- Pits1 and 2 (POI-24R)
- Property Boundaries
- Buildings
- 20' Grid
- Excavated Arsenic Grids
- Arsenic Grid to be Further Excavated
- Arsenic Impacted Soil to be Further Excavated (Test Pit 138)
- AUES Debris Area/ CWM Impacted Soil (Exact Extent Undelineated)
- ECS Footprint (Pit 3)
- Test Pit 23
- Test Trench 1 and 2

0 10 20 40 Feet

1 inch = 20 feet

Scale:	1:240
Created By:	Parsons
File:	20110309 4825 Glenbrook Agent Delineation Map.mxd
Date:	3/9/2011
Figure Number:	7-2
Page Number:	7-4

PARSONS

Figure 7-3
Agent Delineation Map (Lewisite)
4825 Glenbrook Road

Spring Valley
Washington, D.C.

Legend

- ECBC Agent/ABP Non-Detect (Lewisite) (Concentration: ug/kg)
- ECBC Agent/ABP Exceedence (Lewisite) (Concentration: ug/kg)
- High Probability Test Pits
- Test Pits Pending Investigation
- Test Pits Investigated with No Significant Finds
- Pits 1 and 2 (POI-24R)
- Property Boundaries
- Buildings
- 20' Grid
- Excavated Arsenic Grids
- Arsenic Grid to be Excavated
- Arsenic Impacted Soil to be Further Excavated (Test Pit 138)
- AUES Debris Area/ CWM Impacted Soil (Exact Extent Undelineated)
- ECS Footprint (Pit 3)
- Test Pit 23
- Test Trench 1 and 2

0 10 20 40 Feet

1 inch = 20 feet

Scale:	1:240
Created By:	Parsons
File:	20110309 4825 Glenbrook Lewisite Delineation Map.mxd
Date:	3/9/2011
Figure Number:	7-3
Page Number:	7-5

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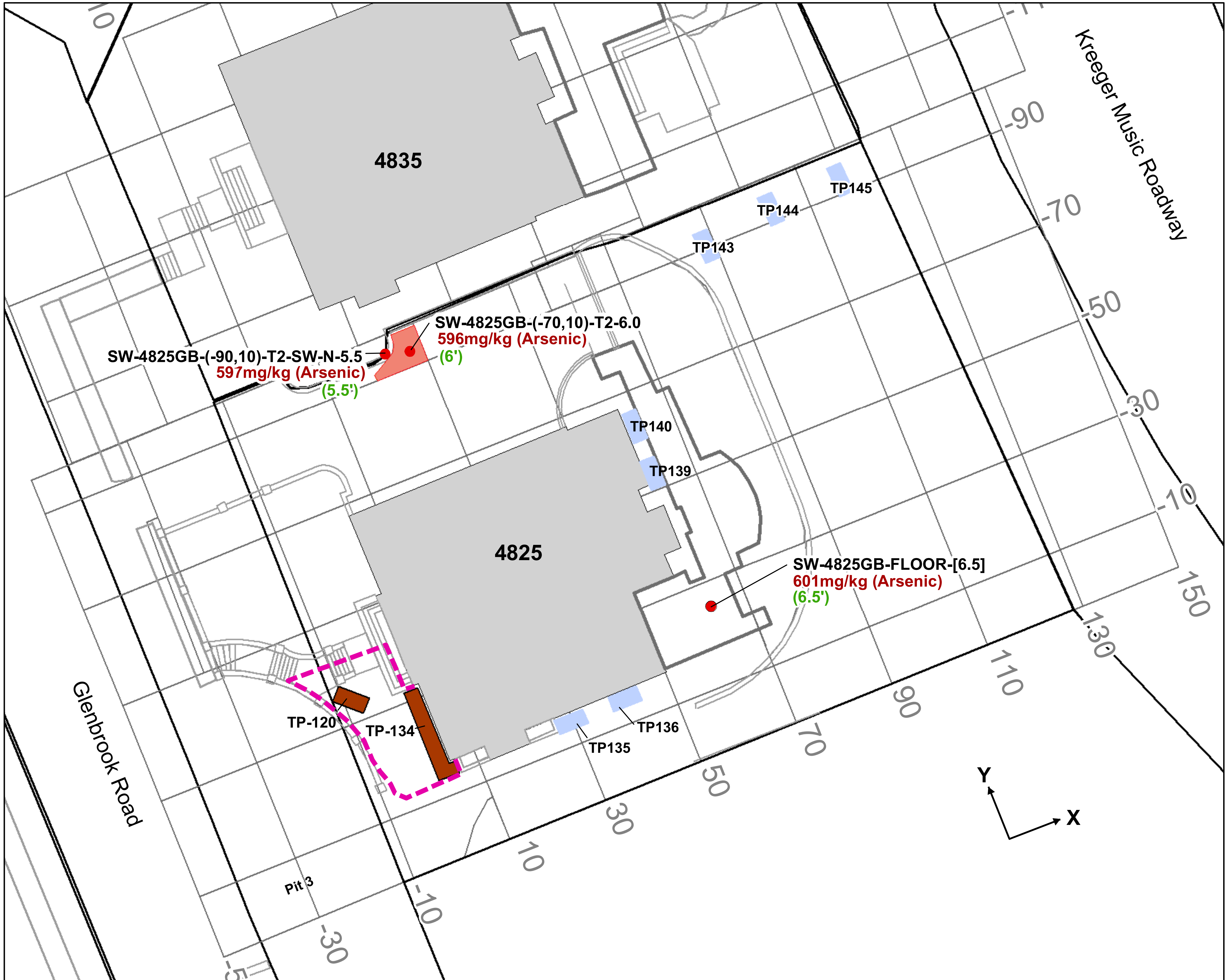

Figure 7-4
Chemical of Concern Map
4825 Glenbrook Road

Spring Valley
Washington, D.C.

Legend

- Soil Sample Location (Concentration)
- Property Boundaries
- Buildings
- 20' Grid
- AUES Debris Area/ CWM Impacted Soil (Exact Extent Undelineated)
- High Probability Test Pits
- Test Pits Pending Investigation
- Test Pits Investigated with No Significant Finds

Scale:	1:240
Created By:	Parsons
File:	20110331 4825 Glenbrook Remaining Work.mxd
Date:	3/9/2011
Figure Number:	7-4
Page Number:	7-6

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SECTION 8
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APPENDIX A
DATA SUMMARY

APPENDIX A

VALIDATED AND UNVALIDATED DATA SUMMARY TABLES

A.1 Validated and ECBC unvalidated data collected from the investigation activities performed between 2007 and 2010 are summarized in this appendix. The validated and unvalidated data summary tables include the following:

Table A.1 – EMS 1992 Soil Sampling 4825 Glenbrook Road

Table A.2 – 1995 Remedial Investigation Soil Sampling 4825 Glenbrook Road

Table A.3 – 4825 Glenbrook USEPA Surface Soil Metals Results

Table A.4 – 4825 Glenbrook USEPA Subsurface Soil Metals Results

Table A.5 – 4825 GR Summa Canister Soil Gas VOC Results

Table A.6 – 4825 GR Gore Sorber Soil Gas Analytical Results Estimated Soil Gas Concentrations

Table A.7 – 4825 GR Driveway Area ABP Soil Analytical Results (All Samples Collected June 28, 2007)

Table A.8 – Soil Analytical Results for Arsenic Grid Samples (2000-2001)

Table A.9 – Summary of Validated Analytical Results for SV 4825 Glenbrook Road (Pit 3) Grab Soil Samples

Table A.10 – Summary of Validated Analytical Results for SV 4825 Glenbrook Road (Pit 3) Pit Characterization Soil Samples

Table A.11 – Summary of Validated Analytical Results for SV 4825 Glenbrook Road - 2009 Soil Pre-Confirmation Samples

Table A.12 – Summary of Validated Analytical Results for SV 4825 Glenbrook Road (TP 138) Pit Characterization Samples

Table A.13 – Final Analytical Results for White Solid in the Flask (TP 138)

Table A.14a – ECBC Sampling Results for TP 138

Table A.14b – ECBC Sampling Results for TPs 120 and 134

Table A.15 – Summary of Validated Analytical Results for SV 4825 Glenbrook Road – Test Pits Grab Samples

Table A.16 – ECBC Agent and ABP Analytical Results

Table A.17 – Summary of Validated Analytical Results for SV 4825 Glenbrook Road – Geotechnical Borings and Backyard Soil Samples (2010)

Table A.18 – Summary of Backfill Soil Results

Table A.1
EMS 1992 Soil Sampling
4825 Glenbrook Road

SAMPLE NUMBER-->	Comparison Levels	052692-1CM
VOCs (ug/kg) - 8240		
Acetone		<2
Benzene		<1
Bromodichloromethane		<1
Bromoform		<5
Bromomethane		<10
2-Butanone		<5
Carbon Disulfide		<2
Carbon tetrachloride		<1
Chlorobenzene		<1
Chloroethane		<5
Chloroform		<1
Chloromethane		<10
Dibromochloromethane		<5
1,2-Dichloroethane		<1
1,1-Dichloroethane		<1
1,1-Dichloroethene		<1
1,2-Dichloroethene		<1
1,2-Dichloropropane		<1
Trans-1,3-Dichloropropene		<1
Cis-1,3-Dichloropropene		<1
Ethylbenzene		<1
2-Hexanone		<5
4-Methyl-2-Pentanone		<1
Methylene chloride	**11,000**	**74**
Styrene		<1
1,1,2,2-Tetrachloroethane		<1
Tetrachloroethene		<1
Toluene	**500,000**	**2**
1,1,1-Trichloroethane		<1
1,1,2-Trichloroethane		<1
Trichloroethene		<1
Vinyl Acetate		<1
Vinyl chloride		<5
Xylenes, total		<5
SVOCs (ug/kg) - 8270		
Acenaphthalene		<100
Acenaphthalyene		<100
Anthracene		<100
Benz(a)anthracene		<100
Benzo(b)fluoranthene		<100
Benzo(k)fluoranthene		<100
Benzoic acid		<100
Benzo(g,h,i)perylene		<100
Benzo(a)pyrene		<100
Benzyl alcohol		<100
Bis(2-chloroethoxy)methane		<100
Bis(2-chloroethoxy)ether		<100
Bix(2-chloroisopropyl)ether		<100
4-bromophenyl phenyl ether		<100
Butyl benzyl phthalate		<100

Table A.1
EMS 1992 Soil Sampling
4825 Glenbrook Road

SAMPLE NUMBER-->	Comparison Levels	052692-1CM
4-Chloroaniline		<100
4-Chloro-3-methylphenol		<100
2-Chloronaphthalene		<100
2-Chlorophenol		<100
4-Chlorophenyl phenyl ether		<100
Chrysene		<100
Dibenz(a,h)anthracene		<100
Di-n-butyl-phthalate		<100
Dibenzofuran		<100
1,2-Dichlorobenzene		<100
1,3-Dichlorobenzene		<100
1.4-Dichlorobenzene		<100
3,3-Dichlorobenzidine		<100
2,4-Dichlorophenol		<100
Diethyl phthalate		<100
2,4-Dimethylphenol		<100
Dimethyl phthalate		<100
4.6-Dinitro-2-methylphenol		<100
2,4-Dinitrophenol		<100
2,4-Dinitrotoluene		<100
2,6-Dinitrotoluene		<100
Di-n-octyl phthalate		<100
Bis(2-ethylhexyl)phthalate		<100
Fluoranthene		<100
Hexachlorobenzene		<100
Hexachlorobutadine		<100
Hexachlorocyclopentadiene		<100
Hexachloroethane		<100
Indeno(1,2,3-cd)pyrene		<100
Isophorone		<100
2-Methylnaphthalene		<100
2-Methylphenol		<100
4-Methylphenol		<100
Naphthalene		<100
2-Nitroaniline		<100
3-Nitroaniline		<100
4-Nitroaniline		<100
Nitrobenzene		<100
2-Nitrophenol		<100
4-Nitrophenol		<100
N-Nitrosodiphenylamine		<100
N-Nitroso-di-n-propylamine		<100
Pentachlorophenol		<100
Phenantrene		<100
Phenol		<100
Pyrene		<100
1,2,4-Trichlorobenzene		<100
2,4,5-Trichlorophenol		<100
2,4,6-Trichlorophenol		<100

Table A.1
EMS 1992 Soil Sampling
4825 Glenbrook Road

SAMPLE NUMBER-->	**Comparison Levels**	**052692-1CM**
Metals (mg/kg) - 200.7		
Arsenic		<10
Barium	**1,500**	**145**
Cadmium		<0.5
Chromium	**12,000**	**54**
Lead	**400**	**100**
Mercury		<0.1
Selenium		<10
Silver		<1
PCB Type (mg/kg)		
1016		<0.1
1221		<0.1
1232		<0.1
1242		<0.1
1248		<0.1
1254		<0.1
1260		<0.1
Pesticide Type (ug/kg)		
Aldrin		<100
A-BHC		<100
b-BHC		<100
g-BHC (Lindane)		<100
d-BHC		<100
Chlordane (total)		<100
$4,4^{1}$-DDD		<100
$4,4^{1}$-DDE		<100
$4,4^{1}$-DDT		<100
Dieldrin		<110
Endosulfan I		<100
Endosulfan II		<100
Endosulfan sulfate		<100
Endrin		<100
Endrin Ketone		<100
Heptachlor		<100
Heptachlor epoxide		<100
Herbicide Type (ug/kg)		
2,4-D		<10
2,4,5-TP (silvex)	**49**	**13**

< = Not detected at this reporting limit.
Detections are bolded.
Comparison levels are EPA Regional Screening Levels (RSL) (November 2010), adjusted by 0.1 for non-carcinogens.
RSLs are shown only for detected chemicals.
SOURCE: Environmental Management Systems, Inc., May and June 1992 Letter Reports.

Table A.2
1995 Remedial Investigation Soil Sampling
4825 Glenbrook Road

Analyte	Units	Baker-10 (2.5-4')	
Organosulfur/Lewisite			
Mustard Distilled	ug/g	0.005	U
Oxathiane	ug/g	0.009	U
Dithiane	ug/g	0.012	U
Lewisite	ug/g	0.5	U
Thiodiglycol	ug/g	2.3	U
Inorganics			
Total Cyanide	ug/g	1.0	U

Source: Table A.20 of Final Remeidal Investigation Report for the Operation Safe Removal Formerly Used Defense Site, Washington, D.C. (USACE, 1995)

Soil represented by these data was removed.

Table A.3
4825 Glenbrook USEPA Surface Soil Metals Results
Spring Valley Operable Unit 3, Washington D.C.

SAMPLE ID:				S-1		S-2		S-3		S-4		S-5		S-6		S-7		SS-8		SS-9	
DATE SAMPLED:	Units	Comparison Level		1994		1994		1994		1994		1994		1994		1994		1999		1999	
LAB SAMPLE ID:		Direct Contact	Leaching																		
Aluminum	mg/kg	19100	55,000	**23000**		**36300**		**19600**		**19900**		**16100**		**39000**		**39600**		**18,500**		**24,700**	
Antimony	mg/kg	5.2	0.66	7.0	UL	7.0	UL	6.5	UL	[7.8]	L	6.6	UL	6.9	UL	6.9	UL		R	**1.3**	L
Arsenic	mg/kg	12.6	0.0013	**4.8**	L	**17.6**	L	**[1.2]**	L	**3.8**	L	**[1.1]**	L	**241**	L	**[1.7]**	L	**8**	L	**6.1**	L
Barium	mg/kg	1500	300															**103**		**134**	
Beryllium	mg/kg	16	58	**[1.0]**		**14**		**13**		**15**		**20**		**15**		**15**		**1.4**		**1.5**	
Chromium	mg/kg	12000	99000000	**418**		**113**		**45.9**		**50.3**		**62.8**		**94.5**		**62.6**		**83.3**		**135**	
Cobalt	mg/kg	17.8	0.49															**21.8**		**28**	
Copper	mg/kg	310	51															**57.8**	J	**65.2**	J
Iron	mg/kg	32400	640															**30,200**		**36,800**	
Lead	mg/kg	400	14	**20.2**	J	**9.7**	J	**16.6**	J	**10.9**	J	**11.0**	J	**11.4**	J	**9.5**	J	**22.9**		**10.7**	
Magnesium	mg/kg	6950	NA															**8,460**		**13,200**	
Manganese	mg/kg	968	57	**579**		**620**		**209**		**327**		**973**		**516**		**382**		**591**		**758**	
Mercury	mg/kg	0.56	0.03	0.12	U	0.12	U	0.11	U	0.11	U	0.12	U	0.12	U	0.12	U	**0.07**	L	**0.08**	L
Nickel	mg/kg	150	48	**74.0**		**55.4**		**31.6**		**33.6**		**38.7**		**45.1**		**39.3**		**36.8**		**51.5**	
Selenium	mg/kg	39	0.95																		
Silver	mg/kg	39	1.6															**6.2**	L	**7.6**	L
Strontium	mg/kg	4700	770																		
Tellurium	mg/kg	39.11	NA																		
Thallium	mg/kg	2.2	0.14	0.74	B	0.47	B	0.75	B	0.61	B	0.74	B	0.57	B	0.57	B				
Tin	mg/kg	4700	5500																		
Titanium	mg/kg	31000/2690	NA																		
Vanadium	mg/kg	75.5	180	**107**		**106**		**37.5**		**49.5**		**71**		**114**		**122**		66.8		95.1	
Zinc	mg/kg	2300	680															65.9	J	78.5	J
Zirconium	mg/kg	48.3	NA																		
Cyanide	mg/kg	160	7.4															0.09	L		
Hexavalent chromium	mg/kg	0.29	8.30E-04															**2.6**	L		
	Soil represented by these data was removed.																				

Comparison value based on the higher of the November 2010 Regional Screening Levels (RSLs), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL). The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.
(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.
U - Analyte was analyzed for but not detected at or above the adjusted practical quantitation limit (PQL).
UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.
J - Analyte detected, estimated concentration.
UL - Analyte not detected, reported PQL is biased low, actual PQL may be higher.
L - Analyte detected, reported value is biased low, actual value may be higher.
K - Analyte detected, reported value is biased high, actual value may be lower.
R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.
mg/kg - Milligram per kilogram.
Detections are bolded.
Detections exceeding the comparison level are shown shaded and bolded.

Table A.3
4825 Glenbrook USEPA Surface Soil Metals Results
Spring Valley Operable Unit 3, Washington D.C.

SAMPLE ID:				SS-10		SS-11		SS-11A		SS-12		SS-13		SS-13A	
DATE SAMPLED:	Units	Comparison Level		1999		1999		1999		1999		1999		1999	
LAB SAMPLE ID:		Direct Contact	Leaching												
Aluminum	mg/kg	19100	55,000	27,900		28,500		26,700		15,200		15,200			
Antimony	mg/kg	5.2	0.66	1.2	L	1.6	L	1.5	L	1.5	L	2.8	L		
Arsenic	mg/kg	12.6	0.0013	5.3	L	8.7	L	6.9	L	13.4	L	50.4	L		
Barium	mg/kg	1500	300	132		112		124		61.2		73.3			
Beryllium	mg/kg	16	58	1.2		1.3		1.2		0.82		0.93			
Chromium	mg/kg	12000	99000000	169		281		222		215		237			
Cobalt	mg/kg	17.8	0.49	41.2		35.5		33.9		27.1		29.9			
Copper	mg/kg	310	51	91.6	J	108	J	123	J	77.7	J	41.5	J		
Iron	mg/kg	32400	640	41,800		51,700		49,500		34,800		30,400			
Lead	mg/kg	400	14	12.4		18.9		16.5		42.1		31.4			
Magnesium	mg/kg	6950	NA	12,900		14,000		14,400		7,490		7,430			
Manganese	mg/kg	968	57	1,290		962		956		535		513			
Mercury	mg/kg	0.56	0.03	0.1	L	0.17	L	0.1	L	0.21	L	0.12	L		
Nickel	mg/kg	150	48	113		94		86.1		62.6		61.5			
Selenium	mg/kg	39	0.95	1.2	J	1.1	J			1.4	J				
Silver	mg/kg	39	1.6	8.6	L	10.3	L	9.9	L	7.3	L	6.7	L		
Strontium	mg/kg	4700	770												
Tellurium	mg/kg	39.11	NA												
Thallium	mg/kg	2.2	0.14												
Tin	mg/kg	4700	5500												
Titanium	mg/kg	31000/2690	NA												
Vanadium	mg/kg	75.5	180	114		161		153		58.4		65.8			
Zinc	mg/kg	2300	680	78.3	J	83.6	J	99.9	J	318	J	94	J		
Zirconium	mg/kg	48.3	NA												
Cyanide	mg/kg	160	7.4	0.03	L			0.09	L			0.07	L		
Hexavalent chromium	mg/kg	0.29	8.30E-04									**1.25**	L	**1.54**	L
	Soil represented by these data was removed.														

Comparison value based on the higher of the November 2010 Regional Screening Levels (RSLs), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL).
The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.
(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.
U - Analyte was analyzed for but not detected at or above the adjusted practical quantitation limit (PQL).
UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.
J - Analyte detected, estimated concentration.
UL - Analyte not detected, reported PQL is biased low, actual PQL may be higher.
L - Analyte detected, reported value is biased low, actual value may be higher.
K - Analyte detected, reported value is biased high, actual value may be lower.
R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.
mg/kg - Milligram per kilogram.
Detections are bolded.
Detections exceeding the comparison level are shown shaded and bolded.

Table A.3 (cont.)
4825 Glenbrook USEPA Surface Soil VOCs, SVOC, Pesticide/Herbicide/PCB Results
Spring Valley Operable Unit 3, Washington D.C.

SAMPLE ID:	Units	Comparison Level		S-1	S-2	S-3	S-4	S-5	S-6	S-7	SS-8	SS-9	SS-10	SS-11	SS-11A	SS-12	SS-13
DATE SAMPLED:				1994	1994	1994	1994	1994	1994	1994	1999	1999	1999	1999	1999	1999	1999
LAB SAMPLE ID:		Direct Contact	Leaching														
Acetone	ug/kg	6100000	4500								0.013 B	0.012 B	0.017 B	0.009 B	0.009 B	0.01 B	0.009 B
Carbon Disulfide	ug/kg	8200	310								0.001 B	0.001 B	0.001 B			0.001 B	
Chloromethane	ug/kg	12000	49											0.006 J			
Methylene Chloride	ug/kg	11,000	1.2								0.005 B	0.005 B	0.006 B	0.004 B	0.004 B	0.004 B	0.004 B
Toluene	ug/kg	500,000	1,600								0.001 J	0.001 J	0.001 J	0.001 J	0.002 J	0.004 J	
1,1,2,2-Tetrachloroethane	ug/kg	560	0.026								0.002 B						
Tetrachloroethene	ug/kg	550	0.049								0.021 B	0.058	0.026	0.05	0.072	0.017 B	0.017 B
Trichloroethene	ug/kg	2800	0.72									0.002 J			0.001 J	0.011 J	
Xylenes (Total)	ug/kg	63000	200								0.004 J	0.005 J	0.003 J	0.006 J	0.006 J		0.002 J
bis(2-Ethylhexyl)phthalate	ug/kg	35000	1100								0.043 B	0.077 B	0.021 B	0.023 B	0.025 B	0.032 B	0.44 B
Di-n-Butylphthalate	ug/kg	610000	9200									0.024 B	0.038 B	0.021 B		0.024 B	0.14 B
Diethylphthalate	ug/kg	4900000	12000											0.022 B		0.023 B	
Phenanthrene (pyrene)	ug/kg	170000	120000													0.086 J	0.026 J
Fluoranthene	ug/kg	230000	160000								0.043 J			0.022 J	0.026 J	0.13 J	0.062 J
Pyrene	ug/kg	170000	120000								0.035 J		0.02 J	0.026 J	0.022 J	0.12 J	0.053 J
Benzo(a)anthracene	ug/kg	150	10	0.407 U	0.393 U	0.379 U	0.375 U	0.388 U	0.388 U	0.398 U	0.024 J					0.058 J	0.069 J
Chrysene	ug/kg	15000	1100								0.031 J					0.066 J	0.12 J
Benzo(b)fluoranthene	ug/kg	150	35	0.407 U	0.393 U	0.379 U	0.375 U	0.388 U	0.388 U	0.398 U	0.026 J					0.045 J	0.079 J
Benzo(k)fluoranthene	ug/kg	15000	350								0.021 J					0.046 J	0.068 J
Benzo(a)pyrene	ug/kg	15	3.5	0.407 U	0.393 U	0.379 U	0.375 U	0.388 U	0.388 U	0.398 U				0.024 J		0.04 J	0.044 J
Indeno(1,2,3-cd)pyrene	ug/kg	150	120	0.407 U	0.393 U	0.379 U	0.375 U	0.388 U	0.388 U	0.398 U						0.032 J	0.033 J
Dibenz(a,h)anthracene	ug/kg	15	11	0.407 U	0.393 U	0.379 U	0.375 U	0.388 U	0.388 U	0.398 U							
Benzo(g,h,j)perylene	ug/kg	170000	120000											0.069 J		0.026 J	
4,4'-DDE	ug/kg	1400	47													0.0036 J	0.0024 J
Endrin	ug/kg	1,800	440									0.0014 J					
4,4'-DDT	ug/kg	1700	67								0.0022 J					0.056	0.0031 J
alpha-Chlordane	ug/kg	1600	13								0.0011 J						
Aroclor-1016	ug/kg	0.29	8.30E-04	0.041 U	0.039 UJ	0.038 U	0.038 U	0.039 U	0.039 UJ	0.04 U		0.017 J					

Soil represented by these data was removed.

Comparison value based on the higher of the November 2010 Regional Screening Levels (RSLs), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL). The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.
(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.
U - Analyte was analyzed for but not detected at or above the adjusted practical quantitation limit (PQL).
UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.
J - Analyte detected, estimated concentration.
UL - Analyte not detected, reported PQL is biased low, actual PQL may be higher.
L - Analyte detected, reported value is biased low, actual value may be higher.
K - Analyte detected, reported value is biased high, actual value may be lower.
R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.
mg/kg - Milligram per kilogram.
Detections are bolded.
Detections exceeding the comparison level are shown shaded and bolded.

Table A.4
4825 Glenbrook USEPA Subsurface Soil Metals Results
Spring Valley Operable Unit 3, Washington D.C.

SAMPLE ID:				OU3-SB01		SB-01-01		SB-01-02		SB-01-03		SB-01-04		SB-02-01		SB-02-02		SB-02-03		SB-02-04	
DATE SAMPLED:	Units	Comparison Level		1999		1999		1999		1999		1999		1999		1999		1999		1999	
Sample Depth (feet):		Direct Contact	Leaching	3.2-3.6		0-0.5		3-4		6-7		9-10		0-0.5		3-4		6-7		6-7	
Aluminum	mg/kg	19100	55,000	34,300		24,900						42,300		23,300							
Antimony	mg/kg	5.2	0.66	6.0	UL	1.2	L					2.2	L	1.3	L						
Arsenic	mg/kg	12.6	0.0013	5.3		22.5	L	2	UL	2	UL	2	UL	22.4	L	3.9	L	3.2	L	2.6	L
Barium	mg/kg	1500	300	128		139						237		111							
Beryllium	mg/kg	16	58	1.5		1.2						1.6		1.3							
Cadmium	mg/kg	7	1.4	2.0																	
Chromium	mg/kg	12000	99000000	113		122						276		110							
Cobalt	mg/kg	17.8	0.49	53.6		34.6						44.8		24							
Copper	mg/kg	310	51	15.7		64.9	J					126	J	67.3	J						
Iron	mg/kg	32400	640	50,500		31,400						54,900		31,300							
Lead	mg/kg	400	14	11.7		23.5						8.2		31.2							
Magnesium	mg/kg	6950	NA	165,000		12,600						24,800		11200							
Manganese	mg/kg	968	57	2,960		682						974		596							
Mercury	mg/kg	0.56	0.03			0.28								0.13	L						
Nickel	mg/kg	150	48	120		55.5						89.1		50.2							
Selenium	mg/kg	39	0.95		R	0.98	J					1	UJ	1	UJ						
Silver	mg/kg	39	1.6			6.9	L					10.4	L	6.3	L						
Strontium	mg/kg	4700	770																		
Tellurium	mg/kg	39.11	NA																		
Thallium	mg/kg	2.2	0.14	0.35	L																
Tin	mg/kg	4700	5500																		
Titanium	mg/kg	31000/2690	NA																		
Vanadium	mg/kg	75.5	180	90.3		90.5						190		86.5							
Zinc	mg/kg	2300	680	57.3		70.9	J					81.5	J	94.6	J						
Cyanide	mg/kg	160	7.4			0.5	UL					0.5	UL	0.5	UL						

Soil represented by these data was removed.

Comparison value based on the higher of the November 2010 Regional Screening Levels (RSLs), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL). The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.
(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.
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UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.
J - Analyte detected, estimated concentration.
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L - Analyte detected, reported value is biased low, actual value may be higher.
K - Analyte detected, reported value is biased high, actual value may be lower.
R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.
mg/kg - Milligram per kilogram.
Detections are bolded.
Detections exceeding the comparison level are shown shaded and bolded.

Source: Results for the Interim Trip Report, Appendix 1 and Appendix 2, Spring Valley Operable Unit 3, Washington D.C. (Prepared by Roy F Weston, Prepared for USPEA Region III, August 10 and 13, 1999)

Table A.4
4825 Glenbrook USEPA Subsurface Soil Metals Results
Spring Valley Operable Unit 3, Washington D.C.

SAMPLE ID:				SB-02-05		SB-03-01		SB-03-02		SB-03-03		SB-03-04	
DATE SAMPLED:	Units	Comparison Level		1999		1999		1999		1999		1999	
Sample Depth:		Direct Contact	Leaching	9-10		0-0.5		3-4		6-7		9-10	
Aluminum	mg/kg	19100	55,000	27,200		29,100						24,600	
Antimony	mg/kg	5.2	0.66	1.3	L	0.97	L						R
Arsenic	mg/kg	12.6	0.0013	2	UL	35	L	6.5		1.4	L	1.8	L
Barium	mg/kg	1500	300	196		121						160	
Beryllium	mg/kg	16	58	1.2		1.3						1.9	
Cadmium	mg/kg	7	1.4										
Chromium	mg/kg	12000	99000000	98.9		159						42.6	
Cobalt	mg/kg	17.8	0.49	19.7		27						15.8	
Copper	mg/kg	310	51	40.7	J	134	J					30.6	J
Iron	mg/kg	32400	640	26,100		39,800						24,000	
Lead	mg/kg	400	14	5.1		11.9						17.8	
Magnesium	mg/kg	6950	NA	17,200		14,100						11,300	
Manganese	mg/kg	968	57	408		699						479	
Mercury	mg/kg	0.56	0.03			0.2	L					0.04	L
Nickel	mg/kg	150	48	42.5		72.9						40.4	
Selenium	mg/kg	39	0.95	1	UJ	1	UJ					1	UJ
Silver	mg/kg	39	1.6	4.6	L	8	L					4.7	L
Strontium	mg/kg	4700	770										
Tellurium	mg/kg	39.11	NA										
Thallium	mg/kg	2.2	0.14									0.51	B
Tin	mg/kg	4700	5500										
Titanium	mg/kg	31000/2690	NA										
Vanadium	mg/kg	75.5	180	75		129						49.8	
Zinc	mg/kg	2300	680	50	J	75.2	J					91.6	J
Cyanide	mg/kg	160	7.4	0.5	UL	0.5	UL					0.5	UL

Comparison value based on the higher of the November 2010 Regional Screening Levels (RSLs), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL).
The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.
(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.
U - Analyte was analyzed for but not detected at or above the adjusted practical quantitation limit (PQL).
UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.
J - Analyte detected, estimated concentration.
UL - Analyte not detected, reported PQL is biased low, actual PQL may be higher.
L - Analyte detected, reported value is biased low, actual value may be higher.
K - Analyte detected, reported value is biased high, actual value may be lower.
R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.
mg/kg - Milligram per kilogram.
Detections are bolded.
Detections exceeding the comparison level are shown shaded and bolded.

Source: Results for the Interim Trip Report, Appendix 1 and Appendix 2, Spring Valley Operable Unit 3, Washington D.C. (Prepared by Roy F Weston, Prepared for

Table A.4(cont.)
4825 Glenbrook USEPA Subsurface Soil VOCs, SVOCs, Pesticide/Herbicide/PCB Results
Spring Valley Operable Unit 3, Washington D.C.

SAMPLE ID:				SB-01-01	SB-01-02	SB-01-03	SB-01-04	SB-02-01	SB-02-02	SB-02-03	SB-02-04
DATE SAMPLED:	Units	Comparison Level		1999	1999	1999	1999	1999	1999	1999	1999
Sample Depth		Direct Contact	Leaching	0-0.5	3-4	6-7	9-10	0-0.5	3-4	6-7	6-7
Acetone	ug/kg	6100000	4500	0.008 B			0.024 B	0.008 B			
Methylene Chloride	ug/kg	11,000	1.2	0.004 B			0.005 B	0.003 B			
Toluene	ug/kg	500,000	1,600	0.002 J			0.001 J	0.002 J			
Tetrachloroethene	ug/kg	550	0.049	0.077			0.03	0.012 B			
Trichloroethene	ug/kg	2800	0.72	0.002 J							
Xylenes (Total)	ug/kg	63000	200	0.008 J			0.004 J	0.002 J			
bis(2-Ethylhexyl)phthalate	ug/kg	35000	1100				0.032 B	0.033 B			
Di-n-Butylphthalate	ug/kg	610000	9200				0.032 B				
Diethylphthalate	ug/kg	4900000	12000								
N-Nitrosodiphenylamine	ug/kg	99000	75					0.039 J			
Fluoranthene	ug/kg	230000	160000	0.021 J				0.03 J			
Pyrene	ug/kg	170000	120000	0.05 J				0.048 J			
Benzo(a)anthracene	ug/kg	150	10					0.02 J			
Chrysene	ug/kg	15000	1100					0.031 J			
4,4'-DDE	ug/kg	1400	47	0.0016 J				0.0033 J			
Endrin	ug/kg	1,800	440								
4,4'-DDT	ug/kg	1700	67					0.002 J			
	Soil represented by these data was removed.										

Comparison value based on the higher of the November 2010 Regional Screening Levels (RSLs), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL). The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.
(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.
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L - Analyte detected, reported value is biased low, actual value may be higher.
K - Analyte detected, reported value is biased high, actual value may be lower.
R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.
mg/kg - Milligram per kilogram.
Detections are bolded.
Detections exceeding the comparison level are shown shaded and bolded.

Source: Results for the Interim Trip Report, Appendix 1 and Appendix 2, Spring Valley Operable Unit 3, Washington D.C. (Prepared by Roy F Weston, Prepared for USPEA Region III, August 10 and 13, 1999)

Table A.4 (cont.)
4825 Glenbrook USEPA Subsurface Soil Metals Results
Spring Valley Operable Unit 3, Washington D.C.

SAMPLE ID:	Units	Comparison Level		SB-02-05	SB-03-01	SB-03-02	SB-03-03	SB-03-04
DATE SAMPLED:				1999	1999	1999	1999	1999
Sample Depth:		Direct Contact	Leaching	9-10	0-0.5	3-4	6-7	9-10
Acetone	ug/kg	6100000	4500	0.022 B	0.012 B			0.027 B
Methylene Chloride	ug/kg	11,000	1.2	0.005 B	0.005 B			0.006 B
Toluene	ug/kg	500,000	1,600					0.002 J
Tetrachloroethene	ug/kg	550	0.049	0.02 B	0.03			0.039
Trichloroethene	ug/kg	2800	0.72					0.001 J
Xylenes (Total)	ug/kg	63000	200	0.003 J	0.004 J			0.005 J
bis(2-Ethylhexyl)phthalate	ug/kg	35000	1100		0.027 B			
Di-n-Butylphthalate	ug/kg	610000	9200					0.096 B
Diethylphthalate	ug/kg	4900000	12000					0.028 B
N-Nitrosodiphenylamine	ug/kg	99000	75					
Fluoranthene	ug/kg	230000	160000					
Pyrene	ug/kg	170000	120000					
Benzo(a)anthracene	ug/kg	150	10					
Chrysene	ug/kg	15000	1100					
4,4'-DDE	ug/kg	1400	47					
Endrin	ug/kg	1,800	440					
4,4'-DDT	ug/kg	1700	67					

Comparison value based on the higher of the November 2010 Regional Screening Levels (RSLs), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL).
The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.
(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.
U - Analyte was analyzed for but not detected at or above the adjusted practical quantitation limit (PQL).
UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.
J - Analyte detected, estimated concentration.
UL - Analyte not detected, reported PQL is biased low, actual PQL may be higher.
L - Analyte detected, reported value is biased low, actual value may be higher.
K - Analyte detected, reported value is biased high, actual value may be lower.
R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.
mg/kg - Milligram per kilogram.
Detections are bolded.
Detections exceeding the comparison level are shown shaded and bolded.

Source: Results for the Interim Trip Report, Appendix 1 and Appendix 2, Spring Valley Operable Unit 3, Washington D.C. (Prepared by Roy F Weston, Prepared for

TABLE A.5
4825 GR SUMMA CANISTER SOIL GAS VOC RESULTS

SAMPLE ID:		SCREENING LEVEL *		4825 GR-SG-6 Ambient Air		4825 GR-SG-1 (2')		4825 GR-SG-2 (2')		4825 GR-SG-3 (2')		4825 GR-DUP (of SG-3)		4825 GR-SG-4 (2')	
DATE SAMPLED:		ug/m^3	ppbv	03/21/07		03/21/07		03/21/07		03/20/07		03/20/07		03/21/07	
Volatile Organics in Air (by TO-15)	**Units**														
1,1,1-Trichloroethane	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
1,1,2,2-Tetrachloroethane	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
1,1,2-Trichloroethane	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
1,1-Dichloroethane	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
1,1-Dichloroethene	ppbv	21	53	0.2	U	0.2	U	4	U	0.4	U	1	U	**0.44**	+
1,2,4-Trichlorobenzene	ppbv			0.5	U	0.5	U	10	U	1	U	2.5	U	1	U
1,2,4-Trimethylbenzene	ppbv				U	0.2	U	4	U	0.4	U	1	U	0.4	U
1,2-Dibromoethane	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
1,2-Dichlorobenzene	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
1,2-Dichloroethane	ppbv	0.094	0.23	0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
1,2-Dichloroethene (total)	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
1,2-Dichloropropane	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
1,2-Dichlorotetrafluoroethane	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
1,3,5-Trimethylbenzene	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
1,3-Butadiene	ppbv	0.081	0.4	0.5	U	**0.53**		10	U	1	U	2.5	U	1	U
1,3-Dichlorobenzene	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
1,4-Dichlorobenzene	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
1,4-Dioxane	ppbv			5	U	5	U	100	U	10	U	25	U	10	U
2,2,4-Trimethylpentane	ppbv	NA	NA	0.2	U	**0.56**		4	U	0.4	U	1	U	0.4	U
2-Chlorotoluene	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
3-Chloropropene	ppbv			0.5	U	0.5	U	10	U	1	U	2.5	U	1	U
4-Ethyltoluene	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
Acetone	ppbv	3200	1347.11	5	U	**30**		100	U	**25**	+	**61**	+	**63**	+
Benzene	ppbv	0.31	0.97	**0.31**		**0.74**		4	U	0.4	U	1	U	**0.73**	+
Bromodichloromethane	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
Bromoethene	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
Bromoform	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U

TABLE A.5
4825 GR SUMMA CANISTER SOIL GAS VOC RESULTS

SAMPLE ID:		SCREENING LEVEL *		4825 GR-SG-6 Ambient Air		4825 GR-SG-1 (2')		4825 GR-SG-2 (2')		4825 GR-SG-3 (2')		4825 GR-DUP (of SG-3)		4825 GR-SG-4 (2')	
DATE SAMPLED:		ug/m^3	ppbv	03/21/07		03/21/07		03/21/07		03/20/07		03/20/07		03/21/07	
Bromomethane	ppbv	0.52	1.34	**0.2**		0.2	U	4	U	0.4	U	1	U	0.4	U
Carbon Disulfide	ppbv			0.5	U	0.5	U	10	U	1	U	2.5	U	1	U
Carbon Tetrachloride	ppbv	0.41	0.65	0.2	U	**0.23**		4	U	0.4	U	1	U	**80**	+
Chlorobenzene	ppbv	5.2	11.3	0.2	U	**0.29**		4	U	0.4	U	1	U	0.4	U
Chloroethane	ppbv			0.5	U	0.5	U	10	U	1	U	2.5	U	1	U
Chloroform	ppbv	0.11	0.23	0.2	U	**0.74**		4	U	0.4	U	1	U	**26**	+
Chloromethane	ppbv	9.4	20.4	**0.66**		0.5	U	10	U	1	U	2.5	U	1	U
cis-1,2-Dichloroethene	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
cis-1,3-Dichloropropene	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
Cyclohexane	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
Dibromochloromethane	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
Dichlorodifluoromethane	ppbv	21	42.5	**0.6**		**0.67**		10	U	1	U	2.5	U	1	U
Ethylbenzene	ppbv	0.97	2.2	0.2	U	**0.29**		4	U	0.4	U	1	U	0.4	U
Freon TF / 113 (Trichlorotrifluoroethane)	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
Hexachlorobutadiene	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
Isopropyl Alcohol	ppbv	NA	NA	5	U	**31**		100	U	10	U	**25**	+	**51**	+
Methyl Butyl Ketone	ppbv			0.5	U	0.5	U	10	U	1	U	2.5	U	1	U
Methyl Ethyl Ketone	ppbv	520	176.34	**1.1**		**2.2**		10	U	1	U	2.5	U	**3.5**	+
Methyl Isobutyl Ketone	ppbv	310	756.7	0.5	U	**0.94**		10	U	1	U	2.5	U	1	U
Methyl tert-Butyl Ether	ppbv			0.5	U	0.5	U	10	U	1	U	2.5	U	1	U
Methylene Chloride	ppbv			0.5	U	0.5	U	10	U	1	U	2.5	U	1	U
n-Heptane	ppbv	NA	NA	0.2	U	**7.4**		4	U	0.4	U	1	U	**1.7**	+
n-Hexane	ppbv			0.5	U	0.5	U	10	U	1	U	2.5	U	1	U
Styrene	ppbv	100	234.8	0.2	U	**0.59**		4	U	0.4	U	1	U	0.4	U
tert-Butyl Alcohol	ppbv			5	U	5	U	100	U	10	U	25	U	10	U
Tetrachloroethene	ppbv	0.41	0.6	0.2	U	**0.93**		4	U	0.4	U	1	U	**34**	+
Tetrahydrofuran	ppbv			5	U	5	U	100	U	10	U	25	U	10	U
Toluene	ppbv	520	1380	**0.3**		**11**		4	U	0.4	U	1	U	**2.1**	+
trans-1,2-Dichloroethene	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
trans-1,3-Dichloropropene	ppbv			0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
Trichloroethene	ppbv	1.2	2.23	0.2	U	**1.2**		4	U	0.4	U	1	U	**6.2**	+
Trichlorofluoromethane	ppbv	73	129.9	**0.32**		**0.42**		4	U	0.4	U	1	U	**0.57**	+
Vinyl Chloride	ppbv	0.16	0.63	0.2	U	0.2	U	4	U	0.4	U	1	U	0.4	U
Xylene (m,p)	ppbv	73	168.1	0.5	U	**1**		10	U	1	U	2.5	U	1	U
Xylene (o)	ppbv	73	168.1	0.2	U	**0.34**		4	U	0.4	U	1	U	0.4	U
Xylene (total)	ppbv	10	23	0.2	U	**0.71**		4	U	0.4	U	1	U	0.4	U

TABLE A.5
4825 GR SUMMA CANISTER SOIL GAS VOC RESULTS

SAMPLE ID:		SCREENING LEVEL *		4825 GR-SG-6 Ambient Air		4825 GR-SG-1 (2')		4825 GR-SG-2 (2')		4825 GR-SG-3 (2')		4825 GR-DUP (of SG-3)		4825 GR-SG-4 (2')	
DATE SAMPLED:		ug/m^3	ppbv	03/21/07		03/21/07		03/21/07		03/20/07		03/20/07		03/21/07	
Volatile Organics TICs in Air	**Units**														
2,2,6-Trimethyldecane (14.58)	ppbv		**NA**												
2,2,7,7-Tetramethyloctane	ppbv		**NA**											**12**	**NJ**
2,2-Dimethyloctane (14.58)	ppbv		**NA**												
2,3,4-Trimethylpentane (10.45)	ppbv		**NA**												
2,8-Dimethylundecane (14.23)	ppbv		**NA**												
3-Carene (13.78)	ppbv		**NA**					**23**	**NJ**						
3-Ethyl-2,2-Dimethylpentane (14.04)	ppbv		**NA**												
Alpha.Pinene (12.94)	ppbv		**NA**					**1100**	**NJ**						
Beta.-pinene (13.54)	ppbv		**NA**					**530**	**NJ**						
Bicyclo[3.1.0] Hexane, 4-Methyl (13.42)	ppbv		**NA**					**24**	**NJ**						
Bicyclo[3.1.0] Hexane, 4-Methyl-1-(1-Methyl) (12.77)	ppbv		**NA**					**34**	**NJ**						
Cyclotrisiloxane, Hexamethyl (11.11)	ppbv		**NA**												
Unknown (10.57)	ppbv		**NA**												
Unknown (12.88)	ppbv		**NA**												
Unknown (12.95)	ppbv		**NA**			**9**	**NJ**			**18**	**NJ**	**41**	**NJ**		
Unknown (13.37)	ppbv		**NA**					**21**	**NJ**						
Unknown (13.42)	ppbv		**NA**					**24**	**NJ**						
Unknown (13.56)	ppbv		**NA**			**19**	**NJ**			**36**	**NJ**	**80**	**NJ**	**25**	**NJ**
Unknown (13.69)	ppbv		**NA**			**8.7**	**NJ**			**17**	**NJ**	**35**	**NJ**	**11**	**NJ**
Unknown (13.83)	ppbv		**NA**			**36**	**NJ**	**66**	**NJ**	**70**	**NJ**	**150**	**NJ**	**48**	**NJ**
Unknown (13.93)	ppbv		**NA**			**8.2**	**NJ**			**17**	**NJ**	**37**	**NJ**	**10**	**NJ**
Unknown (14.04)	ppbv		**NA**			**56**	**NJ**	**34**	**NJ**	**110**	**NJ**	**240**	**NJ**	**73**	**NJ**
Unknown (14.23)	ppbv		**NA**			**24**	**NJ**	**53**	**NJ**	**51**	**NJ**	**110**	**NJ**	**31**	**NJ**
Unknown (14.30)	ppbv		**NA**									**25**	**NJ**		
Unknown (14.38)	ppbv		**NA**			**8**	**NJ**			**16**	**NJ**	**33**	**NJ**	**9.9**	**NJ**
Unknown (14.45)	ppbv		**NA**			**7.1**	**NJ**			**14**	**NJ**	**28**	**NJ**	**7.9**	**NJ**
Unknown (14.58)	ppbv		**NA**			**6.7**	**NJ**			**17**	**NJ**			**8.6**	**NJ**

Soil represented by these data was removed.

U - Analyte was analyzed for but not detected above the adjusted project quantitation limit (PQL).
J - Analyte detected, estimated concentration. NJ - Qualitative identification questionable due to poor resolution. Presumptively present at that concentration.
+ - Result reported from diluted sample.

Source: USACE 2009a

* **SCREENING LEVEL** - Based on Residential Ambient Air Regional Screening Levels (RSLs) from USEPA. RSLs adjusted for a 0.1 attenuation factor.

NOTE: The screening levels for non-carcinogenic compounds were adjusted downward by a factor of 10 to account for cumulative effects of multiple such compounds.

DETECTED CONCENTRATIONS ARE BOLDED. BOLDED COMPOUND NAME MEANS IT WAS DETECTED IN AT LEAST ONE SAMPLE.

COMPOUND EXCEEDS SCREENING LEVEL

TABLE A.5
4825 GR SUMMA CANISTER SOIL GAS VOC RESULTS

SAMPLE ID:		SCREENING LEVEL *		4825 GR-SG-5 (4')		4825 GR-SG/GORE-1(4')		4825 GR-SG/GORE-2(4')		4825 GR-SG/GORE-3(3')		4825 GR-SG/GORE-4(2')	
DATE SAMPLED:		ug/m³	ppbv	03/21/07		IN PIT		IN PIT		03/20/07		TRENCH 02	
Volatile Organics in Air (by TO-15)	**Units**												
1,1,1-Trichloroethane	ppbv			1	U	1	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	ppbv			1	U	1	U	1	U	1	U	1	U
1,1,2-Trichloroethane	ppbv			1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethane	ppbv			1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethene	ppbv	21	53	1	U	1	U	1	U	1	U	1	U
1,2,4-Trichlorobenzene	ppbv			2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2,4-Trimethylbenzene	ppbv			1	U	1	U	1	U	1	U	1	U
1,2-Dibromoethane	ppbv			1	U	1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	ppbv			1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethane	ppbv	0.094	0.23	1	U	1	U	1	U	1	U	**1.5**	+
1,2-Dichloroethene (total)	ppbv			1	U	1	U	1	U	1	U	1	U
1,2-Dichloropropane	ppbv			1	U	1	U	1	U	1	U	1	U
1,2-Dichlorotetrafluoroethane	ppbv			1	U	1	U	1	U	1	U	1	U
1,3,5-Trimethylbenzene	ppbv			1	U	1	U	1	U	1	U	1	U
1,3-Butadiene	ppbv	0.081	0.4	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,3-Dichlorobenzene	ppbv			1	U	1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	ppbv			1	U	1	U	1	U	1	U	1	U
1,4-Dioxane	ppbv			25	U	25	U	25	U	25	U	25	U
2,2,4-Trimethylpentane	ppbv	NA	NA	1	U	1	U	1	U	1	U	**25**	+
2-Chlorotoluene	ppbv			1	U	1	U	1	U	1	U	1	U
3-Chloropropene	ppbv			2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
4-Ethyltoluene	ppbv			1	U	1	U	1	U	1	U	1	U
Acetone	ppbv	3200	1347.11	**81**	+	**57**	+	**94**	+	**32**	+	**49**	+
Benzene	ppbv	0.31	0.97	**1.1**	+	**1.1**	+	**1.4**	+	1	U	**2.3**	+
Bromodichloromethane	ppbv			1	U	1	U	1	U	1	U	1	U
Bromoethene	ppbv			1	U	1	U	1	U	1	U	1	U
Bromoform	ppbv			1	U	1	U	1	U	1	U	1	U

TABLE A.5
4825 GR SUMMA CANISTER SOIL GAS VOC RESULTS

SAMPLE ID:		SCREENING LEVEL *		4825 GR-SG-5 (4')		4825 GR-SG/GORE-1(4')		4825 GR-SG/GORE-2(4')		4825 GR-SG/GORE-3(3')		4825 GR-SG/GORE-4(2')	
DATE SAMPLED:		ug/m^3	ppbv	03/21/07		IN PIT		IN PIT		03/20/07		TRENCH 02	
Bromomethane	ppbv	0.52	1.34	1	U	1	U	1	U	1	U	1	U
Carbon Disulfide	ppbv			2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Carbon Tetrachloride	ppbv	0.41	0.65	1	U	1	U	1	U	1	U	1	U
Chlorobenzene	ppbv	5.2	11.3	1	U	1	U	1	U	1	U	1	U
Chloroethane	ppbv			2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Chloroform	ppbv	0.11	0.23	1	U	**2.3**	+	1	U	**1.6**	+	**1.6**	+
Chloromethane	ppbv	9.4	20.4	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
cis-1,2-Dichloroethene	ppbv			1	U	1	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	ppbv			1	U	1	U	1	U	1	U	1	U
Cyclohexane	ppbv			1	U	1	U	1	U	1	U	1	U
Dibromochloromethane	ppbv			1	U	1	U	1	U	1	U	1	U
Dichlorodifluoromethane	ppbv	21	42.5	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Ethylbenzene	ppbv	0.97	2.2	1	U	1	U	1	U	1	U	1	U
Freon TF / 113 (Trichlorotrifluoroethane)	ppbv			1	U	1	U	1	U	1	U	1	U
Hexachlorobutadiene	ppbv			1	U	1	U	1	U	1	U	1	U
Isopropyl Alcohol	ppbv	NA	NA	**120**	+	**70**	+	**32**	+	**75**	+	**100**	+
Methyl Butyl Ketone	ppbv			2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Methyl Ethyl Ketone	ppbv	520	176.34	2.5	U	**2.9**	+	**7.1**	+	2.5	U	2.5	U
Methyl Isobutyl Ketone	ppbv	310	756.7	2.5	U	2.5	U	**9.4**	+	2.5	U	2.5	U
Methyl tert-Butyl Ether	ppbv			2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Methylene Chloride	ppbv			2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
n-Heptane	ppbv	NA	NA	**1.8**	+	**1**	+	1	U	1	U	**5.4**	+
n-Hexane	ppbv			2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Styrene	ppbv	100	234.8	1	U	1	U	1	U	1	U	1	U
tert-Butyl Alcohol	ppbv			25	U	25	U	25	U	25	U	25	U
Tetrachloroethene	ppbv	0.41	0.6	1	U	1	U	1	U	1	U	**15**	+
Tetrahydrofuran	ppbv			25	U	25	U	25	U	25	U	25	U
Toluene	ppbv	520	1380	**2.6**	+	**1.7**	+	**1.3**	+	**1.3**	+	**2.9**	+
trans-1,2-Dichloroethene	ppbv			1	U	1	U	1	U	1	U	1	U
trans-1,3-Dichloropropene	ppbv			1	U	1	U	1	U	1	U	1	U
Trichloroethene	ppbv	1.2	2.23	**1.5**	+	**1.7**	+	**1.3**	+	**1.1**	+	**4.4**	+
Trichlorofluoromethane	ppbv	73	129.9	1	U	1	U	1	U	1	U	**1.1**	+
Vinyl Chloride	ppbv	0.16	0.63	1	U	1	U	1	U	1	U	**2.4**	+
Xylene (m,p)	ppbv	73	168.1	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Xylene (o)	ppbv	73	168.1	1	U	1	U	1	U	1	U	1	U
Xylene (total)	ppbv	10	23	1	U	1	U	1	U	1	U	1	U

TABLE A.5
4825 GR SUMMA CANISTER SOIL GAS VOC RESULTS

SAMPLE ID:		SCREENING LEVEL *		4825 GR-SG-5 (4')		4825 GR-SG/GORE-1(4')		4825 GR-SG/GORE-2(4')		4825 GR-SG/GORE-3(3')		4825 GR-SG/GORE-4(2')	
DATE SAMPLED:		ug/m³	ppbv	03/21/07		IN PIT		IN PIT		03/20/07		TRENCH 02	
Volatile Organics TICs in Air	**Units**												
2,2,6-Trimethyldecane (14.58)	ppbv		**NA**					**37**	**NJ**				
2,2,7,7-Tetramethyloctane	ppbv		**NA**										
2,2-Dimethyloctane (14.58)	ppbv		**NA**							**18**	**NJ**		
2,3,4-Trimethylpentane (10.45)	ppbv		**NA**									**11**	**NJ**
2,8-Dimethylundecane (14.23)	ppbv		**NA**									**23**	**NJ**
3-Carene (13.78)	ppbv		**NA**										
3-Ethyl-2,2-Dimethylpentane (14.04)	ppbv		**NA**									**62**	**NJ**
Alpha.Pinene (12.94)	ppbv		**NA**										
Beta.-pinene (13.54)	ppbv		**NA**										
Bicyclo[3.1.0] Hexane, 4-Methyl (13.42)	ppbv		**NA**										
Bicyclo[3.1.0] Hexane, 4-Methyl-1-(1-Methyl) (12.77)	ppbv		**NA**										
Cyclotrisiloxane, Hexamethyl (11.11)	ppbv		**NA**	**15**	**NJ**							**11**	**NJ**
Unknown (10.57)	ppbv		**NA**									**19**	**NJ**
Unknown (12.88)	ppbv		**NA**	**11**	**NJ**								
Unknown (12.95)	ppbv		**NA**	**13**	**NJ**	**36**	**NJ**	**48**	**NJ**	**27**	**NJ**	**20**	**NJ**
Unknown (13.37)	ppbv		**NA**			**17**	**NJ**						
Unknown (13.42)	ppbv		**NA**										
Unknown (13.56)	ppbv		**NA**	**21**	**NJ**	**71**	**NJ**	**110**	**NJ**	**57**	**NJ**	**23**	**NJ**
Unknown (13.69)	ppbv		**NA**	**8.8**	**NJ**	**29**	**NJ**	**51**	**NJ**	**25**	**NJ**	**9.9**	**NJ**
Unknown (13.83)	ppbv		**NA**	**41**	**NJ**	**130**	**NJ**	**200**	**NJ**	**110**	**NJ**	**47**	**NJ**
Unknown (13.93)	ppbv		**NA**	**7.8**	**NJ**	**25**	**NJ**	**47**	**NJ**	**25**	**NJ**	**8.3**	**NJ**
Unknown (14.04)	ppbv		**NA**	**62**	**NJ**	**190**	**NJ**	**320**	**NJ**	**170**	**NJ**		
Unknown (14.23)	ppbv		**NA**	**24**	**NJ**	**72**	**NJ**	**140**	**NJ**	**70**	**NJ**		
Unknown (14.30)	ppbv		**NA**										
Unknown (14.38)	ppbv		**NA**			**21**	**NJ**	**45**	**NJ**	**23**	**NJ**		
Unknown (14.45)	ppbv		**NA**	**7.5**	**NJ**	**18**	**NJ**	**37**	**NJ**	**22**	**NJ**		
Unknown (14.58)	ppbv		**NA**										

Soil represented by these data was remove

U - Analyte was analyzed for but not detected above the adjusted project quantitation limit (PQL).
J - Analyte detected, estimated concentration. NJ - Qualitative identification questionable due to pc
+ - Result reported from diluted sample.

Source: USACE 2009a

* **SCREENING LEVEL** - Based on Residential Ambient Air Regional Screening Levels (RSLs) fror

NOTE: The screening levels for non-carcinogenic compounds were adjusted downward by a factor

DETECTED CONCENTRATIONS ARE BOLDED. BOLDED COMPOUND NAME MEANS IT WAS

COMPOUND EXCEEDS SCREENING LEVEL

TABLE A.6
4825 GR GORE SORBER SOIL GAS ANALYTICAL RESULTS
ESTIMATED SOIL GAS CONCENTRATIONS

SAMPLE NAME	PERIOD IN GROUND	BTEX	BENZ	TOL	EtBENZ	mpXYL	oXYL	C11, C13, &C15	UNDEC
		ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv
Gore-1 (6")	3-20- to 3-30, 2007	**0.35**	nd	**0.24**	bdl	**0.12**	bdl	0.00	bdl
Gore-2 (6")	3-20- to 3-30, 2007	**0.15**	nd	**0.08**	nd	**0.07**	bdl	nd	nd
Gore-DUP [of -2(6")]	3-20- to 3-30, 2007	**0.15**	nd	**0.09**	nd	**0.06**	nd	nd	nd
Gore-3 (6")	3-20- to 3-30, 2007	**0.38**	nd	**0.26**	bdl	**0.12**	bdl	0.00	bdl
Gore-4 (6")	3-20- to 3-30, 2007	**0.11**	nd	**0.06**	nd	**0.06**	nd	nd	nd
Gore-5 (6")	3-20- to 3-30, 2007	**0.10**	nd	**0.05**	nd	**0.05**	nd	nd	nd
Gore-6 (6")	3-20- to 3-30, 2007	**0.13**	nd	**0.08**	nd	**0.06**	nd	**0.28**	**0.28**
Gore-7 (6")	3-20- to 3-30, 2007	**0.06**	nd	**0.06**	nd	bdl	nd	nd	nd
Gore/SG-1 (4')	3-20- to 3-30, 2007	**0.05**	nd	**0.05**	nd	nd	nd	0.00	bdl
Gore/SG-2 (4')	3-20- to 3-30, 2007	**0.06**	nd	nd	nd	**0.06**	bdl	**0.12**	**0.06**
Gore/SG-3 (3')	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	**0.06**	**0.06**
Gore/SG-4 (2')	3-20- to 3-30, 2007	0.00	nd	nd	nd	nd	bdl	**0.46**	**0.28**
Gore-FB	3-28- to 4-01, 2007	**0.67**	**0.07**	**0.09**	**0.10**	**0.30**	**0.11**	**0.35**	**0.20**

Detections are bolded.
nd - not detected
bdl - observed at a level below the MDL
ppbv - part per billion by volume
FB - Field Blank
Gore/SG - Gore module was co-located with a Summa Canister.
Note: no MDL is available for summed combinations of analytes (reported values should be considered estimated if any of the individual compounds were reported bdl.

TABLE A.6
4825 GR GORE SORBER SOIL GAS ANALYTICAL RESULTS
ESTIMATED SOIL GAS CONCENTRATIONS

SAMPLE NAME	PERIOD IN GROUND	TRIDEC	PENTADEC	TMBs	124TMB	135TMB	ct12DCE	t12DCE	c12DCE
		ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv
Gore-1 (6")	3-20- to 3-30, 2007	nd	nd	0.00	bdl	nd	nd	nd	nd
Gore-2 (6")	3-20- to 3-30, 2007	nd	nd	0.00	bdl	nd	nd	nd	nd
Gore-DUP [of -2(6")]	3-20- to 3-30, 2007	nd	nd	0.00	bdl	nd	nd	nd	nd
Gore-3 (6")	3-20- to 3-30, 2007	nd	nd	0.00	bdl	bdl	nd	nd	nd
Gore-4 (6")	3-20- to 3-30, 2007	nd	nd	0.00	bdl	nd	nd	nd	nd
Gore-5 (6")	3-20- to 3-30, 2007	nd	nd	0.00	bdl	nd	nd	nd	nd
Gore-6 (6")	3-20- to 3-30, 2007	nd	nd	0.00	bdl	nd	nd	nd	nd
Gore-7 (6")	3-20- to 3-30, 2007	nd	nd	0.00	bdl	nd	nd	nd	nd
Gore/SG-1 (4')	3-20- to 3-30, 2007	bdl	bdl	nd	nd	nd	nd	nd	nd
Gore/SG-2 (4')	3-20- to 3-30, 2007	**0.03**	**0.03**	0.00	bdl	bdl	nd	nd	nd
Gore/SG-3 (3')	3-20- to 3-30, 2007	bdl	bdl	nd	nd	nd	nd	nd	nd
Gore/SG-4 (2')	3-20- to 3-30, 2007	**0.13**	**0.05**	**0.14**	**0.11**	**0.04**	nd	nd	nd
Gore-FB	3-28- to 4-01, 2007	**0.08**	**0.07**	**0.31**	**0.26**	**0.06**	nd	nd	nd

Detections are bolded.
nd - not detected
bdl - observed at a level below the MDL
ppbv - part per billion by volume
FB - Field Blank
Gore/SG - Gore module was co-located with a Summa Canister.
Note: no MDL is available for summed combinations of analytes (reported values should be considered estimated if any of the individual compounds were reported bdl.

TABLE A.6
4825 GR GORE SORBER SOIL GAS ANALYTICAL RESULTS
ESTIMATED SOIL GAS CONCENTRATIONS

SAMPLE NAME	PERIOD IN GROUND	NAPH&2-MN	NAPH	2MeNAPH	MTBE	11DCA	111TCA	12DCA	TCE
		ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv
Gore-1 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd	nd
Gore-2 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd	nd
Gore-DUP [of -2(6")]	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd	nd
Gore-3 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd	nd
Gore-4 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd	nd
Gore-5 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd	nd
Gore-6 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd	nd
Gore-7 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd	nd
Gore/SG-1 (4')	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd	nd
Gore/SG-2 (4')	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd	nd
Gore/SG-3 (3')	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd	nd
Gore/SG-4 (2')	3-20- to 3-30, 2007	**0.30**	**0.09**	**0.20**	nd	nd	nd	**0.08**	**0.17**
Gore-FB	3-28- to 4-01, 2007	**0.18**	**0.14**	**0.04**	nd	nd	nd	nd	nd

Detections are bolded.
nd - not detected
bdl - observed at a level below the MDL
ppbv - part per billion by volume
FB - Field Blank
Gore/SG - Gore module was co-located with a Summa Canister.
Note: no MDL is available for summed combinations of analytes (reported values should be considered estimated if any of the individual compounds were reported bdl.

TABLE A.6
4825 GR GORE SORBER SOIL GAS ANALYTICAL RESULTS
ESTIMATED SOIL GAS CONCENTRATIONS

SAMPLE NAME	PERIOD IN GROUND	OCT	PCE	14DCB	11DCE	CHCl3	CCl4	Dimethyldisulfide
		ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv
Gore-1 (6")	3-20- to 3-30, 2007	nd	bdl	nd	nd	nd	nd	nd
Gore-2 (6")	3-20- to 3-30, 2007	nd	bdl	nd	nd	nd	nd	nd
Gore-DUP [of -2(6")]	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore-3 (6")	3-20- to 3-30, 2007	nd	bdl	nd	nd	nd	nd	nd
Gore-4 (6")	3-20- to 3-30, 2007	nd	bdl	nd	nd	nd	nd	nd
Gore-5 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore-6 (6")	3-20- to 3-30, 2007	nd	bdl	nd	nd	nd	nd	nd
Gore-7 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore/SG-1 (4')	3-20- to 3-30, 2007	nd	nd	nd	nd	bdl	nd	nd
Gore/SG-2 (4')	3-20- to 3-30, 2007	bdl	nd	nd	nd	bdl	nd	nd
Gore/SG-3 (3')	3-20- to 3-30, 2007	**0.09**	nd	nd	nd	bdl	nd	nd
Gore/SG-4 (2')	3-20- to 3-30, 2007	nd	**1.90**	**0.16**	nd	bdl	nd	bdl
Gore-FB	3-28- to 4-01, 2007	**0.10**	nd	**0.10**	nd	nd	nd	nd

Detections are bolded.
nd - not detected
bdl - observed at a level below the MDL
ppbv - part per billion by volume
FB - Field Blank
Gore/SG - Gore module was co-located with a Summa Canister.
Note: no MDL is available for summed combinations of analytes (reported values should be considered estimated if any of the individual compounds were reported bdl.

TABLE A.6
4825 GR GORE SORBER SOIL GAS ANALYTICAL RESULTS
ESTIMATED SOIL GAS CONCENTRATIONS

SAMPLE NAME	PERIOD IN GROUND	112TCA	ClBENZ	1112TetCA	DMMP	**1,4 Oxathiane**	1122TetCA	13DCB
		ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv
Gore-1 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore-2 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore-DUP [of -2(6")]	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore-3 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore-4 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore-5 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore-6 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore-7 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore/SG-1 (4')	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore/SG-2 (4')	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore/SG-3 (3')	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore/SG-4 (2')	3-20- to 3-30, 2007	nd	nd	nd	nd	**2.93**	nd	nd
Gore-FB	3-28- to 4-01, 2007	nd	nd	nd	nd	nd	nd	nd

Detections are bolded.
nd - not detected
bdl - observed at a level below the MDL
ppbv - part per billion by volume
FB - Field Blank
Gore/SG - Gore module was co-located with a Summa Canister.
Note: no MDL is available for summed combinations of analytes (reported values should be considered estimated if any of the individual compounds were reported bdl.

TABLE A.6
4825 GR GORE SORBER SOIL GAS ANALYTICAL RESULTS
ESTIMATED SOIL GAS CONCENTRATIONS

SAMPLE NAME	PERIOD IN GROUND	12DCB	DIMP	**1,4Dithiane**	NiBENZ	2NiTOL	Thiodiglycol	4Chloroacetophenone
		ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv
Gore-1 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore-2 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore-DUP [of -2(6")]	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore-3 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore-4 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore-5 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore-6 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore-7 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore/SG-1 (4')	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore/SG-2 (4')	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore/SG-3 (3')	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd	nd
Gore/SG-4 (2')	3-20- to 3-30, 2007	nd	nd	**11.21**	nd	nd	nd	nd
Gore-FB	3-28- to 4-01, 2007	nd	nd	nd	nd	nd	nd	nd

Detections are bolded.
nd - not detected
bdl - observed at a level below the MDL
ppbv - part per billion by volume
FB - Field Blank
Gore/SG - Gore module was co-located with a Summa Canister.
Note: no MDL is available for summed combinations of analytes (reported values should be considered estimated if any of the individual compounds were reported bdl.

TABLE A.6
4825 GR GORE SORBER SOIL GAS ANALYTICAL RESULTS
ESTIMATED SOIL GAS CONCENTRATIONS

SAMPLE NAME	PERIOD IN GROUND	pChlorophenylmethylsulfide	2Chloroacetophenone	3NiTOL	4NiTOL	13DNB
		ppbv	ppbv	ppbv	ppbv	ppbv
Gore-1 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd
Gore-2 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd
Gore-DUP [of -2(6")]	3-20- to 3-30, 2007	nd	nd	nd	nd	nd
Gore-3 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd
Gore-4 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd
Gore-5 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd
Gore-6 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd
Gore-7 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd
Gore/SG-1 (4')	3-20- to 3-30, 2007	nd	nd	nd	nd	nd
Gore/SG-2 (4')	3-20- to 3-30, 2007	nd	nd	nd	nd	nd
Gore/SG-3 (3')	3-20- to 3-30, 2007	nd	nd	nd	nd	nd
Gore/SG-4 (2')	3-20- to 3-30, 2007	nd	nd	nd	nd	nd
Gore-FB	3-28- to 4-01, 2007	nd	nd	nd	nd	nd

Detections are bolded.
nd - not detected
bdl - observed at a level below the MDL
ppbv - part per billion by volume
FB - Field Blank
Gore/SG - Gore module was co-located with a Summa Canister.
Note: no MDL is available for summed combinations of analytes (reported values should be considered estimated if any of the individual compounds were reported bdl.

TABLE A.6
4825 GR GORE SORBER SOIL GAS ANALYTICAL RESULTS
ESTIMATED SOIL GAS CONCENTRATIONS

SAMPLE NAME	PERIOD IN GROUND	26DNT	pChlorophenylmethylsulfoxide	pChlorophenylmethylsulfone	24DNT	135TNB	246TNT
		ppbv	ppbv	ppbv	ppbv	ppbv	ppbv
Gore-1 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd
Gore-2 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd
Gore-DUP [of -2(6")]	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd
Gore-3 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd
Gore-4 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd
Gore-5 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd
Gore-6 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd
Gore-7 (6")	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd
Gore/SG-1 (4')	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd
Gore/SG-2 (4')	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd
Gore/SG-3 (3')	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd
Gore/SG-4 (2')	3-20- to 3-30, 2007	nd	nd	nd	nd	nd	nd
Gore-FB	3-28- to 4-01, 2007	nd	nd	nd	nd	nd	nd

Detections are bolded.
nd - not detected
bdl - observed at a level below the MDL
ppbv - part per billion by volume
FB - Field Blank
Gore/SG - Gore module was co-located with a Summa Canister.
Note: no MDL is available for summed combinations of analytes (reported values should be considered estimated if any of the individual compounds were reported bdl.

TABLE A.7
4825 GR DRIVEWAY AREA ABP SOIL ANALYTICAL RESULTS
(All Samples Collected June 28, 2007)

	ARSENIC (mg/kg)	1,4-DITHIANE (ug/kg)	1,4-OXATHIANE (ug/kg)	THIODIGLYCOL (ug/kg)	LOCATION\1
COMPARISON VALUE--->>	20\2	61,000\3	61,000\4	540,000\3	
4825GR-ABP-1 (1.5')	**10.4 K**	12 U	23 U	580 U	Near old western most driveway boring
4825GR-ABP-2 (1.5')	**6.4 K**	11 U	23 U	560 U	Near old driveway boring--20 feet east of ABP-1
4825GR-ABP-3 (0.5')	**31.4 K**	12 U	24 U	600 U	Surface sample near anecdotal location of buried materials
4825GR-ABP-4 (2')	**67.4 K**	11 U	22 U	560 U	Western most edge of old Trench 02
4825GR-ABP-4 (4')	**54 K**	12 U	24 U	590 U	Same above at 4 feet
4825GR-ABP-5 (2')	**41.4 K**	12 U	23 U	580 U	**Trench 02 location of Gore sorber ABP detects**
4825GR-ABP-9 [Dup of 5(2')]	**68.6 K**	12 U	23 U	580 U	Duplicate of above location
4825GR-ABP-5 (4')	**18 K**	12 U	25 U	620 U	Same above at 4 feet
4825GR-ABP-6 (1.5')	**0.33 JK**	11 U	21 U	530 U	Near old driveway boring closest to garage doors

\1 -- See Figure 2-2

Soil represented by these data was removed.

\2 -- Spring Valley Remediation Endpoint for arsenic.
\3 -- RSLs (November, 2010). Non-carcinogen RSL adjusted downward by factor of 10 to account for cumulative effects.
\4 -- See 2008 Parameters Report (USACE 2008d) for derivation of oxathiane comparison value.

(NO CODE) - Confirmed identification.
U - Analyte was analyzed for but not detected above the adjusted project quantitation limit (PQL).
K - Analyte detected, reported value is biased high, actual value is expected to be lower.
J - Analyte detected, estimated concentration.
Detections are in bold.

ABP -- Agent Breakdown Product. Specifically, mustard ABPs: dithiane, oxathiane, and thiodiglycol.

Table A.8
Soil Analytical Results for Arsenic Grid Samples (2000-2001)
4825 Glenbrook Road
Spring Valley, Washington DC

Sample ID	Depth (feet)	Arsenic Concentration (mg/kg)
Grid (-90, 10)*	0-0.5	**520**
Grid (-90, 30)*	0-0.5	**286**
Grid (-90, 50)	0-0.5	**28.6**
Grid (-90, 50)	2	6.92
Grid (-90, 110)	0-0.5	4.85
Grid (-70,-50)	0-0.5	16.3
Grid (-70,-30)	0-0.5	**41.3**
Grid (-70,-30)*	0-0.5	**20.6**
Grid (-70,-30)	2	**41.8**
Grid (-70,-30)	4	10.8
Grid (-70,-10)	0-0.5	**22.2**
Grid (-70,-10)*	0-0.5	**81.2**
Grid (-70,-10)	2	**21.6**
Grid (-70, 10)*	0-0.5	**89**
Grid (-70, 30)*	0-0.5	2.46
Grid (-70, 50)	0-0.5	14.9
Grid (-70, 70)	0-0.5	4.77
Grid (-70, 70)	2	2.96
Grid (-70, 90)	0-0.5	**24.8**
Grid (-70, 90)	2	4.44
Grid (-70, 110)	0-0.5	9.23
Grid (-70, 130)	0-0.5	9.21
Grid (-50, -50)	0-0.5	16.8
Grid (-50, -50)	2	15.3
Grid (-50, -30)	0-0.5	14.9
Grid (-50, -30)	2	15.8
Grid (-50, -10)	0-0.5	10.7
Grid (-50, -10)	2	4.28
Grid (-50, 50)	0-0.5	6.89
Grid (-50, 70)	0-0.5	9.11
Grid (-50, 70)	2	7.25
Grid (-50, 90)	0-0.5	**44.7**
Grid (-50, 90)	2	2.36
Grid (-50, 110)	0-0.5	5.81
Grid (-50, 130)	0-0.5	6.25
Grid (-30, -50)	0-0.5	12.2
Grid (-30, -30)	0-0.5	**80**
Grid (-30, -30)	2	**22.9**
Grid (-30, -10)	0-0.5	**47.9**
Grid (-30, -10)	2	7.91
Grid (-30, 70)	0-0.5	**36.7**
Grid (-30, 70)	4	4.88

Table A.8
Soil Analytical Results for Arsenic Grid Samples (2000-2001)
4825 Glenbrook Road
Spring Valley, Washington DC

Sample ID	Depth (feet)	Arsenic Concentration (mg/kg)
Grid (-30, 90)	0-0.5	**40.9**
Grid (-30, 90)	2	7.87
Grid (-30, 110)	0-0.5	19.5
Grid (-30, 110)	2	4.22
Grid (-30, 130)	0-0.5	10.9
Grid (-30, 130)	2	5.29
Grid (-10, -50)	0-0.5	8.87
Grid (-10, -30)	0-0.5	13.6
Grid (-10, -10)	0-0.5	9.89
Grid (-10, 70)	0-0.5	**620**
Grid (-10, 70)	2	11.4
Grid (-10, 70)	4	4.8
Grid (-10, 90)	0-0.5	**168**
Grid (-10, 90)	2	3.98
Grid (-10, 110)	0-0.5	**27.5**
Grid (-10, 110)	2	**694**
Grid (-10, 110)	4	2.72
Grid (-10, 130)	0-0.5	5.59
Grid (-10, 130)	0-0.5	6.36
Grid (0, -10)	0-0.5	12.4
Grid (0, -10)	4	8.78
Grid (0, 10)	2	4.7
Grid (0, 30)	2	4.12
Grid (0, 50)	2	4.9
Grid (0, 70)	0-0.5	**230**
Grid (0, 70)	2	8.33
Grid (0, 90)	0-0.5	**194**
Grid (0, 90)	4	3.5
Grid (0, 110)	0-0.5	**341**
Grid (0, 110)	2	**42.9**
Grid (0, 110)	4	10.3
Grid (0, 130)	0-0.5	19.2
Grid (0, 130)	2	13.5

Soil represented by these data was removed in 2001.
Soil represented by these data was removed in 2009.
Soil represented by these data was removed druing Burial Pit 3 Investigation.

Bold - Concentration exceeds the Spring Valley arsenic action level of 20 mg/kg.
The grid coordinates represent the southwest corner of the block as shown on Figure 1-3.
* soil boring samples collected in the driveway on 23 January 2001.

Table A.9
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (PIT 3) GRAB SOIL SAMPLES

SAMPLE ID:			SW-BP3-GS-02		SW-BP3-GS-03		SW-BP3-GS-04		SW-BP3-GS-05	
DATE SAMPLED:			01/31/08		01/31/08		05/28/08		05/28/08	
LAB SAMPLE ID:			802016-001		802016-002		806146-001		806146-002	
	Units	Comparison Level								
Volatile Organics - OLM04.3_V										
1,1,1-Trichloroethane	ug/kg	870000	13	U	12	U	12	UL	12	UL
1,1,2,2-Tetrachloroethane	ug/kg	560	13	U	12	U	12	UL	12	UL
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/kg	4300000	13	U	12	U	12	UL	12	UL
1,1,2-Trichloroethane	ug/kg	1100	13	U	12	U	12	UL	12	UL
1,1-Dichloroethane	ug/kg	3300	13	U	12	U	12	UL	12	UL
1,1-Dichloroethene	ug/kg	24000	13	U	12	U	12	UL	12	UL
1,2,4-Trichlorobenzene	ug/kg	22000	13	U	12	U	12	UL	12	UL
1,2-Dibromo-3-chloropropane	ug/kg	5.4	13	U	12	U	12	UL	12	UL
1,2-Dibromoethane	ug/kg	34	13	U	12	U	12	UL	12	UL
1,2-Dichlorobenzene	ug/kg	190000	13	U	12	U	12	UL	12	UL
1,2-Dichloroethane	ug/kg	430	13	U	12	U	12	UL	12	UL
1,2-Dichloropropane	ug/kg	890	13	U	12	U	12	UL	12	UL
1,3-Dichlorobenzene	ug/kg	18	13	U	12	U	12	UL	12	UL
1,4-Dichlorobenzene	ug/kg	2400	13	U	12	U	12	UL	12	UL
Acetone	ug/kg	6100000	13	U	12	U	12	UL	12	UL
Acetonitrile	ug/kg	87000	130	U	120	U	120	UL	120	UL
Acrolein	ug/kg	15	63	R	58	R	62	R	60	R
Benzene	ug/kg	1100	13	U	12	U	12	UL	12	UL
Benzyl Bromide	ug/kg	16000	13	U	12	U	12	UL	12	UL
Benzyl chloride	ug/kg	1000	13	U	12	U	12	UL	12	UL
Bromobenzene	ug/kg	30000	13	U	12	U	12	UL	12	UL
Bromodichloromethane	ug/kg	270	13	U	12	U	12	UL	12	UL
Bromoform	ug/kg	61000	13	U	12	U	12	UL	12	UL
Carbon disulfide	ug/kg	82000	13	U	12	U	12	UL	12	UL
Carbon tetrachloride	ug/kg	610	13	U	12	U	12	UL	12	UL
Chlorobenzene	ug/kg	29000	13	U	12	U	12	UL	12	UL
Chlorodibromomethane	ug/kg	680	13	U	12	U	12	UL	12	UL
Chloroethane	ug/kg	1500000	13	U	12	U	12	UL	12	UL
Chloroform	ug/kg	290	13	U	12	U	12	UL	12	UL
Chloropicrin	ug/kg	57000000	63	U	58	U	62	UL	60	UL
Cis-1,2-Dichloroethene	ug/kg	78000	13	U	12	U	12	UL	12	UL
cis-1,3-Dichloropropene	ug/kg	18	13	U	12	U	12	UL	12	UL
Cyclohexane	ug/kg	700000	13	U	12	U	12	UL	12	UL
Dichlorodifluoromethane	ug/kg	18000	13	U	12	U	12	UL	12	UL
Diphenyl Ether	ug/kg	NA	13	UJ	12	UJ	12	R	12	R
Ethyl benzene	ug/kg	5400	13	U	12	U	12	UL	12	UL

Table A.9

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (PIT 3) GRAB SOIL SAMPLES

SAMPLE ID:			SW-BP3-GS-02		SW-BP3-GS-03		SW-BP3-GS-04		SW-BP3-GS-05	
DATE SAMPLED:			01/31/08		01/31/08		05/28/08		05/28/08	
LAB SAMPLE ID:			802016-001		802016-002		806146-001		806146-002	
	Units	Comparison Level								
Isopropylbenzene	ug/kg	210000	13	U	12	U	12	UL	12	UL
Methyl Acetate	ug/kg	7800000	13	U	12	U	12	UL	12	UL
Methyl bromide	ug/kg	730	13	U	12	U	12	UL	12	UL
Methyl butyl ketone	ug/kg	21000	13	U	12	U	12	UL	12	UL
Methyl chloride	ug/kg	12000	13	U	12	U	12	UL	12	UL
Methyl ethyl ketone	ug/kg	2800000	13	U	12	U	12	UL	12	UL
Methyl isobutyl ketone	ug/kg	530000	13	U	12	U	12	UL	12	UL
Methyl Tertbutyl Ether	ug/kg	43000	13	U	12	U	12	UL	12	UL
MethylCyclohexane	ug/kg	18	13	U	12	U	12	UL	12	UL
Methylene chloride	ug/kg	11000	13	U	12	U	**5.5**	L	**5.1**	L
Styrene	ug/kg	630000	13	U	12	U	12	UL	12	UL
Tetrachloroethene	ug/kg	550	13	U	12	U	12	UL	12	UL
Toluene	ug/kg	500000	**3.1**	J	12	U	12	UL	12	UL
Trans-1,2-Dichloroethene	ug/kg	15000	13	U	12	U	12	UL	12	UL
trans-1,3-dichloropropene	ug/kg	18	13	U	12	U	12	UL	12	UL
Trichloroethene	ug/kg	2800	13	U	12	U	12	UL	12	UL
Trichlorofluoromethane	ug/kg	79000	13	U	12	U	12	UL	12	UL
Vinyl chloride	ug/kg	60	13	U	12	U	12	UL	12	UL
Xylenes (Total)	ug/kg	63000	**7.4**	J	12	U	12	UL	12	UL
Semivolatile Organics - OLM04.3_SV										
1,1'-Biphenyl	ug/kg	390000	420	U	390	U	820	UJ	800	UJ
1-chloro-2,4-dinitrobenzene	ug/kg	510	420	U	390	U	820	UJ	800	UJ
2,4,5-Trichlorophenol	ug/kg	610000	1100	U	960	U	2100	UJ	2000	UJ
2,4,6-Trichlorophenol	ug/kg	44000	420	U	390	U	820	UJ	800	UJ
2,4-Dichlorophenol	ug/kg	18000	420	U	390	U	820	UJ	800	UJ
2,4-Dimethylphenol	ug/kg	120000	420	U	390	U	820	UJ	800	UJ
2,4-Dinitrophenol	ug/kg	12000	1100	U	960	U	2100	UJ	2000	UJ
2-Bromo-4'-chloroacetophenone	ug/kg	510	420	U	390	U	820	UJ	800	UJ
2-Chloronaphthalene	ug/kg	630000	420	U	390	U	820	UJ	800	UJ
Ethylene Chlorohydrin	ug/kg	NA	420	U	390	U	820	UJ	800	UJ
2-Chlorophenol	ug/kg	39000	420	U	390	U	820	UJ	800	UJ
2-Methylnaphthalene	ug/kg	31000	420	U	390	U	820	UJ	800	UJ
2-Methylphenol	ug/kg	310000	420	U	390	U	820	UJ	800	UJ
2-Nitroaniline	ug/kg	61000	1100	U	960	U	2100	UJ	2000	UJ
2-Nitrophenol	ug/kg	510	420	U	390	U	820	UJ	800	UJ
3,3'-Dichlorobenzidine	ug/kg	1100	420	U	390	U	820	UJ	800	UJ

Table A.9
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (PIT 3) GRAB SOIL SAMPLES

SAMPLE ID:			SW-BP3-GS-02		SW-BP3-GS-03		SW-BP3-GS-04		SW-BP3-GS-05	
DATE SAMPLED:			01/31/08		01/31/08		05/28/08		05/28/08	
LAB SAMPLE ID:			802016-001		802016-002		806146-001		806146-002	
	Units	Comparison Level								
3-Nitroaniline	ug/kg	1300	1100	U	960	U	2100	UJ	2000	UJ
4,6-Dinitro-2-methylphenol	ug/kg	490	1100	U	960	U	2100	UJ	2000	UJ
4-Bromophenyl-phenylether	ug/kg	510	420	U	390	U	820	UJ	800	UJ
4-Chloro-3-methylphenol	ug/kg	610000	420	U	390	U	820	UJ	800	UJ
4-Chloroacetophenone	ug/kg	510	420	U	390	U	820	UJ	800	UJ
4-Chloroaniline	ug/kg	2400	420	U	390	U	820	UJ	800	UJ
4-Chlorophenyl-PhenylEther	ug/kg	510	420	U	390	U	820	UJ	800	UJ
4-Methylphenol	ug/kg	31000	420	U	390	U	820	UJ	800	UJ
4-Nitroaniline	ug/kg	24000	1100	U	960	U	2100	UJ	2000	UJ
4-Nitrophenol	ug/kg	1300	1100	U	960	U	2100	UJ	2000	UJ
Acenaphthene	ug/kg	340000	420	U	390	U	820	UJ	800	UJ
Acenaphthylene	ug/kg	510	420	U	390	U	820	UJ	800	UJ
Acetophenone	ug/kg	780000	420	U	390	U	820	UJ	800	UJ
Anthracene	ug/kg	1700000	420	U	390	U	820	UJ	800	UJ
Atrazine	ug/kg	2100	420	U	390	U	820	UJ	800	UJ
Benzal Chloride	ug/kg	510	420	U	390	U	820	UJ	800	UJ
Benzaldehyde	ug/kg	780000	420	U	390	U	820	UJ	800	UJ
Benzo(a)anthracene	ug/kg	150	420	U	390	U	820	UJ	800	UJ
Benzo(a)pyrene	ug/kg	15	420	U	390	U	820	UJ	800	UJ
Benzo(b)fluoranthene	ug/kg	150	420	U	390	U	820	UJ	800	UJ
Benzo(g,h,i)perylene	ug/kg	331.5	420	U	390	U	820	UJ	800	UJ
Benzo(k)fluoranthene	ug/kg	1500	420	U	390	U	820	UJ	800	UJ
Benzoic Acid	ug/kg	24000000	420	U	390	U	820	UJ	800	UJ
Bis(2-Chloroethoxy)methane	ug/kg	18000	420	U	390	U	820	UJ	800	UJ
Bis(2-Chloroethyl)ether	ug/kg	210	420	U	390	U	820	UJ	800	UJ
Bis(2-Chloroisopropyl)ether	ug/kg	4600	420	U	390	U	820	UJ	800	UJ
Bis(2-Ethylhexyl)phthalate	ug/kg	35000	**54**	J	390	U	820	UJ	800	UJ
Bromacetophenone	ug/kg	510	420	U	390	U	820	UJ	800	UJ
Bromchloracetophenone	ug/kg	510	420	U	390	U	820	UJ	800	UJ
Bromoacetophenone	ug/kg	510	420	U	390	U	820	UJ	800	UJ
Butylbenzylphthalate	ug/kg	260000	420	U	390	U	820	UJ	800	UJ
Caprolactam	ug/kg	3100000	420	U	390	U	820	UJ	800	UJ
Carbazole	ug/kg	510	420	U	390	U	820	UJ	800	UJ
Chrysene	ug/kg	15000	420	U	390	U	820	UJ	800	UJ
Dibenz(a,h)anthracene	ug/kg	15	420	U	390	U	820	UJ	800	UJ
Dibenzofuran	ug/kg	7800	420	U	390	U	820	UJ	800	UJ
Diethyl phthalate	ug/kg	4900000	420	U	390	U	820	UJ	800	UJ

Table A.9
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (PIT 3) GRAB SOIL SAMPLES

SAMPLE ID:			SW-BP3-GS-02		SW-BP3-GS-03		SW-BP3-GS-04		SW-BP3-GS-05	
DATE SAMPLED:			01/31/08		01/31/08		05/28/08		05/28/08	
LAB SAMPLE ID:	Units	Comparison Level	802016-001		802016-002		806146-001		806146-002	
Dimethylaniline	ug/kg	16000	420	U	390	U	820	UJ	800	UJ
Dimethylphthalate	ug/kg	510	420	U	390	U	820	UJ	800	UJ
Di-n-butylphthalate	ug/kg	610000	420	U	390	U	820	UJ	800	UJ
di-n-Octyl Phthalate	ug/kg	510	420	U	390	U	820	UJ	800	UJ
Fluoranthene	ug/kg	230000	420	U	390	U	820	UJ	800	UJ
Fluorene	ug/kg	230000	420	U	390	U	820	UJ	800	UJ
Glycol-bromohydrin	ug/kg	510	420	U	390	U	820	UJ	800	UJ
Hexachlorobenzene	ug/kg	300	420	U	390	U	820	UJ	800	UJ
Hexachlorobutadiene	ug/kg	6200	420	U	390	U	820	UJ	800	UJ
Hexachlorocyclopentadiene	ug/kg	37000	420	U	390	U	820	UJ	800	UJ
Hexachloroethane	ug/kg	35000	420	U	390	U	820	UJ	800	UJ
Indeno(1,2,3-cd)pyrene	ug/kg	150	420	U	390	U	820	UJ	800	UJ
Isophorone	ug/kg	510000	420	U	390	U	820	UJ	800	UJ
Naphthalene	ug/kg	3600	420	U	390	U	820	UJ	800	UJ
N-Nitrosodiphenylamine	ug/kg	99000	420	U	390	U	820	UJ	800	UJ
N-Nitrosodipropylamine	ug/kg	69	420	U	390	U	820	UJ	800	UJ
Pentachlorophenol	ug/kg	3000	1100	U	960	U	2100	UJ	2000	UJ
Phenanthrene	ug/kg	407.4	420	U	390	U	820	UJ	800	UJ
Phenol	ug/kg	1800000	420	U	390	U	820	UJ	800	UJ
Phenyl isocyanate	ug/kg	510	420	R	390	R	820	R	800	R
Phenyl isothiocyanate	ug/kg	510	420	U	390	U	820	UJ	800	UJ
Pyrene	ug/kg	170000	420	U	390	U	820	UJ	800	UJ
Tolidine	ug/kg	44	420	U	390	U	820	UJ	800	UJ
Explosives - SW8330A										
1,3,5-Trinitrobenzene	mg/kg	220	0.04	U	0.04	U	0.04	UJ	0.041	UJ
1,3-Dinitrobenzene	mg/kg	0.61	0.04	U	0.04	U	0.04	UJ	0.041	UJ
2,4,6-Trinitrotoluene	mg/kg	19	0.04	U	0.04	U	0.04	UJ	0.041	UJ
2,4-Dinitrotoluene	mg/kg	1.6	0.04	U	0.04	U	0.04	UJ	0.041	UJ
2,6-Dinitrotoluene	mg/kg	6.1	0.04	U	0.04	U	0.04	UJ	0.041	UJ
2-amino-4,6-Dinitrotoluene	mg/kg	15	0.04	U	0.04	U	0.04	UJ	0.041	UJ
2-Nitrotoluene	mg/kg	2.9	0.08	U	0.08	U	0.08	UJ	0.083	UJ
3-Nitrotoluene	mg/kg	0.61	0.08	U	0.08	U	0.08	UJ	0.083	UJ
4-amino-2,6-Dinitrotoluene	mg/kg	15	0.04	U	0.04	U	0.04	UJ	0.041	UJ
4-Nitrotoluene	mg/kg	30	0.08	U	0.08	U	0.08	UJ	0.083	UJ
HMX	mg/kg	380	0.08	U	0.08	U	0.08	UJ	0.083	UJ
Nitrobenzene	mg/kg	4.8	0.04	U	0.04	U	0.04	UJ	0.041	UJ

Table A.9
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (PIT 3) GRAB SOIL SAMPLES

SAMPLE ID:			SW-BP3-GS-02		SW-BP3-GS-03		SW-BP3-GS-04		SW-BP3-GS-05	
DATE SAMPLED:			01/31/08		01/31/08		05/28/08		05/28/08	
LAB SAMPLE ID:	Units	Comparison Level	802016-001		802016-002		806146-001		806146-002	
Nitroglycerine	mg/kg	0.61	4	U	4	U	4	UJ	4	UJ
RDX	mg/kg	5.5	0.08	U	**0.046**	**J**	0.08	UJ	0.083	UJ
Tetryl	mg/kg	24	0.08	U	0.08	U	0.08	UJ	0.083	UJ
Metals - ILM05.4										
Aluminum	mg/kg	19100	**8870**		**22800**		**42000**	J	**29100**	J
Antimony	mg/kg	5.2	**0.25**	L	**0.26**	**L**	**2.9**	J	**2.2**	J
Arsenic	mg/kg	20	**79.8**		**298**		**19.8**	J	**18.2**	J
Barium	mg/kg	1500	**277**		**195**		**230**		**254**	
Beryllium	mg/kg	16	**0.18**	J	**0.57**		**1.4**	J	**0.95**	J
Cadmium	mg/kg	7	0.47	U	**0.099**	**B**	**0.49**		**0.37**	J
Chromium	mg/kg	12000	**21.4**	K	**70.4**	**K**	**119**	J	**97.2**	J
Cobalt	mg/kg	17.8	**16.3**		**64.8**		**21.2**	J	**16.4**	J
Copper	mg/kg	310	**17.8**		**52.7**		**59.1**		**51.4**	
Iron	mg/kg	32400	**15500**		**32900**		**39300**		**28500**	
Lead	mg/kg	400	**6**		**10.8**		**10.6**		**7.5**	
Magnesium	mg/kg	6950	**4280**	J	**11600**	**J**	**17500**		**16600**	
Manganese	mg/kg	968	**82.2**	K	**219**	**K**	**412**		**358**	
Mercury, Elemental	mg/kg	0.56	**0.12**		**0.25**		**1.7**	L	**2.2**	L
Nickel	mg/kg	150	**12.2**	J	**30.3**	**J**	**48.2**		**43.4**	
Selenium	mg/kg	39	3.3	U	**1.2**	**J**	3.2	U	3	U
Silver	mg/kg	39	**0.063**	J	**0.79**	**U**	**0.078**	B	**0.16**	B
Strontium	mg/kg	4700	**59**		**50.1**		**36.1**	J	**43.7**	J
Tellurium	mg/kg	39.11	**4.1**	J	**3.2**	**J**	**3.1**	J	**3.5**	J
Thallium	mg/kg	2.2	2.4	U	**2**	**U**	4.6	U	2.2	U
Tin	mg/kg	4700	**2.8**	B	**4.7**	**B**	**2**	B	**1.2**	B
Titanium	mg/kg	31000	**806**		**1330**		**1940**	J	**1760**	J
Vanadium	mg/kg	75.5	**28.1**	J	**75.6**	**J**	**112**	J	**84.3**	J
Zinc	mg/kg	2300	**21.8**	J	**55.6**	**J**	**103**		**84.7**	
Zirconium	mg/kg	48.3	**6.9**	B	**7.3**	**B**	**10.1**	B	**7.6**	B
Other Parameters										
Cyanide	mg/kg	160	0.18	U	0.16	U	0.17	UL	0.16	UL
Fluoride	mg/kg	310	**2.4**	J	**5.1**	**J**	**12**	L	**12**	L
Iodine (as Iodide)	mg/kg	78	0.06	U	0.06	U	**0.07**		**0.088**	
Iodine Pentafluoride	mg/kg	NA	**33**	L	**17**	**L**	**93**		**86**	
Perchlorate	ug/kg	5500	2	U	2	U	61	UL	60	UL

Table A.9

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (PIT 3) GRAB SOIL SAMPLES

SAMPLE ID:			**SW-BP3-GS-02**	**SW-BP3-GS-03**	**SW-BP3-GS-04**	**SW-BP3-GS-05**
DATE SAMPLED:			**01/31/08**	**01/31/08**	**05/28/08**	**05/28/08**
LAB SAMPLE ID:			**802016-001**	**802016-002**	**806146-001**	**806146-002**
	Units	**Comparison Level**				

Note: The soil samples were submitted for agents and ABPs analysis. Agents and ABPs were not detected.

Soil represented by these data was removed.

QA NOTES AND DATA QUALIFIERS:

Comparison value based on the higher of the November 2010 Regional Screening Levels (RSLs), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL). The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.

(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.

U - Analyte was analyzed for but not detected at or above the adjusted practical quantitation limit (PQL).

UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.

J - Analyte detected, estimated concentration.

UL - Analyte not detected, reported PQL is biased low, actual PQL may be higher.

L - Analyte detected, reported value is biased low, actual value may be higher.

K - Analyte detected, reported value is biased high, actual value may be lower.

R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.

B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.

ug/kg - Microgram per kilogram. mg/kg - Milligram per kilogram. HD - mustard. L - Lewisite.

Detections are bolded.

Detections exceeding the comparison level are shown shaded and bolded.

Table A.10

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (PIT 3) PIT CHARACTERIZATION SOIL SAMPLES

SAMPLE ID:			SW-BP3-EFL-(-10)		SW-BP3-EFL-(-10)-C		SW-BP3-WFL-(-1)		SW-BP3-WFL-(-1)-C		SW-BP3-NEW01-5		SW-BP3-NEW01-5-1		SW-BP3-NEW01-5-2		SW-BP3-NEW01-5-3		SW-BP3-NEW01-5-4		SW-BP3-NWW01-2		SW-BP3-SEW01-5		SW-BP3-SWW01-2	
DATE SAMPLED:			03/06/08		07/09/09		03/06/08		07/09/09		03/13/08		07/30/09		07/30/09		07/30/09		07/30/09		03/13/08		03/13/08		03/13/08	
LAB SAMPLE ID:			803062-001		907055-011		803062-002		907055-012		803116-004		907176-001		907176-002		907176-003		907176-002		803116-002		803116-001		803116-003	
	Units	Comparison Level																								
Volatile Organics - OLM04.3_V																										
1,1,1-Trichloroethane	ug/kg	870000	12	U			11	U			12	U									12	U	13	UL	11	U
1,1,2,2-Tetrachloroethane	ug/kg	560	12	U			11	U			12	U									12	U	13	UL	11	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/kg	4300000	12	U			11	U			12	U									12	U	13	UL	11	U
1,1,2-Trichloroethane	ug/kg	1100	12	U			11	U			12	U									12	U	13	UL	11	U
1,1-Dichloroethane	ug/kg	3300	12	U			11	U			12	U									12	U	13	UL	11	U
1,1-Dichloroethene	ug/kg	24000	12	U			11	U			12	U									12	U	13	UL	11	U
1,2,4-Trichlorobenzene	ug/kg	22000	12	U			11	U			12	U									12	U	13	UL	11	U
1,2-Dibromo-3-chloropropane	ug/kg	5.4	12	U			11	U			12	U									12	U	13	UL	11	U
1,2-Dibromoethane	ug/kg	34	12	U			11	U			12	U									12	U	13	UL	11	U
1,2-Dichlorobenzene	ug/kg	190000	12	U			11	U			12	U									12	U	13	UL	11	U
1,2-Dichloroethane	ug/kg	430	12	U			11	U			12	U									12	U	13	UL	11	U
1,2-Dichloropropane	ug/kg	890	12	U			11	U			12	U									12	U	13	UL	11	U
1,3-Dichlorobenzene	ug/kg	18	12	U			11	U			12	U									12	U	13	UL	11	U
1,4-Dichlorobenzene	ug/kg	2400	12	U			11	U			12	U									12	U	13	UL	11	U
Acetone	ug/kg	6100000	12	U			11	U			12	U									**3.4**	J	**3.6**	L	**2.5**	J
Acetonitrile	ug/kg	87000	120	U			110	U			120	U									120	U	130	UL	110	U
Acrolein	ug/kg	15	57	R			55	R			59	U									59	U	63	UL	56	U
Benzene	ug/kg	1100	12	U			11	U			12	U									12	U	13	UL	11	U
Benzyl Bromide	ug/kg	16000	12	UJ			11	UJ			12	U									12	U	13	UL	11	U
Benzyl chloride	ug/kg	1000	12	U			11	U			12	U									12	U	13	UL	11	U
Bromobenzene	ug/kg	30000	12	U			11	U			12	U									12	U	13	UL	11	U
Bromodichloromethane	ug/kg	270	12	U			11	U			12	U									12	U	13	UL	11	U
Bromoform	ug/kg	61000	12	U			11	U			12	U									12	U	13	UL	11	U
Carbon disulfide	ug/kg	82000	12	U			11	U			12	U									12	U	13	UL	11	U
Carbon tetrachloride	ug/kg	610	12	U			11	U			12	U									12	U	13	UL	11	U
Chlorobenzene	ug/kg	29000	12	U			11	U			12	U									12	U	13	UL	11	U
Chlorodibromomethane	ug/kg	680	12	U			11	U			12	U									12	U	13	UL	11	U
Chloroethane	ug/kg	1500000	12	U			11	U			12	U									12	U	13	UL	11	U
Chloroform	ug/kg	290	12	U			11	U			12	U									12	U	13	UL	11	U
Chloropicrin	ug/kg	57000000	57	U			55	U			59	U									59	U	63	UL	56	U
Cis-1,2-Dichloroethene	ug/kg	78000	12	U			11	U			12	U									12	U	13	UL	11	U
cis-1,3-Dichloropropene	ug/kg	18	12	U			11	U			12	U									12	U	13	UL	11	U
Cyclohexane	ug/kg	700000	12	U			11	U			12	U									12	U	13	UL	11	U
Dichlorodifluoromethane	ug/kg	18000	12	U			11	U			12	U									12	U	13	UL	11	U
Diphenyl Ether	ug/kg	NA	12	R			11	R			12	R									12	R	13	R	11	R
Ethyl benzene	ug/kg	5400	12	U			11	U			12	U									12	U	13	UL	11	U
Isopropylbenzene	ug/kg	210000	12	U			11	U			12	U									12	U	13	UL	11	U
Methyl Acetate	ug/kg	7800000	12	U			11	U			12	U									12	U	13	UL	11	U
Methyl bromide	ug/kg	730	12	U			11	U			12	U									12	U	13	UL	11	U

Table A.10

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (PIT 3) PIT CHARACTERIZATION SOIL SAMPLES

SAMPLE ID:			SW-BP3-EFL-(-10)		SW-BP3-EFL-(-10)-C		SW-BP3-WFL-(-1)		SW-BP3-WFL-(-1)-C		SW-BP3-NEW01-5		SW-BP3-NEW01-5-1		SW-BP3-NEW01-5-2		SW-BP3-NEW01-5-3		SW-BP3-NEW01-5-4		SW-BP3-NWW01-2		SW-BP3-SEW01-5		SW-BP3-SWW01-2	
DATE SAMPLED:			03/06/08		07/09/09		03/06/08		07/09/09		03/13/08		07/30/09		07/30/09		07/30/09		07/30/09		03/13/08		03/13/08		03/13/08	
LAB SAMPLE ID:			803062-001		907055-011		803062-002		907055-012		803116-004		907176-001		907176-002		907176-003		907176-002		803116-002		803116-001		803116-003	
	Units	Comparison Level																								
Methyl butyl ketone	ug/kg	21000	12	U			11	U			12	U									12	U	13	UL	11	U
Methyl chloride	ug/kg	12000	12	U			11	U			12	U									12	U	13	UL	11	U
Methyl ethyl ketone	ug/kg	2800000	12	U			11	U			12	U									12	U	13	UL	11	U
Methyl isobutyl ketone	ug/kg	530000	12	U			11	U			12	U									12	U	13	UL	11	U
Methyl Tertbutyl Ether	ug/kg	43000	12	U			11	U			12	U									12	U	13	UL	11	U
MethylCyclohexane	ug/kg	18	12	U			11	U			12	U									12	U	13	UL	11	U
Methylene chloride	ug/kg	11000	**2.1**	J			**1.9**	J			**3.4**	J									**5.1**	J	**4.1**	L	**2.9**	J
Styrene	ug/kg	630000	12	U			11	U			12	U									12	U	13	UL	11	U
Tetrachloroethene	ug/kg	550	12	U			11	U			12	U									12	U	13	UL	11	U
Toluene	ug/kg	500000	12	U			11	U			12	U									12	U	13	UL	11	U
Trans-1,2-Dichloroethene	ug/kg	15000	12	U			11	U			12	U									12	U	13	UL	11	U
trans-1,3-dichloropropene	ug/kg	18	12	U			11	U			12	U									12	U	13	UL	11	U
Trichloroethene	ug/kg	2800	12	U			11	U			12	U									12	U	13	UL	11	U
Trichlorofluoromethane	ug/kg	79000	12	U			11	U			12	U									12	U	13	UL	11	U
Vinyl chloride	ug/kg	60	12	U			11	U			12	U									12	U	13	UL	11	U
Xylenes (Total)	ug/kg	63000	12	U			11	U			12	U									12	U	13	UL	11	U
Semivolatile Organics - OLM04.3_SV																										
1,1'-Biphenyl	ug/kg	390000	380	U			370	U			390	U									400	U	420	U	370	U
1-chloro-2,4-dinitrobenzene	ug/kg	510	380	U			370	U			390	U									400	U	420	U	370	U
2,4,5-Trichlorophenol	ug/kg	610000	950	U			910	U			980	U									990	U	1000	U	930	U
2,4,6-Trichlorophenol	ug/kg	44000	380	U			370	U			390	U									400	U	420	U	370	U
2,4-Dichlorophenol	ug/kg	18000	380	U			370	U			390	U									400	U	420	U	370	U
2,4-Dimethylphenol	ug/kg	120000	380	U			370	U			390	U									400	U	420	U	370	U
2,4-Dinitrophenol	ug/kg	12000	950	U			910	U			980	U									990	U	1000	U	930	U
2-Bromo-4'-chloroacetophenone	ug/kg	510	380	U			370	U			390	U									400	U	420	U	370	U
2-Chloronaphthalene	ug/kg	630000	380	U			370	U			390	U									400	U	420	U	370	U
Ethylene Chlorohydrin	ug/kg	NA	380	U			370	U			390	U									400	U	420	U	370	U
2-Chlorophenol	ug/kg	39000	380	U			370	U			390	U									400	U	420	U	370	U
2-Methylnaphthalene	ug/kg	31000	380	U			370	U			390	U									400	U	420	U	370	U
2-Methylphenol	ug/kg	310000	380	U			370	U			390	U									400	U	420	U	370	U
2-Nitroaniline	ug/kg	61000	950	U			910	U			980	U									990	U	1000	U	930	U
2-Nitrophenol	ug/kg	510	380	U			370	U			390	U									400	U	420	U	370	U
3,3'-Dichlorobenzidine	ug/kg	1100	380	UJ			370	UJ			390	U									400	U	420	U	370	U
3-Nitroaniline	ug/kg	1300	950	U			910	U			980	U									990	U	1000	U	930	U
4,6-Dinitro-2-methylphenol	ug/kg	490	950	U			910	U			980	U									990	U	1000	U	930	U
4-Bromophenyl-phenylether	ug/kg	510	380	U			370	U			390	U									400	U	420	U	370	U
4-Chloro-3-methylphenol	ug/kg	610000	380	U			370	U			390	U									400	U	420	U	370	U
4-Chloroacetophenone	ug/kg	510	380	U			370	U			390	U									400	U	420	U	370	U
4-Chloroaniline	ug/kg	2400	380	U			370	U			390	U									400	U	420	U	370	U

Table A.10

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (PIT 3) PIT CHARACTERIZATION SOIL SAMPLES

SAMPLE ID:			SW-BP3-EFL-(-10)		SW-BP3-EFL-(-10)-C		SW-BP3-WFL-(-1)		SW-BP3-WFL-(-1)-C		SW-BP3-NEW01-5		SW-BP3-NEW01-5-1		SW-BP3-NEW01-5-2		SW-BP3-NEW01-5-3		SW-BP3-NEW01-5-4		SW-BP3-NWW01-2		SW-BP3-SEW01-5		SW-BP3-SWW01-2	
DATE SAMPLED:			03/06/08		07/09/09		03/06/08		07/09/09		03/13/08		07/30/09		07/30/09		07/30/09		07/30/09		03/13/08		03/13/08		03/13/08	
LAB SAMPLE ID:			803062-001		907055-011		803062-002		907055-012		803116-004		907176-001		907176-002		907176-003		907176-002		803116-002		803116-001		803116-003	
	Units	Comparison Level																								
4-Chlorophenyl-PhenylEther	ug/kg	510	380	U			370	U			390	U									400	U	420	U	370	U
4-Methylphenol	ug/kg	31000	380	U			370	U			390	U									400	U	420	U	370	U
4-Nitroaniline	ug/kg	24000	950	U			910	U			980	U									990	U	1000	U	930	U
4-Nitrophenol	ug/kg	1300	**38**	J			910	U			980	U									990	U	1000	U	930	U
Acenaphthene	ug/kg	340000	380	U			370	U			390	U									400	U	420	U	370	U
Acenaphthylene	ug/kg	510	380	U			370	U			390	U									400	U	420	U	370	U
Acetophenone	ug/kg	780000	380	U			370	U			390	U									400	U	420	U	370	U
Anthracene	ug/kg	1700000	380	U			370	U			390	U									400	U	420	U	370	U
Atrazine	ug/kg	2100	380	R			370	R			390	R									400	R	420	R	370	R
Benzal Chloride	ug/kg	510	380	U			370	U			390	U									400	U	420	U	370	U
Benzaldehyde	ug/kg	780000	380	U			370	U			390	U									400	U	420	U	370	U
Benzo(a)anthracene	ug/kg	150	380	U			370	U			390	U									400	U	420	U	370	U
Benzo(a)pyrene	ug/kg	15	380	U			370	U			390	U									400	U	420	U	370	U
Benzo(b)fluoranthene	ug/kg	150	380	U			370	U			390	U									400	U	420	U	370	U
Benzo(g,h,i)perylene	ug/kg	331.5	380	U			370	U			390	U									400	U	420	U	370	U
Benzo(k)fluoranthene	ug/kg	1500	380	U			370	U			390	U									400	U	420	U	370	U
Bis(2-Chloroethoxy)methane	ug/kg	18000	380	U			370	U			390	U									400	U	420	U	370	U
Bis(2-Chloroethyl)ether	ug/kg	210	380	U			370	U			390	U									400	U	420	U	370	U
Bis(2-Chloroisopropyl)ether	ug/kg	4600	380	U			370	U			390	U									400	U	420	U	370	U
Bis(2-Ethylhexyl)phthalate	ug/kg	35000	380	U			**80**	J			**89**	J									**110**	J	**110**	J	**90**	J
Bromacetophenone	ug/kg	510	380	U			370	U			390	U									400	U	420	U	370	U
Bromchloracetophenone	ug/kg	510	380	U			370	U			390	U									400	U	420	U	370	U
Bromoacetophenone	ug/kg	510	380	U			370	U			390	U									400	U	420	U	370	U
Butylbenzylphthalate	ug/kg	260000	380	U			370	U			390	U									400	U	420	U	370	U
Caprolactam	ug/kg	3100000	380	U			370	U			390	U									400	U	420	U	370	U
Carbazole	ug/kg	510	380	U			370	U			390	U									400	U	420	U	370	U
Chrysene	ug/kg	15000	380	U			370	U			390	U									400	U	420	U	370	U
Dibenz(a,h)anthracene	ug/kg	15	380	U			370	U			390	U									400	U	420	U	370	U
Dibenzofuran	ug/kg	7800	380	U			370	U			390	U									400	U	420	U	370	U
Diethyl phthalate	ug/kg	4900000	380	U			370	U			390	U									400	U	420	U	370	U
Dimethylaniline	ug/kg	16000	380	U			370	U			390	U									400	U	420	U	370	U
Dimethylphthalate	ug/kg	510	380	U			370	U			390	U									400	U	420	U	370	U
Di-n-butylphthalate	ug/kg	610000	380	U			**110**	J			**43**	J									**61**	J	**62**	J	**37**	J
di-n-Octyl Phthalate	ug/kg	510	380	UJ			370	UJ			390	U									400	U	420	U	370	U
Fluoranthene	ug/kg	230000	380	U			370	U			390	U									400	U	420	U	370	U
Fluorene	ug/kg	230000	380	U			370	U			390	U									400	U	420	U	370	U
Glycol-bromohydrin	ug/kg	510	380	U			370	U			390	UJ									400	UJ	420	UJ	370	UJ
Hexachlorobenzene	ug/kg	300	380	U			370	U			390	U									400	U	420	U	370	U
Hexachlorobutadiene	ug/kg	6200	380	U			370	U			390	U									400	U	420	U	370	U
Hexachlorocyclopentadiene	ug/kg	37000	380	U			370	U			390	U									400	U	420	U	370	U

Table A.10

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (PIT 3) PIT CHARACTERIZATION SOIL SAMPLES

SAMPLE ID:			SW-BP3-EFL-(-10)		SW-BP3-EFL-(-10)-C		SW-BP3-WFL-(-1)		SW-BP3-WFL-(-1)-C		SW-BP3-NEW01-5		SW-BP3-NEW01-5-1		SW-BP3-NEW01-5-2		SW-BP3-NEW01-5-3		SW-BP3-NEW01-5-4		SW-BP3-NWW01-2		SW-BP3-SEW01-5		SW-BP3-SWW01-2	
DATE SAMPLED:			03/06/08		07/09/09		03/06/08		07/09/09		03/13/08		07/30/09		07/30/09		07/30/09		07/30/09		03/13/08		03/13/08		03/13/08	
LAB SAMPLE ID:			803062-001		907055-011		803062-002		907055-012		803116-004		907176-001		907176-002		907176-003		907176-002		803116-002		803116-001		803116-003	
	Units	Comparison Level																								
Hexachloroethane	ug/kg	35000	380	U			370	U			390	U									400	U	420	U	370	U
Indeno(1,2,3-cd)pyrene	ug/kg	150	380	U			370	U			390	U									400	U	420	U	370	U
Isophorone	ug/kg	510000	380	U			370	U			390	U									400	U	420	U	370	U
Naphthalene	ug/kg	3600	380	U			370	U			390	U									400	U	420	U	370	U
N-Nitrosodiphenylamine	ug/kg	99000	380	U			370	U			390	U									400	U	420	U	370	U
N-Nitrosodipropylamine	ug/kg	69	380	U			370	U			390	U									400	U	420	U	370	U
Pentachlorophenol	ug/kg	3000	950	U			910	U			980	U									990	U	1000	U	930	U
Phenanthrene	ug/kg	407.4	380	U			370	U			390	U									400	U	420	U	370	U
Phenol	ug/kg	1800000	380	U			370	U			390	U									400	U	420	U	370	U
Phenyl isocyanate	ug/kg	510	380	U			**64**	J			390	UJ									**100**	J	420	UJ	370	UJ
Phenyl isothiocyanate	ug/kg	510	380	U			370	U			390	U									400	U	420	U	370	U
Pyrene	ug/kg	170000	380	U			370	U			390	U									400	U	420	U	370	U
Tolidine	ug/kg	44	380	U			370	U			390	U									400	U	420	U	370	U
Explosives - SW8330A																										
1,3,5-Trinitrobenzene	mg/kg	220	0.04	U			0.04	U			0.04	U									0.04	U	0.04	U	0.04	U
1,3-Dinitrobenzene	mg/kg	0.61	0.04	U			0.04	U			0.04	U									0.04	U	0.04	U	0.04	U
2,4,6-Trinitrotoluene	mg/kg	19	0.04	U			0.04	U			0.04	U									0.04	U	0.04	U	0.04	U
2,4-Dinitrotoluene	mg/kg	1.6	0.04	U			0.04	U			0.04	U									0.04	U	0.04	U	0.04	U
2,6-Dinitrotoluene	mg/kg	6.1	0.04	U			0.04	U			0.04	U									0.04	U	0.04	U	0.04	U
2-amino-4,6-Dinitrotoluene	mg/kg	15	0.04	U			0.04	U			0.04	U									0.04	U	0.04	U	0.04	U
2-Nitrotoluene	mg/kg	2.9	0.08	U			0.08	U			0.08	U									0.08	U	0.08	U	0.08	U
3-Nitrotoluene	mg/kg	0.61	0.08	U			0.08	U			0.08	U									0.08	U	0.08	U	0.08	U
4-amino-2,6-Dinitrotoluene	mg/kg	15	0.04	U			0.04	U			0.04	U									0.04	U	0.04	U	0.04	U
4-Nitrotoluene	mg/kg	30	0.08	U			0.08	U			0.08	U									0.08	U	0.08	U	0.08	U
HMX	mg/kg	380	0.08	U			0.08	U			0.08	U									0.08	U	0.08	U	0.08	U
Nitrobenzene	mg/kg	4.8	0.04	U			0.04	U			0.04	U									0.04	U	0.04	U	0.04	U
Nitroglycerine	mg/kg	0.61	4	U			4	U			4	U									4	U	4	U	4	U
RDX	mg/kg	5.5	0.08	U			0.08	U			0.08	U									0.08	U	0.08	U	0.08	U
Tetryl	mg/kg	24	0.08	U			0.08	U			0.08	U									0.08	U	0.08	U	0.08	U
Metals - ILM05.4																										
Aluminum	mg/kg	19100	**23400**		**25400**		**16300**				**35300**		**29900**		**32200**		**30700**		**28000**		**18400**		**15800**		**22500**	
Antimony	mg/kg	5.2	**0.55**	L			4.8	UL			**0.42**	L									5	UL	**0.3**	L	4.7	UL
Arsenic	mg/kg	20	**184**		**9.6**		**3.4**				**3.6**										**3.7**		**4.5**		**25.7**	
Barium	mg/kg	1500	**215**				**77.1**				**177**										**60.4**		**45.3**		**113**	
Beryllium	mg/kg	16	**0.59**				**2**				**1.8**										**0.89**		**0.64**		**1.6**	
Cadmium	mg/kg	7	**0.34**	J			**0.38**	J			**0.24**	J									**0.061**	J	**0.025**	J	**0.14**	J
Chromium	mg/kg	12000	**54**				**52**				**86.2**										**43.5**		**40.4**		**57.2**	
Cobalt	mg/kg	17.8	**14.7**				**64.6**		**16.4**	J	**40**		**12.9**		**22**		**17.5**		**31.1**		**13.1**		**10.6**		**29.9**	

Table A.10

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (PIT 3) PIT CHARACTERIZATION SOIL SAMPLES

SAMPLE ID:			SW-BP3-EFL-(-10)	SW-BP3-EFL-(-10)-C	SW-BP3-WFL-(-1)	SW-BP3-WFL-(-1)-C	SW-BP3-NEW01-5	SW-BP3-NEW01-5-1	SW-BP3-NEW01-5-2	SW-BP3-NEW01-5-3	SW-BP3-NEW01-5-4	SW-BP3-NWW01-2	SW-BP3-SEW01-5	SW-BP3-SWW01-2
DATE SAMPLED:			03/06/08	07/09/09	03/06/08	07/09/09	03/13/08	07/30/09	07/30/09	07/30/09	07/30/09	03/13/08	03/13/08	03/13/08
LAB SAMPLE ID:			803062-001	907055-011	803062-002	907055-012	803116-004	907176-001	907176-002	907176-003	907176-002	803116-002	803116-001	803116-003
	Units	Comparison Level												
Copper	mg/kg	310	**46.2**		**56.4**		**49**					**29.5**	**33.8**	**47.3**
Iron	mg/kg	32400	**28100**		**30900**		**40500**					**32200**	**36700**	**30100**
Lead	mg/kg	400	**4.1** K		**17.6** K		**15.2**					**37**	**19.3**	**8.1**
Magnesium	mg/kg	NA	**13600**		**6630**		**13200**					**2750**	**1920**	**9240**
Manganese	mg/kg	968	**256**		**1110**	**504**	**976**	**254**	**668**	**454**	**527**	**274**	**225**	**441**
Mercury, Elemental	mg/kg	0.56	**0.1**		0.095 U		0.095 U					0.11 U	0.11 U	**0.13**
Nickel	mg/kg	150	**28.8**		**42.6**		**44.2**					**18.9**	**14.7**	**31.9**
Selenium	mg/kg	39	2.7 U		2.8 U		**3**					**2.9**	**3.3**	**2.8**
Silver	mg/kg	39	**0.031** B		4 U		**0.86**					**0.83**	**0.42** J	**0.61** J
Strontium	mg/kg	4700	**70.5** K		**24.6** K		**28.8** J					**20.6** J	**27.3** J	**36.6** J
Tellurium	mg/kg	39.11	**3.2** K		**2.5** K		**3.3** J					**2.9** J	**4.4** J	**3** J
Thallium	mg/kg	2.2	1.9 U		2 U		2.1 U					2.1 U	2.3 U	2 U
Tin	mg/kg	4700	**5.5** B		**1.8** B		**2.4** B					**2.4** B	**2.8** B	**3.3** B
Titanium	mg/kg	31000	**1590**		**604**		**1240**					**402**	**307**	**826**
Vanadium	mg/kg	75.5	**83.7**	**75.1**	**49.7**		**102**	**79.5**	**85.2**	**82.4**	**87**	**54.9**	**49.8**	**60.8**
Zinc	mg/kg	2300	**57.1**		**46**		**64.3**					**45**	**38.8**	**52.7**
Zirconium	mg/kg	48.3	**4.7** B		**23.6** B		**13.1** B					**25.8** B	**27.3** B	**14.9** B
Other Parameters														
Cyanide	mg/kg	160	0.22 U		0.23 U		0.15 U					0.16 U	0.17 U	0.15 U
Fluoride	mg/kg	310	**5.3** L		**4.9** L		**16**					**17**	**16**	**5.8**
Iodine (as Iodide)	mg/kg	78	0.06 U		0.05 U		0.06 U					0.06 U	0.06 U	0.06 U
Iodine Pentafluoride	mg/kg	NA	5.6 U		5.3 U		**110**					**160**	**180**	**59**
Perchlorate	ug/kg	5500	**1.13** K		**1.13** K		2.46 U					2.25 U	**1.19** J	**2.39**

Note: The soil samples were submitted for agents and ABPs analysis. Agents and ABPs were not detected.

Soil represented by these data was removed.

QA NOTES AND DATA QUALIFIERS:

Comparison value based on the higher of the 2010 Regional Screening Levels (RSLs), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL). The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.

(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.

U - Analyte was analyzed for but not detected at or above the adjusted practical quantitation limit (PQL).

UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.

J - Analyte detected, estimated concentration.

UL - Analyte not detected, reported PQL is biased low, actual PQL may be higher.

L - Analyte detected, reported value is biased low, actual value may be higher.

K - Analyte detected, reported value is biased high, actual value may be lower.

R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.

B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.

ug/kg - Microgram per kilogram. mg/kg - Milligram per kilogram.

Detections are bolded.

Table A.10
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (PIT 3) PIT CHARACTERIZATION SOIL SAMPLES

SAMPLE ID:			SW-BP3-SWW02-2	SW-BP3-EAST-FL-11.5	SW-BP3-EAST-FL-11.5-C	SW-BP3-EAST-SW(01)-8	SW-BP3-EAST-SW(02)-8	SW-BP3-EAST-SW(02)-11	SW-BP3-East2-FL(01)-5.0	SW-BP3-East2-FL(01)-5.0-C	SW-BP3-East2-NEW(01)-2.5	SW-BP3-East2-NEW(02)-2.5	SW-BP3-East2-SWW(01)-2.5	SW-BP3-East2-SWW(02)-2.5
DATE SAMPLED:			07/09/09	07/24/08	07/08/09	07/24/08	07/09/09	07/09/09	03/12/09	07/08/09	03/12/09	07/09/09	03/12/09	07/08/09
LAB SAMPLE ID:			907055-013	808065-002	907055-005	808065-001	907055-006	907055-007	903126-003	907055-001	903126-002	907055-014	903126-001	907055-002
	Units	Comparison Level												
Volatile Organics - OLM04.3_V														
1,1,1-Trichloroethane	ug/kg	870000		13 UL		11 UL			12 U		11 U		12 U	
1,1,2,2-Tetrachloroethane	ug/kg	560		13 UL		11 UL			12 U		11 U		12 U	
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/kg	4300000		13 UL		11 UL			12 U		11 U		12 U	
1,1,2-Trichloroethane	ug/kg	1100		13 UL		11 UL			12 U		11 U		12 U	
1,1-Dichloroethane	ug/kg	3300		13 UL		11 UL			12 U		11 U		12 U	
1,1-Dichloroethene	ug/kg	24000		13 UL		11 UL			12 U		11 U		12 U	
1,2,4-Trichlorobenzene	ug/kg	22000		13 UL		11 UL			12 U		11 U		12 U	
1,2-Dibromo-3-chloropropane	ug/kg	5.4		13 UL		11 UL			12 R		11 R		12 R	
1,2-Dibromoethane	ug/kg	34		13 UL		11 UL			12 U		11 U		12 U	
1,2-Dichlorobenzene	ug/kg	190000		13 UL		11 UL			12 U		11 U		12 U	
1,2-Dichloroethane	ug/kg	430		13 UL		11 UL			12 U		11 U		12 U	
1,2-Dichloropropane	ug/kg	890		13 UL		11 UL			12 U		11 U		12 U	
1,3-Dichlorobenzene	ug/kg	18		13 UL		11 UL			12 U		11 U		12 U	
1,4-Dichlorobenzene	ug/kg	2400		13 UL		11 UL			12 U		11 U		12 U	
Acetone	ug/kg	6100000		**6.8** L		11 UL			12 UJ		11 UJ		12 UJ	
Acetonitrile	ug/kg	87000		130 UL		110 UL			120 U		110 U		120 U	
Acrolein	ug/kg	15		63 UL		56 UL			58 U		56 U		58 U	
Benzene	ug/kg	1100		13 UL		11 UL			12 U		11 U		12 U	
Benzyl Bromide	ug/kg	16000		13 UL		11 UL			12 R		11 R		12 R	
Benzyl chloride	ug/kg	1000		13 UL		11 UL			12 U		11 U		12 U	
Bromobenzene	ug/kg	30000		13 UL		11 UL			12 U		11 U		12 U	
Bromodichloromethane	ug/kg	270		13 UL		11 UL			12 U		11 U		12 U	
Bromoform	ug/kg	61000		13 UL		11 UL			12 U		11 U		12 U	
Carbon disulfide	ug/kg	82000		13 UL		11 UL			12 U		11 U		12 U	
Carbon tetrachloride	ug/kg	610		13 UL		11 UL			12 U		11 U		12 U	
Chlorobenzene	ug/kg	29000		13 UL		11 UL			12 U		11 U		12 U	
Chlorodibromomethane	ug/kg	680		13 UL		11 UL			12 U		11 U		12 U	
Chloroethane	ug/kg	1500000		13 UL		11 UL			12 U		11 U		12 U	
Chloroform	ug/kg	290		13 UL		11 UL			12 U		11 U		12 U	
Chloropicrin	ug/kg	57000000		63 UL		56 UL			58 UJ		56 UJ		58 UJ	
Cis-1,2-Dichloroethene	ug/kg	78000		13 UL		11 UL			12 U		11 U		12 U	
cis-1,3-Dichloropropene	ug/kg	18		13 UL		11 UL			12 U		11 U		12 U	
Cyclohexane	ug/kg	700000		13 UL		11 UL			12 U		11 U		12 U	
Dichlorodifluoromethane	ug/kg	18000		13 UL		11 UL			12 U		11 U		12 U	
Diphenyl Ether	ug/kg	NA		NA		NA			NA		NA		NA	
Ethyl benzene	ug/kg	5400		13 UL		11 UL			12 U		11 U		12 U	
Isopropylbenzene	ug/kg	210000		13 UL		11 UL			12 U		11 U		12 U	
Methyl Acetate	ug/kg	7800000		13 UL		11 UL			12 U		11 U		12 U	
Methyl bromide	ug/kg	730		13 UL		11 UL			12 U		11 U		12 U	

Table A.10

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (PIT 3) PIT CHARACTERIZATION SOIL SAMPLES

SAMPLE ID:			SW-BP3-SWW02-2	SW-BP3-EAST-FL-11.5	SW-BP3-EAST-FL-11.5-C	SW-BP3-EAST-SW(01)-8	SW-BP3-EAST-SW(02)-8	SW-BP3-EAST-SW(02)-11	SW-BP3-East2-FL(01)-5.0	SW-BP3-East2-FL(01)-5.0-C	SW-BP3-East2-NEW(01)-2.5	SW-BP3-East2-NEW(02)-2.5	SW-BP3-East2-SWW(01)-2.5	SW-BP3-East2-SWW(02)-2.5
DATE SAMPLED:			07/09/09	07/24/08	07/08/09	07/24/08	07/09/09	07/09/09	03/12/09	07/08/09	03/12/09	07/09/09	03/12/09	07/08/09
LAB SAMPLE ID:			907055-013	808065-002	907055-005	808065-001	907055-006	907055-007	903126-003	907055-001	903126-002	907055-014	903126-001	907055-002
	Units	Comparison Level												
Methyl butyl ketone	ug/kg	21000		13 UL		11 UL			12 U		11 U		12 U	
Methyl chloride	ug/kg	12000		13 UL		11 UL			12 U		11 U		12 U	
Methyl ethyl ketone	ug/kg	2800000		13 UL		11 UL			12 U		11 U		12 U	
Methyl isobutyl ketone	ug/kg	530000		13 UL		11 UL			12 U		11 U		12 U	
Methyl Tertbutyl Ether	ug/kg	43000		13 UL		11 UL			12 U		11 U		12 U	
MethylCyclohexane	ug/kg	18		13 UL		11 UL			12 U		11 U		12 U	
Methylene chloride	ug/kg	11000		13 UL		11 UL			12 U		11 U		12 U	
Styrene	ug/kg	630000		13 UL		11 UL			12 U		11 U		12 U	
Tetrachloroethene	ug/kg	550		13 UL		11 UL			12 U		11 U		12 U	
Toluene	ug/kg	500000		13 UL		11 UL			12 U		11 U		12 U	
Trans-1,2-Dichloroethene	ug/kg	15000		13 UL		11 UL			12 U		11 U		12 U	
trans-1,3-dichloropropene	ug/kg	18		13 UL		11 UL			12 U		11 U		12 U	
Trichloroethene	ug/kg	2800		13 UL		11 UL			12 U		11 U		12 U	
Trichlorofluoromethane	ug/kg	79000		13 UL		11 UL			12 U		11 U		12 U	
Vinyl chloride	ug/kg	60		13 UL		11 UL			12 UJ		11 UJ		12 UJ	
Xylenes (Total)	ug/kg	63000		13 UL		11 UL			12 U		11 U		12 U	
Semivolatile Organics - OLM04.3_SV														
1,1'-Biphenyl	ug/kg	390000		420 UJ		380 UJ			390 U		370 U		380 U	
1-chloro-2,4-dinitrobenzene	ug/kg	510		420 UJ		380 UJ			390 U		370 U		380 U	
2,4,5-Trichlorophenol	ug/kg	610000		1100 UJ		940 UJ			960 U		940 U		960 U	
2,4,6-Trichlorophenol	ug/kg	44000		420 UJ		380 UJ			390 U		370 U		380 U	
2,4-Dichlorophenol	ug/kg	18000		420 UJ		380 UJ			390 U		370 U		380 U	
2,4-Dimethylphenol	ug/kg	120000		420 UJ		380 UJ			390 U		370 U		380 U	
2,4-Dinitrophenol	ug/kg	12000		1100 UJ		940 UJ			960 U		940 U		960 U	
2-Bromo-4'-chloroacetophenone	ug/kg	510		420 UJ		380 UJ			390 U		370 U		380 U	
2-Chloronaphthalene	ug/kg	630000		420 UJ		380 UJ			390 U		370 U		380 U	
Ethylene Chlorohydrin	ug/kg	NA		420 UJ		380 UJ			NA		NA		NA	
2-Chlorophenol	ug/kg	39000		420 UJ		380 UJ			390 U		370 U		380 U	
2-Methylnaphthalene	ug/kg	31000		420 UJ		380 UJ			390 U		370 U		380 U	
2-Methylphenol	ug/kg	310000		420 UJ		380 UJ			390 U		370 U		380 U	
2-Nitroaniline	ug/kg	61000		1100 UJ		940 UJ			960 U		940 U		960 U	
2-Nitrophenol	ug/kg	510		420 UJ		380 UJ			390 U		370 U		380 U	
3,3'-Dichlorobenzidine	ug/kg	1100		420 UJ		380 UJ			390 U		370 U		380 UJ	
3-Nitroaniline	ug/kg	1300		1100 UJ		940 UJ			960 U		940 U		960 U	
4,6-Dinitro-2-methylphenol	ug/kg	490		1100 UJ		940 UJ			960 U		940 U		960 U	
4-Bromophenyl-phenylether	ug/kg	510		420 UJ		380 UJ			390 U		370 U		380 U	
4-Chloro-3-methylphenol	ug/kg	610000		420 UJ		380 UJ			390 U		370 U		380 U	
4-Chloroacetophenone	ug/kg	510		420 UJ		380 UJ			390 U		370 U		380 U	
4-Chloroaniline	ug/kg	2400		420 UJ		380 UJ			390 U		370 U		380 U	

Table A.10

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (PIT 3) PIT CHARACTERIZATION SOIL SAMPLES

SAMPLE ID:			SW-BP3-SWW02-2	SW-BP3-EAST-FL-11.5	SW-BP3-EAST-FL-11.5-C	SW-BP3-EAST-SW(01)-8	SW-BP3-EAST-SW(02)-8	SW-BP3-EAST-SW(02)-11	SW-BP3-East2-FL(01)-5.0	SW-BP3-East2-FL(01)-5.0-C	SW-BP3-East2-NEW(01)-2.5	SW-BP3-East2-NEW(02)-2.5	SW-BP3-East2-SWW(01)-2.5	SW-BP3-East2-SWW(02)-2.5
DATE SAMPLED:			07/09/09	07/24/08	07/08/09	07/24/08	07/09/09	07/09/09	03/12/09	07/08/09	03/12/09	07/09/09	03/12/09	07/08/09
LAB SAMPLE ID:			907055-013	808065-002	907055-005	808065-001	907055-006	907055-007	903126-003	907055-001	903126-002	907055-014	903126-001	907055-002
	Units	Comparison Level												
4-Chlorophenyl-PhenylEther	ug/kg	510		420 UJ		380 UJ			390 U		370 U		380 U	
4-Methylphenol	ug/kg	31000		420 UJ		380 UJ			390 U		370 U		380 U	
4-Nitroaniline	ug/kg	24000		1100 UJ		940 UJ			960 U		940 U		960 U	
4-Nitrophenol	ug/kg	1300		1100 UJ		940 UJ			960 U		940 U		960 U	
Acenaphthene	ug/kg	340000		420 UJ		380 UJ			390 U		370 U		380 U	
Acenaphthylene	ug/kg	510		420 UJ		380 UJ			390 U		370 U		380 U	
Acetophenone	ug/kg	780000		420 UJ		380 UJ			390 U		370 U		380 U	
Anthracene	ug/kg	1700000		420 UJ		380 UJ			390 U		370 U		380 U	
Atrazine	ug/kg	2100		420 UJ		380 UJ			390 U		370 U		380 U	
Benzal Chloride	ug/kg	510		420 UJ		380 UJ			390 U		370 U		380 U	
Benzaldehyde	ug/kg	780000		420 UJ		380 UJ			390 U		370 U		380 U	
Benzo(a)anthracene	ug/kg	150		420 UJ		380 UJ			390 U		370 U		380 UJ	
Benzo(a)pyrene	ug/kg	15		420 UJ		380 UJ			390 U		370 U		380 U	
Benzo(b)fluoranthene	ug/kg	150		420 UJ		380 UJ			390 U		370 U		380 U	
Benzo(g,h,i)perylene	ug/kg	331.5		420 UJ		380 UJ			390 U		370 U		380 U	
Benzo(k)fluoranthene	ug/kg	1500		420 UJ		380 UJ			390 U		370 U		380 U	
Bis(2-Chloroethoxy)methane	ug/kg	18000		420 UJ		380 UJ			390 U		370 U		380 U	
Bis(2-Chloroethyl)ether	ug/kg	210		420 UJ		380 UJ			390 U		370 U		380 U	
Bis(2-Chloroisopropyl)ether	ug/kg	4600		420 UJ		380 UJ			390 U		370 U		380 U	
Bis(2-Ethylhexyl)phthalate	ug/kg	35000		**71** J		**73** J			**62** J		**60** J		**45** J	
Bromacetophenone	ug/kg	510		420 UJ		380 UJ			390 U		370 U		380 U	
Bromchloracetophenone	ug/kg	510		420 UJ		380 UJ			390 U		370 U		380 U	
Bromoacetophenone	ug/kg	510		420 UJ		380 UJ			390 U		370 U		380 U	
Butylbenzylphthalate	ug/kg	260000		420 UJ		380 UJ			390 U		370 U		380 UJ	
Caprolactam	ug/kg	3100000		420 UJ		380 UJ			390 U		370 U		380 U	
Carbazole	ug/kg	510		420 UJ		380 UJ			390 U		370 U		380 U	
Chrysene	ug/kg	15000		420 UJ		380 UJ			390 U		370 U		380 UJ	
Dibenz(a,h)anthracene	ug/kg	15		420 UJ		380 UJ			390 U		370 U		380 U	
Dibenzofuran	ug/kg	7800		420 UJ		380 UJ			390 U		370 U		380 U	
Diethyl phthalate	ug/kg	4900000		**1100** J		380 UJ			390 U		370 U		380 U	
Dimethylaniline	ug/kg	16000		420 UJ		380 UJ			390 U		370 U		380 U	
Dimethylphthalate	ug/kg	510		420 UJ		380 UJ			390 U		370 U		380 U	
Di-n-butylphthalate	ug/kg	610000		420 UJ		380 UJ			390 U		370 U		380 U	
di-n-Octyl Phthalate	ug/kg	510		420 UJ		380 UJ			390 U		370 U		380 U	
Fluoranthene	ug/kg	230000		420 UJ		380 UJ			390 U		370 U		380 U	
Fluorene	ug/kg	230000		420 UJ		380 UJ			390 U		370 U		380 U	
Glycol-bromohydrin	ug/kg	510		420 UJ		380 UJ			390 U		370 U		380 U	
Hexachlorobenzene	ug/kg	300		420 UJ		380 UJ			390 U		370 U		380 U	
Hexachlorobutadiene	ug/kg	6200		420 UJ		380 UJ			390 U		370 U		380 U	
Hexachlorocyclopentadiene	ug/kg	37000		420 UJ		380 UJ			390 U		370 U		380 U	

Table A.10
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (PIT 3) PIT CHARACTERIZATION SOIL SAMPLES

SAMPLE ID:			SW-BP3-SWW02-2	SW-BP3-EAST-FL-11.5	SW-BP3-EAST-FL-11.5-C	SW-BP3-EAST-SW(01)-8	SW-BP3-EAST-SW(02)-8	SW-BP3-EAST-SW(02)-11	SW-BP3-East2-FL(01)-5.0	SW-BP3-East2-FL(01)-5.0-C	SW-BP3-East2-NEW(01)-2.5	SW-BP3-East2-NEW(02)-2.5	SW-BP3-East2-SWW(01)-2.5	SW-BP3-East2-SWW(02)-2.5
DATE SAMPLED:			07/09/09	07/24/08	07/08/09	07/24/08	07/09/09	07/09/09	03/12/09	07/08/09	03/12/09	07/09/09	03/12/09	07/08/09
LAB SAMPLE ID:			907055-013	808065-002	907055-005	808065-001	907055-006	907055-007	903126-003	907055-001	903126-002	907055-014	903126-001	907055-002
	Units	Comparison Level												
Hexachloroethane	ug/kg	35000		420 UJ		380 UJ			390 U		370 U		380 U	
Indeno(1,2,3-cd)pyrene	ug/kg	150		420 UJ		380 UJ			390 U		370 U		380 U	
Isophorone	ug/kg	510000		420 UJ		380 UJ			390 U		370 U		380 U	
Naphthalene	ug/kg	3600		420 UJ		380 UJ			390 U		370 U		380 U	
N-Nitrosodiphenylamine	ug/kg	99000		420 UJ		380 UJ			390 U		370 U		380 U	
N-Nitrosodipropylamine	ug/kg	69		420 UJ		380 UJ			390 U		370 U		380 U	
Pentachlorophenol	ug/kg	3000		1100 UJ		940 UJ			960 U		940 U		960 U	
Phenanthrene	ug/kg	407.4		420 UJ		380 UJ			390 U		370 U		380 U	
Phenol	ug/kg	1800000		420 UJ		380 UJ			390 U		370 U		380 U	
Phenyl isocyanate	ug/kg	510		420 UJ		380 UJ			390 R		370 R		380 U	
Phenyl isothiocyanate	ug/kg	510		420 UJ		380 UJ			390 U		370 U		380 R	
Pyrene	ug/kg	170000		420 UJ		380 UJ			390 U		370 U		380 UJ	
Tolidine	ug/kg	44		420 UJ		380 UJ			390 U		370 U		380 U	
Explosives - SW8330A														
1,3,5-Trinitrobenzene	mg/kg	220		0.04 UJ		0.04 UJ			0.099 U		0.1 U		0.1 U	
1,3-Dinitrobenzene	mg/kg	0.61		0.04 UJ		0.04 UJ			0.099 U		0.1 U		0.1 U	
2,4,6-Trinitrotoluene	mg/kg	19		0.04 UJ		0.04 UJ			0.099 U		0.1 U		0.1 U	
2,4-Dinitrotoluene	mg/kg	1.6		0.04 UJ		0.04 UJ			0.099 U		0.1 U		0.1 U	
2,6-Dinitrotoluene	mg/kg	6.1		0.04 UJ		0.04 UJ			0.099 U		0.1 U		0.1 U	
2-amino-4,6-Dinitrotoluene	mg/kg	15		0.04 UJ		0.04 UJ			0.099 U		0.1 U		0.1 U	
2-Nitrotoluene	mg/kg	2.9		0.08 UJ		0.08 UJ			0.2 U		0.2 U		0.2 U	
3-Nitrotoluene	mg/kg	0.61		0.08 UJ		0.08 UJ			0.2 U		0.2 U		0.2 U	
4-amino-2,6-Dinitrotoluene	mg/kg	15		0.04 UJ		0.04 UJ			0.099 U		0.1 U		0.1 U	
4-Nitrotoluene	mg/kg	30		0.08 UJ		0.08 UJ			0.2 U		0.2 U		0.2 U	
HMX	mg/kg	380		0.08 UJ		0.08 UJ			0.2 U		0.2 U		0.2 U	
Nitrobenzene	mg/kg	4.8		0.04 UJ		0.04 UJ			0.099 U		0.1 U		0.1 U	
Nitroglycerine	mg/kg	0.61		4 UJ		4 UJ			1 R		1 R		1 R	
RDX	mg/kg	5.5		0.08 UJ		0.08 UJ			0.2 U		0.2 U		0.2 U	
Tetryl	mg/kg	24		0.08 UJ		0.08 UJ			0.2 U		0.2 U		0.2 U	
Metals - ILM05.4														
Aluminum	mg/kg	19100	19100	26000	28700	29200	31000	40200	36700	44100	18200		40800	19400
Antimony	mg/kg	5.2		0.75 L		0.69 L			0.99 L		24.8 R		1.2 L	
Arsenic	mg/kg	20	4.1	127	7.8	55.7	1 U	1 J	2.8		7.6		1.5	
Barium	mg/kg	1500		219		240			241		71		277	
Beryllium	mg/kg	16		0.6 J		0.78 J			0.76 J		1.2 J		0.68 J	
Cadmium	mg/kg	7		0.12 J		0.086 J			0.12 J		0.31 J		0.17 J	
Chromium	mg/kg	12000		81.2		88.4			51.8		41.8		65	
Cobalt	mg/kg	17.8	23.9	21.4	18.6 J	19.1	16.6 J	23.7 J	17.8 J		16.2 J		19.4 J	17.4

Table A.10
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (PIT 3) PIT CHARACTERIZATION SOIL SAMPLES

SAMPLE ID:			SW-BP3-SWW02-2	SW-BP3-EAST-FL-11.5	SW-BP3-EAST-FL-11.5-C	SW-BP3-EAST-SW(01)-8	SW-BP3-EAST-SW(02)-8	SW-BP3-EAST-SW(02)-11	SW-BP3-East2-FL(01)-5.0	SW-BP3-East2-FL(01)-5.0-C	SW-BP3-East2-NEW(01)-2.5	SW-BP3-East2-NEW(02)-2.5	SW-BP3-East2-SWW(01)-2.5	SW-BP3-East2-SWW(02)-2.5
DATE SAMPLED:			07/09/09	07/24/08	07/08/09	07/24/08	07/09/09	07/09/09	03/12/09	07/08/09	03/12/09	07/09/09	03/12/09	07/08/09
LAB SAMPLE ID:			907055-013	808065-002	907055-005	808065-001	907055-006	907055-007	903126-003	907055-001	903126-002	907055-014	903126-001	907055-002
	Units	Comparison Level												
Copper	mg/kg	310		**43.9**		**52.7**			**40.9**		**7.9** J		**60.6**	
Iron	mg/kg	32400		**29200**		**30100**			**31100**		**27800**		**34500**	
Lead	mg/kg	400		**4.9**		**5.7**			**5.7**		**7.4**		**7.5**	
Magnesium	mg/kg	6950		**17100**		**18600**			**16100**		**10400**		**19500**	
Manganese	mg/kg	968		**332**		**443**			**497**		**452**		**400**	
Mercury, Elemental	mg/kg	0.56		**0.096** J		0.098 U			**0.14**		**0.24**		0.11 U	
Nickel	mg/kg	150		**44.6**		**41.9**			**30.8**		**37.6**		**34.3**	
Selenium	mg/kg	39		**0.87** J		**0.51** J			14.2 U		14.5 U		15.3 U	
Silver	mg/kg	39		0.94 U		0.84 U			**0.56** J		**0.42** J		**1** J	
Strontium	mg/kg	4700		**10.9**		**11.9**			**34.7** J		**30.6** J		**35.9** J	
Tellurium	mg/kg	39.11		**3.1** J		**3.3** J			**3.3** J		**1.7** J		**3.1** J	
Thallium	mg/kg	2.2		4.7 U		4.2 U			**3.7** J	2 U	**2.4** J	0.35 U	**3.7** J	**0.39** U
Tin	mg/kg	4700		**2.2** B		**1** B			**3.3** B		**3.4** B		**3.1** B	
Titanium	mg/kg	31000		**1750**		**1960**			**1740**		**1040**		**2140**	
Vanadium	mg/kg	75.5		**83.6**	**95.4**	**91.5**	**85.4**	**108**	**91.3**	**110**	**42.2**		**103**	**41.9**
Zinc	mg/kg	2300		**60.9** J		**48.1** J			**64.8**		**89.5**		**66.9**	
Zirconium	mg/kg	48.3		**0.93** J		**0.53** J			**2.2** B		**16.7** B		**1.7** B	
Other Parameters														
Cyanide	mg/kg	160		0.17 UL		0.15 UL			0.15 U		0.15 U		0.15 U	
Fluoride	mg/kg	310		**6.8**		**3.4**			**5.9**		**2**		**5**	
Iodine (as Iodide)	mg/kg	78		0.03 U		0.02 U			0.02 U		0.02 U		0.02 U	
Iodine Pentafluoride	mg/kg	NA		**64**		**31**			**51**		**19**		**40**	
Perchlorate	ug/kg	5500		2.34 UL		2.26 UL			2.3 U		2.3 U		2.3 U	

Note: The soil samples were submitted for agents and ABPs analysis. Agents and ABPs were not detected.

(green) Soil represented by these data was removed.

QA NOTES AND DATA QUALIFIERS:

Comparison value based on the higher of the 2010 Regional Screening Levels (RSLs), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL). The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.
(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.
U - Analyte was analyzed for but not detected at or above the adjusted practical quantitation limit (PQL).
UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.
J - Analyte detected, estimated concentration.
UL - Analyte not detected, reported PQL is biased low, actual PQL may be higher.
L - Analyte detected, reported value is biased low, actual value may be higher.
K - Analyte detected, reported value is biased high, actual value may be lower.
R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.
ug/kg - Microgram per kilogram. mg/kg - Milligram per kilogram.
Detections are bolded.

Table A.11

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD - 2009 SOIL PRE-CONFIRMATION SAMPLES

SAMPLE ID:	Units	Comparison Level	SW-4825GB-(-70,-30)-3.0	SW-4825GB-(-70,-30)-4.0	SW-4825GB-(-70,-10)-3.0	SW-4825GB-(-70,-10)-4.0	SW-4825GB-(-70,10)-3.0	SW-4825GB-(-70,10)-4.0	SW-4825GB-(-70,10)SW-E-0.5	SW-4825GB-(-90,30)SW-N(2)-0.5	SW-4825GB-(-90,50)SW-N(2)-0.5
SAMPLING DEPTH:			**3'**	**4'**	**3'**	**4'**	**3'**	**4'**	**0.5'**	**0.5'**	**0.5'**
DATE SAMPLED:			**05/29/09**	**05/29/09**	**06/01/09**	**06/01/09**	**06/01/09**	**06/01/09**	**06/04/09**	**06/04/09**	**06/04/09**
LAB SAMPLE ID:			**906012-001**	**906012-002**	**906012-004**	**906012-005**	**906012-007**	**906012-008**	**906026-003**	**906026-002**	**906026-001**
Metals - ILM05.4											
Aluminum	mg/kg	19100	**16600**	**18300**	**31100**	**29400**	**36700**	**36400**	**20400**	NA	**36600**
Antimony	mg/kg	5.2	12.2 UL	6.7 UL	12.7 UL	6.7 UL	32.5 UL	6.2 UL	9.7 UL	NA	11.1 UL
Arsenic	mg/kg	20	**4.4**	**4.1**	**0.87** J	**0.9** J	**1.7**	**1.8**	**3.3** L	**25.5** L	**1.8** L
Barium	mg/kg	1500	**70**	**74.3**	**179**	**230**	**199**	**213**	**82.6** K	NA	**193** K
Cadmium	mg/kg	7	**0.051** J	**0.4** J	**0.53**	**0.56**	**0.54**	**0.52**	0.48 U	NA	0.55 U
Copper	mg/kg	310	**77.8**	**88.8**	**4.9** J	**49**	**10.8** J	**6.7**	**58.4**	NA	**109**
Lead	mg/kg	400	**5.1**	**24.2**	**3.2**	**3.4**	**7.6**	**4.3**	**12** L	NA	**10.7** L
Manganese	mg/kg	968	**510** J	**896** J	**496** J	**442** J	**642** J	**575** J	**199**	NA	**674**
Mercury, Elemental	mg/kg	0.56	**0.11**	**0.1**	**0.3**	**0.32**	**0.43**	**0.3**	**0.26**	NA	**0.11** B
Nickel	mg/kg	150	**39** J	**39.3** J	**44.8** J	**34.8** J	**52.4** J	**55.9** J	**16.9** K	NA	**56.9** K
Thallium	mg/kg	2.2	**1.5** B	**2.8** B	**2.3** B	**2.4** B	**2.4** B	**3** B	**12.1**	NA	**4.2** J
Vanadium	mg/kg	75.5	**76.6**	**54.1**	**70**	**93.6**	**87.5**	**79.9**	**45.9** K	NA	**110** K
Zinc	mg/kg	2300	**92.7**	**91**	**52.2**	**55**	**64.3**	**71.1**	**33.4**	NA	**67.9**

Soil represented by these data was removed.

QA NOTES AND DATA QUALIFIERS:

Comparison value based on the higher of the May 2010 Regional Screening Levels (RSLs), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL). The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.
(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.
U - Analyte was analyzed for but not detected at or above the adjusted practical quantitation limit (PQL).
UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.
J - Analyte detected, estimated concentration.
UL - Analyte not detected, reported PQL is biased low, actual PQL may be higher.
L - Analyte detected, reported value is biased low, actual value may be higher.
K - Analyte detected, reported value is biased high, actual value may be lower.
R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.
mg/kg - Milligram per kilogram.
Detections are bolded.
Detections exceeding the comparison level are shown shaded and bolded.

Table A.11
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD - 2009 SOIL PRE-CONFIRMATION SAMPLES

SAMPLE ID:			SW-4825GB-(-70,30)SW-S(4)-0.5	SW-4825GB-(-90,30)SW-S(3)-0.5	SW-4825GB-(-90,30)-T2-5.0	SW-4825GB-(-90, 30)-T2-6.0		SW-4825GB-(-90,50)-T2-5.0		SW-4825GB-(-70, 30)SW-S(5)-0.5		SW-4825GB-(-70,10)-T2-SW-W-4.5		SW-4825GB-(-70,30)-T2-SW-S-4.5		SW-4825GB-(-90, 30)T2-SW-S-4.5		SW-4825GB-(-90, 30)T2-SW-S-5.5	
SAMPLING DEPTH:			**0.5'**	**0.5'**	**5'**	**6'**		**5'**		**0.5'**		**4.5'**		**4.5'**		**4.5'**		**5.5'**	
DATE SAMPLED:			**06/11/09**	**06/11/09**	**06/09/09**	**06/17/09**		**06/11/09**		**06/17/09**		**06/17/09**		**06/17/09**		**06/17/09**		**06/17/09**	
LAB SAMPLE ID:			**906065-004**	**906065-003**	**906065-001**	**906092-004**		**906065-002**		**906092-001**		**906092-006**		**906092-005**		**906092-002**		**906092-003**	
	Units	**Comparison Level**																	
Metals - ILM05.4																			
Aluminum	mg/kg	19100	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Antimony	mg/kg	5.2	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Arsenic	mg/kg	20	**121**	**135**	**81.8**	**2.9**	J	**3.2**		**4.9**	J	**19.6**	J	**3250**	J	**2.8**	J	**3.5**	J
Barium	mg/kg	1500	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Cadmium	mg/kg	7	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Copper	mg/kg	310	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Lead	mg/kg	400	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Manganese	mg/kg	968	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Mercury, Elemental	mg/kg	0.56	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Nickel	mg/kg	150	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Thallium	mg/kg	2.2	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Vanadium	mg/kg	75.5	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Zinc	mg/kg	2300	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	

Soil represented by these data was removed.

QA NOTES AND DATA QUALIFIERS:

Comparison value based on the higher of the May 2010 Regional Screening Levels (RSLs), formerly RBCs (if non-carcinogenic), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL). The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.
(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.
U - Analyte was analyzed for but not detected at or above the adjusted practical quantitation limit (PQL).
UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.
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B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.
mg/kg - Milligram per kilogram.
Detections are bolded.
Detections exceeding the comparison level are shown shaded and bolded.

Table A.11

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD - 2009 SOIL PRE-CONFIRMATION SAMPLES

SAMPLE ID:	Units	Comparison Level	SW-4825GB-(-70,10)-T2-SW-W-5.5		SW-4825GB-(-70,50)-T2-SW-N-4.5		SW-4825GB-(-90,30)-T2-SW-N-4.5		SW-4825GB-(-90,30)-T2-SW-N-5.5		SW-4825GB-(-90,50)-T2-SW-E-4.5		SW-4825GB-(-90,50)-T2-SW-S-4.5		SW-4825GB-(-70,50)SW-T2-S1-0.5		SW-4825GB-(-70,50)SW-T2-S1-4.5		SW-4825GB-(-90,10)SW-E-2.5		SW-4825GB-(-90,-10)SW-N1-0.5	
SAMPLING DEPTH:			5.5'		4.5'		4.5'		5.5'		4.5'		4.5'		0.5'		4.5'		2.5'		0.5'	
DATE SAMPLED:			06/23/09		06/23/09		06/23/09		06/23/09		06/23/09		06/23/09		06/29/09		06/29/09		06/29/09		06/29/09	
LAB SAMPLE ID:			906139-001		906139-005		906139-003		906139-004		906139-002		906139-006		906144-001		906144-002		906144-004		906144-008	
Metals - ILM05.4																						
Aluminum	mg/kg	19100	NA		**22600**	J	NA		NA		**25300**	J	NA		**24800**		**26200**		**34200**		**22000**	
Antimony	mg/kg	5.2	NA		6.4	UL	NA		NA		6.3	UL	NA		6.6	UL	6	UL	5.9	UL	6.3	UL
Arsenic	mg/kg	20	**53.5**	J	**3.3**	J	**1.6**	J	**502**	J	**12.4**	J	**85.3**	J	**1.4**		**2.1**		**2.3**		**9.2**	
Barium	mg/kg	1500	NA		**91**		NA		NA		**103**		NA		**71.8**	J	**80.4**	J	**200**	J	**88.9**	J
Cadmium	mg/kg	7	NA		**0.53**	J	NA		NA		**0.53**	J	NA		0.55	U	0.5	U	0.49	U	0.52	U
Copper	mg/kg	310	NA		**29.8**	K	NA		NA		**99.4**	K	NA		**107**	J	**28**	J	**31.7**	J	**51.6**	J
Lead	mg/kg	400	NA		**8.6**	J	NA		NA		**8.4**	J	NA		**6.6**		**5.7**		**6.9**		**7.3**	
Manganese	mg/kg	968	NA		**736**		NA		NA		**536**		NA		**478**	J	**558**	J	**782**	J	**411**	J
Mercury, Elemental	mg/kg	0.56	NA		0.088	U	NA		NA		**0.043**	B	NA		**0.069**	B	**0.23**		**0.039**	B	**0.085**	B
Nickel	mg/kg	150	NA		**49**	J	NA		NA		**62.5**	J	NA		**44.8**	J	**56.6**	J	**75.8**	J	**36.8**	J
Thallium	mg/kg	2.2	NA		**2.9**		NA		NA		**3.1**		NA		**6.9**		**5.1**		**4.4**		**2.3**	J
Vanadium	mg/kg	75.5	NA		**119**		NA		NA		**111**		NA		**231**		**171**		**116**		**67**	
Zinc	mg/kg	2300	NA		**76.9**	J	NA		NA		**63.1**	J	NA		**33**		**126**		**150**		**64.6**	
	Soil represented by these data was removed.																					

QA NOTES AND DATA QUALIFIERS:

Comparison value based on the higher of the November 2010 Regional Screening Levels (RSLs), formerly RBCs (if non-carcinogenic), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL). The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.
(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.
U - Analyte was analyzed for but not detected at or above the adjusted practical quantitation limit (PQL).
UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.
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K - Analyte detected, reported value is biased high, actual value may be lower.
R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.
mg/kg - Milligram per kilogram.
Detections are bolded.
Detections exceeding the comparison level are shown shaded and bolded.

Table A.11

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD - 2009 SOIL PRE-CONFIRMATION SAMPLES

SAMPLE ID:			SW-4825GB-(-90,-10)SW-N1-2.5		SW-4825GB-(-90,10)SW-N1-0.5		SW-4825GB-(-90,10)SW-N1-2.5		SW-4825GB-(-90,10)T2-W1-5.5		SW-4825GB-(-90,30)T2-SW-N-5.5		SW-4825GB-(-70,30)-T2-SW-S-5.0		SW-4825GB-(-70,30)-T2-SW-S-6.0		SW-4825GB-(-90,-10)-SW-N-0.5		SW-4825GB-(-90,-10)-SW-N-2.5		SW-4825GB-(-90,10)-SW-N-0.5	
SAMPLING DEPTH:			2.5'		0.5'		2.5'		5.5'		5.5'		5'		6'		0.5'		2.5'		0.5'	
DATE SAMPLED:			06/29/09		06/29/09		06/29/09		06/29/09		06/29/09		06/24/09		06/24/09		06/24/09		06/24/09		06/24/09	
LAB SAMPLE ID:			906144-009		906144-005		906144-006		906144-003		906144-007		906151-009		906151-010		906151-005		906151-006		906151-001	
	Units	Comparison Level																				
Metals - ILM05.4																						
Aluminum	mg/kg	19100	**31300**		**24400**		**20600**		NA		NA		**29200**		NA		NA		NA		**26300**	
Antimony	mg/kg	5.2	12.8	UL	5.7	UL	6.1	UL	NA		NA		6.7	R	NA		NA		NA		6.4	R
Arsenic	mg/kg	20	**0.86**	J	**10.5**		**9**		**38.2**		**46.6**		**1.7**	L	**2.9**	L	**15.5**	L	**27.3**	L	**63.2**	L
Barium	mg/kg	1500	**192**	J	**114**	J	**87.5**	J	NA		NA		**153**		NA		NA		NA		**140**	
Cadmium	mg/kg	7	0.54	U	0.47	U	0.51	U	NA		NA		0.55	U	NA		NA		NA		0.53	U
Copper	mg/kg	310	**50.3**	J	**62**	J	**61**	J	NA		NA		**78.4**	J	NA		NA		NA		**49.4**	J
Lead	mg/kg	400	**4.5**	J	**6.7**		**8**		NA		NA		**8.2**	L	NA		NA		NA		**10.1**	L
Manganese	mg/kg	968	**455**	J	**511**	J	**477**	J	NA		NA		**378**	J	NA		NA		NA		**569**	J
Mercury, Elemental	mg/kg	0.56	**0.028**	B	**0.11**	B	**0.068**	B	NA		NA		**0.07**	B	NA		NA		NA			
Nickel	mg/kg	150	**50.7**	J	**39.6**	J	**36.1**	J	NA		NA		**51.4**	J	NA		NA		NA		**42.6**	J
Thallium	mg/kg	2.2	**2.5**	J	**2.3**	J	**1.7**	J	NA		NA		**3.1**		NA		NA		NA		**2.6**	J
Vanadium	mg/kg	75.5	**72.3**		**75.7**		**59.5**		NA		NA		**225**		NA		NA		NA		**81.3**	
Zinc	mg/kg	2300	**52.2**		**79.3**		**56.5**		NA		NA		**52.8**	J	NA		NA		NA		**69.9**	J
	Soil represented by these data was removed.																					

QA NOTES AND DATA QUALIFIERS:

Comparison value based on the higher of the May 2010 Regional Screening Levels (RSLs), formerly RBCs (if non-carcinogenic), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL). The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.
(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.
U - Analyte was analyzed for but not detected at or above the adjusted practical quantitation limit (PQL).
UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.
J - Analyte detected, estimated concentration.
UL - Analyte not detected, reported PQL is biased low, actual PQL may be higher.
L - Analyte detected, reported value is biased low, actual value may be higher.
K - Analyte detected, reported value is biased high, actual value may be lower.
R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.
mg/kg - Milligram per kilogram.
Detections are bolded.
Detections exceeding the comparison level are shown shaded and bolded.

Table A.11
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD - 2009 SOIL PRE-CONFIRMATION SAMPLES

Table A.11 SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825			SW-4825GB-(-90,10)-SW-N-2.5		SW-4825GB-(-90,-30)-SW-N-0.5		SW-4825GB-(-90,-30)-SW-N-2.5		SW-4825GB-(-90,-30)-SW-W-0.5		SW-4825GB-(-90,-30)-SW-W-2.5		SW-4825GB-(-70,10)-T2-6.0	SW-4825GB-(-70,10)-T2-SW-S-5.5	SW-4825GB-(-70,10)T2-SW-W2-5.5	SW-4825GB-(-70,30)-T2-SW-S-5.5
SAMPLING DEPTH:			**2.5'**		**0.5'**		**2.5'**		**0.5'**		**2.5'**		**6'**	**5.5'**	**5.5'**	**5.5'**
DATE SAMPLED:			**06/24/09**		**06/24/09**		**06/24/09**		**06/24/09**		**06/24/09**		**07/07/09**	**07/07/09**	**07/07/09**	**07/07/09**
LAB SAMPLE ID:			**906151-002**		**906151-003**		**906151-004**		**906151-007**		**906151-008**		**907016-001**	**907016-005**	**907016-006**	**907016-004**
	Units	**Comparison Level**														
Metals - ILM05.4																
Aluminum	mg/kg	19100	NA		**15000**		**21200**		**21200**		**24800**		NA	NA	NA	NA
Antimony	mg/kg	5.2	NA		5.8	R	6.4	R	6.6	R	6.3	R	NA	NA	NA	NA
Arsenic	mg/kg	20	**14.2**	L	**9**	L	**14.8**	L	**13.3**	L	**19.5**	L	**596**	**1.4**	**1.5**	**4.2**
Barium	mg/kg	1500	NA		**82.7**		**100**		**103**		**129**		NA	NA	NA	NA
Cadmium	mg/kg	7	NA		**0.023**	J	0.53	U	0.55	U	0.53	U	NA	NA	NA	NA
Copper	mg/kg	310	NA		**61.9**	J	**46.4**	J	**36.2**	J	**60.5**	J	NA	NA	NA	NA
Lead	mg/kg	400	NA		**8.3**	L	**8.5**	L	**9.6**	L	**7.5**	L	NA	NA	NA	NA
Manganese	mg/kg	968	NA		**545**	J	**475**	J	**412**	J	**571**	J	NA	NA	NA	NA
Mercury, Elemental	mg/kg	0.56	NA		**0.052**	B	**0.15**	B	**0.23**		**0.06**	B	NA	NA	NA	NA
Nickel	mg/kg	150	NA		**28.6**	J	**41.2**	J	**33.2**	J	**51**	J	NA	NA	NA	NA
Thallium	mg/kg	2.2	NA		**2.1**	J	**1.8**	J	**1.3**	J	**2.4**	J	NA	NA	NA	NA
Vanadium	mg/kg	75.5	NA		**65.4**		**62.9**		**63.6**		**98.3**		NA	NA	NA	NA
Zinc	mg/kg	2300	NA		**51.1**	J	**64.8**	J	**66**	J	**67.9**	J	NA	NA	NA	NA
	Soil represented by these data was removed.															
QA NOTES AND DATA QUALIFIERS:																

Comparison value based on the higher of the May 2010 Regional Screening Levels (RSLs), formerly RBCs (if non-carcinogenic), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL). The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.
(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.
U - Analyte was analyzed for but not detected at or above the adjusted practical quantitation limit (PQL).
UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.
J - Analyte detected, estimated concentration.
UL - Analyte not detected, reported PQL is biased low, actual PQL may be higher.
L - Analyte detected, reported value is biased low, actual value may be higher.
K - Analyte detected, reported value is biased high, actual value may be lower.
R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.
mg/kg - Milligram per kilogram.
Detections are bolded.
Detections exceeding the comparison level are shown shaded and bolded.

Table A.11

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD - 2009 SOIL PRE-CONFIRMATION SAMPLES

SAMPLE ID:			**SW-4825GB-(-90,10)-T2-SW-N-5.5**	**SW-4825GB-(90,30)-T2-SW-N1-5.5**	**4825GB-TEST PIT 137-18 BGS**
SAMPLING DEPTH:			**5.5'**	**5.5'**	**18"**
DATE SAMPLED:			**07/07/09**	**07/07/09**	**08/03/09**
LAB SAMPLE ID:			**907016-003**	**907016-002**	**908016-001**
	Units	**Comparison Level**			
Metals - ILM05.4					
Aluminum	mg/kg	19100	NA	NA	NA
Antimony	mg/kg	5.2	NA	NA	NA
Arsenic	mg/kg	20	**597**	**6.1**	**10.2**
Barium	mg/kg	1500	NA	NA	NA
Cadmium	mg/kg	7	NA	NA	NA
Copper	mg/kg	310	NA	NA	NA
Lead	mg/kg	400	NA	NA	NA
Manganese	mg/kg	968	NA	NA	NA
Mercury, Elemental	mg/kg	0.56	NA	NA	NA
Nickel	mg/kg	150	NA	NA	NA
Thallium	mg/kg	2.2	NA	NA	NA
Vanadium	mg/kg	75.5	NA	NA	NA
Zinc	mg/kg	2300	NA	NA	NA

QA NOTES AND DATA QUALIFIERS:

Comparison value based on the higher of the May 2010 Regional Screening Levels (RSLs), formerly RBCs (if non-carcinogenic), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL). The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.
(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.
U - Analyte was analyzed for but not detected at or above the adjusted practical quantitation limit (PQL).
UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.
J - Analyte detected, estimated concentration.
UL - Analyte not detected, reported PQL is biased low, actual PQL may be higher.
L - Analyte detected, reported value is biased low, actual value may be higher.
K - Analyte detected, reported value is biased high, actual value may be lower.
R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.
mg/kg - Milligram per kilogram.
Detections are bolded.
Detections exceeding the comparison level are shown shaded and bolded.

Table A.12
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (TP 138) PIT CHARACTERIZATION SAMPLES

SAMPLE ID:		Comparison	SW-4825GB-EW01-LE01[2]		SW-4825GB-EW02-LE01[2]		SW-4825GB-NW01-LN01[2]		SW-4825GB-SW01-LS01[2]		SW-4825GB-FLOOR-[6.5]	
DATE SAMPLED:	Units	Level	12/01/09		12/01/09		12/01/09		12/01/09		12/10/09	
LAB SAMPLE ID:			9822201001		9822201002		9822201004		9822201003		9823367-001	
Volatile Organics - SW-846 8260B												
1,1,1-Trichloroethane	ug/kg	870000	2.2	U	2.3	U	2.4	UJ	2.3	U	2.4	U
1,1,2,2-Tetrachloroethane	ug/kg	560	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/kg	4300000	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
1,1,2-Trichloroethane	ug/kg	1100	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
1,1-Dichloroethane	ug/kg	3300	2.2	U	2.3	U	2.4	UJ	2.3	U	2.4	U
1,1-Dichloroethene	ug/kg	24000	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
1,2,4-Trichlorobenzene	ug/kg	22000	5.6	U	5.8	U	5.9	U	5.7	U	6.1	U
1,2-Dibromo-3-chloropropane	ug/kg	5.4	5.6	U	5.8	U	5.9	U	5.7	U	6.1	U
1,2-Dibromoethane	ug/kg	34	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
1,2-Dichlorobenzene	ug/kg	190000	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
1,2-Dichloroethane	ug/kg	430	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
1,2-Dichloropropane	ug/kg	890	2.2	U	2.3	U	2.4	UJ	2.3	U	2.4	U
1,3-Dichlorobenzene	ug/kg	18	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
1,4-Dichlorobenzene	ug/kg	2400	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
Acetone	ug/kg	6100000	**145**	L	**332**	L	**255**	L	**1270**	L	**32.5**	L
Acetonitrile	ug/kg	87000	11.1	R	11.6	R	11.8	R	11.4	R	12.1	R
Acrolein	ug/kg	15	55.6	R	57.8	R	58.8	R	57.2	R	60.7	R
Benzene	ug/kg	1100	2.2	U	2.3	U	2.4	UJ	2.3	U	2.4	U
Benzyl chloride	ug/kg	1000	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
Bromobenzene	ug/kg	30000	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
Bromodichloromethane	ug/kg	270	2.2	U	2.3	U	2.4	UJ	2.3	U	2.4	U
Bromoform	ug/kg	61000	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
Carbon disulfide	ug/kg	82000	**0.86**	J	2.3	U	2.4	U	2.3	U	2.4	U
Carbon tetrachloride	ug/kg	610	2.2	U	2.3	U	2.4	U	2.3	U	**0.87**	J
Chlorobenzene	ug/kg	29000	2.2	U	2.3	U	**7.2**	J	2.3	U	**15.8**	
Chlorodibromomethane	ug/kg	680	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U

Table A.12
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (TP 138) PIT CHARACTERIZATION SAMPLES

SAMPLE ID:		Comparison	SW-4825GB-EW01-LE01[2]		SW-4825GB-EW02-LE01[2]		SW-4825GB-NW01-LN01[2]		SW-4825GB-SW01-LS01[2]		SW-4825GB-FLOOR-[6.5]	
DATE SAMPLED:	Units	Level	12/01/09		12/01/09		12/01/09		12/01/09		12/10/09	
LAB SAMPLE ID:			9822201001		9822201002		9822201004		9822201003		9823367-001	
Chloroethane	ug/kg	1500000	5.6	U	5.8	U	5.9	U	5.7	U	6.1	U
Chloroform	ug/kg	290	**1.3**	J	**1.3**	J	**1.3**	J	**1.2**	J	**1.1**	J
Cis-1,2-Dichloroethene	ug/kg	16,000	2.2	U	2.3	U	**4.5**	J	2.3	U	**2.3**	J
cis-1,3-Dichloropropene	ug/kg	18	2.2	U	2.3	U	2.4	UJ	2.3	U	2.4	U
Cyclohexane	ug/kg	700000	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
Dichlorodifluoromethane	ug/kg	18000	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
Ethyl benzene	ug/kg	5400	2.2	U	2.3	U	2.4	UJ	2.3	U	2.4	U
Isopropylbenzene	ug/kg	210000	2.2	U	2.3	U	2.4	UJ	2.3	U	2.4	U
Methyl Acetate	ug/kg	7800000	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
Methyl bromide	ug/kg	730	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
Methyl butyl ketone	ug/kg	21000	11.1	U	11.6	U	11.8	U	11.4	U	12.1	U
Methyl chloride	ug/kg	12000	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
Methyl cyclohexane	ug/kg	18	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
Methyl ethyl ketone	ug/kg	2800000	11.1	U	11.6	U	11.8	U	11.4	U	12.1	U
Methyl isobutyl ketone	ug/kg	530000	11.1	U	11.6	U	11.8	U	11.4	U	12.1	U
Methyl Tertbutyl Ether	ug/kg	43000	2.2	U	2.3	U	**0.6**	J	**0.6**	J	2.4	U
Methylene chloride	ug/kg	11000	**2.5**	L	**2.7**		**5.4**	J	**3.6**	L	**15.1**	J
Styrene	ug/kg	630000	2.2	U	2.3	U	2.4	UJ	2.3	U	2.4	U
Tetrachloroethene	ug/kg	550	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
Toluene	ug/kg	500000	2.2	U	2.3	U	2.4	UJ	2.3	U	2.4	U
Total Xylenes	ug/kg	63000	6.7	U	6.9	U	7.1	UJ	6.9	U	**0.81**	J
Trans-1,2-Dichloroethene	ug/kg	15000	2.2	U	2.3	U	2.4	U	2.3	U	**0.81**	J
trans-1,3-dichloropropene	ug/kg	18	2.2	U	2.3	U	2.4	UJ	2.3	U	2.4	U
Trichloroethene	ug/kg	2800	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
Trichlorofluoromethane	ug/kg	79000	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U
Vinyl chloride	ug/kg	60	2.2	U	2.3	U	2.4	U	2.3	U	2.4	U

Table A.12
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (TP 138) PIT CHARACTERIZATION SAMPLES

SAMPLE ID:		Comparison	SW-4825GB-EW01-LE01[2]		SW-4825GB-EW02-LE01[2]		SW-4825GB-NW01-LN01[2]		SW-4825GB-SW01-LS01[2]		SW-4825GB-FLOOR-[6.5]	
DATE SAMPLED:	Units	Level	12/01/09		12/01/09		12/01/09		12/01/09		12/10/09	
LAB SAMPLE ID:			9822201001		9822201002		9822201004		9822201003		9823367-001	
Semivolatile Organics - SW-846 8270D												
1,1'-Biphenyl	ug/kg	390000	121	U	123	U	117	U	116	U	122	U
2,4,5-Trichlorophenol	ug/kg	610000	328	U	332	U	316	U	314	U	330	U
2,4,6-Trichlorophenol	ug/kg	44000	328	U	332	U	316	U	314	U	330	U
2,4-Dichlorophenol	ug/kg	18000	328	U	332	U	316	U	314	U	330	U
2,4-Dimethylphenol	ug/kg	120000	328	U	332	U	316	U	314	U	330	U
2,4-Dinitrophenol	ug/kg	12000	656	U	664	U	632	U	628	U	660	U
2-Chloronaphthalene	ug/kg	630000	121	U	123	U	117	U	116	U	122	U
2-Chlorophenol	ug/kg	39000	328	U	332	U	316	U	314	U	330	U
2-Methylnaphthalene	ug/kg	31000	60.7	U	61.5	U	58.5	U	58.2	U	61.1	U
2-Methylphenol	ug/kg	310000	328	U	332	U	316	U	314	U	330	U
2-Nitroaniline	ug/kg	61000	328	U	332	U	316	U	314	U	330	U
2-Nitrophenol	ug/kg	510	328	U	332	U	316	U	314	U	330	U
3,3'-Dichlorobenzidine	ug/kg	1100	656	U	664	U	632	U	628	U	660	UJ
3-Nitroaniline	ug/kg	1300	328	U	332	U	316	U	314	U	330	U
4,6-Dinitro-2-methylphenol	ug/kg	490	328	U	332	U	316	U	314	U	330	U
4-Bromophenyl-phenylether	ug/kg	510	121	U	123	U	117	U	116	U	122	U
4-Chloro-3-methylphenol	ug/kg	610000	328	U	332	U	316	U	314	U	330	U
4-Chloroaniline	ug/kg	2400	328	U	332	U	316	U	314	U	330	U
4-Chlorophenyl-PhenylEther	ug/kg	510	121	U	123	U	117	U	116	U	122	U
4-Nitroaniline	ug/kg	24000	328	U	332	U	316	U	314	U	330	U
4-Nitrophenol	ug/kg	1300	328	U	332	U	316	U	314	U	330	U
Acenaphthene	ug/kg	340000	60.7	U	61.5	U	58.5	U	58.2	U	61.1	U
Acenaphthylene	ug/kg	510	60.7	U	61.5	U	58.5	U	58.2	U	61.1	U
Acetophenone	ug/kg	780000	121	U	123	U	117	U	116	U	122	U
Anthracene	ug/kg	1700000	60.7	U	61.5	U	58.5	U	58.2	U	61.1	U
Atrazine	ug/kg	2100	121	U	123	U	117	U	116	U	122	U

Table A.12
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (TP 138) PIT CHARACTERIZATION SAMPLES

SAMPLE ID:		Comparison	SW-4825GB-EW01-LE01[2]		SW-4825GB-EW02-LE01[2]		SW-4825GB-NW01-LN01[2]		SW-4825GB-SW01-LS01[2]		SW-4825GB-FLOOR-[6.5]	
DATE SAMPLED:	Units	Level	12/01/09		12/01/09		12/01/09		12/01/09		12/10/09	
LAB SAMPLE ID:			9822201001		9822201002		9822201004		9822201003		9823367-001	
Benzaldehyde	ug/kg	780000	328	U	332	U	316	U	314	U	**218**	J
Benzo(a)anthracene	ug/kg	150	60.7	U	61.5	U	58.5	U	58.2	U	61.1	U
Benzo(a)pyrene	ug/kg	15	60.7	U	61.5	U	58.5	U	58.2	U	61.1	U
Benzo(b)fluoranthene	ug/kg	150	60.7	U	61.5	U	58.5	U	58.2	U	61.1	U
Benzo(g,h,i)perylene	ug/kg	331.5	60.7	U	61.5	U	58.5	U	58.2	U	61.1	U
Benzo(k)fluoranthene	ug/kg	1500	60.7	U	61.5	U	58.5	U	58.2	U	61.1	U
Benzoic Acid	ug/kg	24000000	850	U	860	U	819	U	814	U	**563**	J
Bis(2-Chloroethoxy)methane	ug/kg	18000	121	U	123	U	117	U	116	U	122	U
Bis(2-Chloroethyl)ether	ug/kg	210	121	U	123	U	117	U	116	U	122	U
Bis(2-Chloroisopropyl)ether	ug/kg	4600	121	U	123	U	117	U	116	U	122	U
Bis(2-Ethylhexyl)phthalate	ug/kg	35000	121	U	**29.6**	J	117	U	116	U	**36.9**	J
Butylbenzylphthalate	ug/kg	260000	121	U	123	U	117	U	116	U	122	U
Caprolactam	ug/kg	3100000	328	U	332	U	316	U	314	U	330	U
Carbazole	ug/kg	510	121	U	123	U	117	U	116	U	122	U
Chrysene	ug/kg	15000	60.7	U	61.5	U	58.5	U	58.2	U	61.1	U
Dibenz(a,h)anthracene	ug/kg	15	60.7	U	61.5	U	58.5	U	58.2	U	61.1	U
Dibenzofuran	ug/kg	7800	121	U	123	U	117	U	116	U	122	U
Diethyl phthalate	ug/kg	4900000	121	U	123	U	117	U	116	U	122	U
Dimethylphthalate	ug/kg	510	121	U	123	U	117	U	116	U	122	U
Di-n-butylphthalate	ug/kg	610000	121	U	123	U	117	U	116	U	122	U
Di-n-octylphthalate	ug/kg	510	328	U	332	U	316	U	314	U	330	U
Diphenylamine	ug/kg	150000	121	U	123	U	117	U	116	U	**31.5**	J
Fluoranthene	ug/kg	230000	60.7	U	61.5	U	58.5	U	58.2	U	61.1	U
Fluorene	ug/kg	230000	60.7	U	61.5	U	58.5	U	58.2	U	61.1	U
Hexachlorobenzene	ug/kg	300	121	U	123	U	117	U	116	U	122	U
Hexachlorobutadiene	ug/kg	6200	121	U	123	U	117	U	116	U	122	U
Hexachlorocyclopentadiene	ug/kg	37000	328	U	332	U	316	U	314	U	330	U

Table A.12
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (TP 138) PIT CHARACTERIZATION SAMPLES

SAMPLE ID:		Comparison	SW-4825GB-EW01-LE01[2]		SW-4825GB-EW02-LE01[2]		SW-4825GB-NW01-LN01[2]		SW-4825GB-SW01-LS01[2]		SW-4825GB-FLOOR-[6.5]	
DATE SAMPLED:	Units	Level	12/01/09		12/01/09		12/01/09		12/01/09		12/10/09	
LAB SAMPLE ID:			9822201001		9822201002		9822201004		9822201003		9823367-001	
Hexachloroethane	ug/kg	35000	121	U	123	U	117	U	116	U	122	U
Indeno(1,2,3-cd)pyrene	ug/kg	150	60.7	U	61.5	U	58.5	U	58.2	U	61.1	U
Isophorone	ug/kg	510000	121	U	123	U	117	U	116	U	122	U
mp-Cresol	ug/kg	NA	328	U	332	U	316	U	314	U	330	U
Naphthalene	ug/kg	3600	60.7	U	61.5	U	58.5	U	58.2	U	61.1	U
N-Nitrosodiphenylamine	ug/kg	99000	121	U	123	U	117	U	116	U	**36.8**	J
N-Nitrosodipropylamine	ug/kg	69	121	U	123	U	117	U	116	U	122	U
Pentachlorophenol	ug/kg	3000	656	U	664	U	632	U	628	U	660	U
Phenanthrene	ug/kg	407.4	60.7	U	61.5	U	58.5	U	58.2	U	61.1	U
Phenol	ug/kg	1800000	328	U	332	U	316	U	314	U	330	U
Pyrene	ug/kg	170000	60.7	U	61.5	U	58.5	U	58.2	U	61.1	U
Explosives - SW846 8330B												
1,3,5-Trinitrobenzene	mg/kg	220	0.099	U	0.098	U	0.099	U	0.099	U	0.1	U
1,3-Dinitrobenzene	mg/kg	0.61	0.099	U	0.098	U	0.099	U	0.099	U	0.1	U
2,4,6-Trinitrotoluene	mg/kg	19	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
2,4-Dinitrotoluene	mg/kg	1.6	0.099	U	0.098	U	0.099	U	0.099	U	0.1	U
2,6-Dinitrotoluene	mg/kg	6.1	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
2-amino-4,6-Dinitrotoluene	mg/kg	15	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
2-Nitrotoluene	mg/kg	2.9	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
3-Nitrotoluene	mg/kg	0.61	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
4-amino-2,6-Dinitrotoluene	mg/kg	NA	0.099	U	0.098	U	0.099	U	0.099	U	0.1	U
4-Nitrotoluene	mg/kg	30	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
HMX	mg/kg	380	0.099	U	0.098	U	0.099	U	0.099	U	0.1	U
Nitrobenzene	mg/kg	4.8	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Nitroglycerine	mg/kg	0.61	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U
RDX	mg/kg	5.5	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U

Table A.12
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (TP 138) PIT CHARACTERIZATION SAMPLES

SAMPLE ID:		Comparison	SW-4825GB-EW01-LE01[2]		SW-4825GB-EW02-LE01[2]		SW-4825GB-NW01-LN01[2]		SW-4825GB-SW01-LS01[2]		SW-4825GB-FLOOR-[6.5]	
DATE SAMPLED:	Units	Level	12/01/09		12/01/09		12/01/09		12/01/09		12/10/09	
LAB SAMPLE ID:			9822201001		9822201002		9822201004		9822201003		9823367-001	
Tetryl	mg/kg	24	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Metals - SW846 6010C												
Aluminum	mg/kg	19100	**54300**		**57000**		**53800**		**59300**		**35100**	
Antimony	mg/kg	5.2	4.3	UL	**4.7**		4.8	UL	4.7	UL	4.3	U
Arsenic	mg/kg	0.39	**1.1**	J	**5.5**		**8.2**		**5**		**601**	
Barium	mg/kg	1500	**274**		**241**		**188**		**192**		**171**	
Beryllium	mg/kg	16	**1.6**		**1.7**		**1.5**		**1**		**1.7**	
Boron	mg/kg	1600	**10.8**	J	**10.6**	J	**8.3**	J	**9**	J	**13.7**	J
Cadmium	mg/kg	7	1.1	U	1.2	U	1.2	U	**0.8**	J	**0.99**	J
Chromium	mg/kg	12000	**98.2**		**154**		**127**		**177**		**164**	
Cobalt	mg/kg	17.8	**21.1**	K	**32.3**	K	**30.2**	K	**41.1**	K	**20.6**	
Copper	mg/kg	310	**133**		**106**		**103**		**48.3**		**97.8**	
Iron	mg/kg	32400	**55800**		**59600**		**46600**		**54700**		**46000**	
Lead	mg/kg	400	**12.5**		**12.4**		**9.4**		**7.3**		**12.5**	
Magnesium	mg/kg	6950	**17700**		**22400**		**17000**		**30700**		**21000**	
Manganese	mg/kg	968	**1330**	J	**920**	J	**774**	J	**1340**	J	**474**	
Mercury	mg/kg	0.56	**0.029**	B	**0.04**	B	**0.06**	B	**0.044**	B	**0.032**	J
Nickel	mg/kg	150	**99.5**	L	**106**	L	**80.3**	L	**135**	L	**77.3**	
Selenium	mg/kg	39	2.8	U	3.1	U	2.5	U	3	U	2.9	U
Silver	mg/kg	39	1.1	U	1.2	U	1.2	U	1.2	U	1.1	U
Strontium	mg/kg	4700	**16.2**		**16.9**		**14**		**16.9**		**6.1**	
Tellurium	mg/kg	39.11	3	U	3	U	3	U	3	U	2.9	U
Thallium	mg/kg	2.2	6.5	U	7	U	7.2	U	7	U	**3.6**	J
Tin	mg/kg	4700	10.8	U	11.6	U	12	U	11.7	U	10.7	U
Titanium	mg/kg	31000/2690	**1000**		**1040**		**1270**		**976**		**1310**	
Vanadium	mg/kg	75.5	**134**		**177**		**129**		**139**		**142**	

Table A.12
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD (TP 138) PIT CHARACTERIZATION SAMPLES

SAMPLE ID:		Comparison	SW-4825GB-EW01-LE01[2]		SW-4825GB-EW02-LE01[2]		SW-4825GB-NW01-LN01[2]		SW-4825GB-SW01-LS01[2]		SW-4825GB-FLOOR-[6.5]	
DATE SAMPLED:	Units	Level	12/01/09		12/01/09		12/01/09		12/01/09		12/10/09	
LAB SAMPLE ID:			9822201001		9822201002		9822201004		9822201003		9823367-001	
Zinc	mg/kg	2300	**90.4**	L	**123**	L	**111**	L	**438**	L	**191**	
Zirconium	mg/kg	48.3	**5.9**	J	**4.8**	J	**3.2**	J	**3.1**	J	**3.1**	J
Other Parameters												
Total Cyanide	mg/kg	160	0.3	U	0.3	U	0.3	U	**0.12**	B	**0.48**	
Fluoride	mg/kg	310	**7.3**	L	**6.2**	L	**2.5**	L	**4**	L	**1.6**	B
Iodine (as Iodide)	ug/kg	78000	48.3	U	49.1	U	47.6	U	47.5	U	48.7	U
Perchlorate	ug/kg	5500	2.4	U	2.4	U	2.4	U	2.4	U	2.4	U

Note: The soil samples were submitted for agents and ABPs analysis. Agents and ABPs were not detected.

QA NOTES AND DATA QUALIFIERS:

Comparison value based on the higher of the 2010 Regional Screening Levels (RSLs), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL). The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.
(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.
U - Analyte was analyzed for but not detected at or above the adjusted practical quantitation limit (PQL).
UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.
J - Analyte detected, estimated concentration.
UL - Analyte not detected, reported PQL is biased low, actual PQL may be higher.
L - Analyte detected, reported value is biased low, actual value may be higher.
K - Analyte detected, reported value is biased high, actual value may be lower.
R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.
NJ - Tentatively identified compound (TIC). Presumptively present at approximate concentration.
ug/kg - Microgram per kilogram. mg/kg - Milligram per kilogram.
Detections are bolded.
Detections exceeding the comparison level are shown shaded and bolded.

Table A.13
Final Analytical Results for White Solid in the Flask (TP 138)

Sample ID		HD (ug/kg)	L (ug/kg)	1,4-Dithiane (ug/kg)	1,4-Thioxane (ug/kg)	Thiodiglycol (ug/kg)
SW-4825GB-SCR-001		1,600 D	<400	800	1,000	NA
(White Solid in flask from TP 138)						
SW-4825GB-SCR-006		960 D	<100	2200	3,600	NA

Ananlytical Result for Grab Sample

Sample ID		HD (ug/kg)	L (ug/kg)	1,4-Dithiane (ug/kg)	1,4-Thioxane (ug/kg)	Thiodiglycol (ug/kg)
SW-4825GB-GS01		<10	<100	510 E	50 J	<250

NA - not analyzed
HD - mustard
L - lewisite

Table A.14a
ECBC Sampling Results for TP 138

Sample ID	Drum ID	HD (ug/kg)	L (ug/kg)	1,4-Dithiane (ug/kg)	1,4-Thioxane (ug/kg)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-GRAB-02(TP120)	second rolloff (R25821RT)	3.4 J	48 J	170	47 J	NA	NA
4825-TP138-(SPOILS)*	ESW-TP138-001 through 031	<10	<100	110 J	<100	<250	NA
SW-4825GB-CWM-001	ESW-4825GB-001						
	ESW-4825GB-002	3.4 J	<100	850 D	46 J	NA	NA
	ESW-4825GB-003						
SW-4825GB-CWM-002	ESW-4825GB-004						
	ESW-4825GB-005	4.2 J	<100	730 D	78 J	NA	NA
	ESW-4825GB-006						
SW-4825GB-CWM-003	ESW-4825GB-007						
	ESW-4825GB-008	3.6 J	<100	730 D	51 J	NA	NA
	ESW-4825GB-009						
SW-4825GB-CWM-004	ESW-4825GB-010						
	ESW-4825GB-011	4.4 J	<100	820 D	63 J	NA	NA
	ESW-4825GB-012						
SW-4825GB-CWM-005	ESW-4825GB-013						
	ESW-4825GB-014	2.5 J	<100	220	19 J	<250	NA
	ESW-4825GB-015						
SW-4825GB-CWM-006	ESW-4825GB-016						
	ESW-4825GB-017	3.5 J	<100	340	31 J	<250	NA
	ESW-4825GB-018						
SW-4825GB-CWM-007	ESW-4825GB-019						
	ESW-4825GB-020	2.3 J	<100	480	58 J	<250	NA
	ESW-4825GB-021						
SW-4825GB-CWM-008	ESW-4825GB-022						
	ESW-4825GB-023	<10	<100	190	18 J	<250	NA
	ESW-4825GB-024						
SW-4825GB-CWM-009	ESW-4825GB-025						
	ESW-4825GB-026	3.0 J	<100	390	28 J	<250	NA
	ESW-4825GB-027						
SW-4825GB-CWM-010	ESW-4825GB-028						
	ESW-4825GB-029	<10	<100	90 J	<100	NA	NA
	ESW-4825GB-030						

Table A.14a
ECBC Sampling Results for TP 138

Sample ID	Drum ID	HD (ug/kg)	L (ug/kg)	1,4-Dithiane (ug/kg)	1,4-Thioxane (ug/kg)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-011	ESW-4825GB-031						
	ESW-4825GB-032	<10	<100	67 J	<100	NA	NA
	ESW-4825GB-033						
SW-4825GB-CWM-012	ESW-4825GB-034						
	ESW-4825GB-035	<10	<100	76 J	<100	NA	NA
	ESW-4825GB-036						
SW-4825GB-CWM-013	ESW-4825GB-037						
	ESW-4825GB-038	<10	<100	26 J	<100	NA	NA
	ESW-4825GB-039						
SW-4825GB-CWM-014	ESW-4825GB-040						
	ESW-4825GB-041	<10	<100	19 J	<100	NA	NA
	ESW-4825GB-042						
SW-4825GB-CWM-015	ESW-4825GB-043						
	ESW-4825GB-044	<10	<100	<100	<100	NA	NA
	ESW-4825GB-045						
SW-4825GB-CWM-016	ESW-4825GB-046						
	ESW-4825GB-047	<10	<100	<100	<100	NA	NA
	ESW-4825GB-048						
SW-4825GB-CWM-017	ESW-4825GB-049						
	ESW-4825GB-050	<10	<100	<100	<100	NA	NA
	ESW-4825GB-051						
SW-4825GB-CWM-018	ESW-4825GB-052						
	ESW-4825GB-053	<10	<100	<100	<100	NA	NA
	ESW-4825GB-054						
SW-4825GB-CWM-019	ESW-4825GB-055						
	ESW-4825GB-056	<10	<100	<100	<100	NA	NA
	ESW-4825GB-057						
SW-4825GB-CWM-020	ESW-4825GB-058						
	ESW-4825GB-059	<10	<100	29 J	<100	<250	NA
	ESW-4825GB-060						
SW-4825GB-CWM-021	ESW-4825GB-061						
	ESW-4825GB-062	<10	<100	25 J	<100	<250	NA
	ESW-4825GB-063						

Table A.14a
ECBC Sampling Results for TP 138

Sample ID	Drum ID	HD (ug/kg)	L (ug/kg)	1,4-Dithiane (ug/kg)	1,4-Thioxane (ug/kg)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
	ESW-4825GB-064						
SW-4825GB-CWM-022	ESW-4825GB-065	<10	<100	170	20 J	<250	NA
	ESW-4825GB-066						
	ESW-4825GB-067						
SW-4825GB-CWM-023	ESW-4825GB-068	<10	<100	32 J	<100	NA	140 D
	ESW-4825GB-069						
	ESW-4825GB-070						
SW-4825GB-CWM-024	ESW-4825GB-071	<10	<100	33 J	<100	NA	150 D
	ESW-4825GB-072						
	ESW-4825GB-073						
SW-4825GB-CWM-025	ESW-4825GB-074	<10	31 J	30 J	<100	NA	1100 D
	ESW-4825GB-075						
	ESW-4825GB-076						
SW-4825GB-CWM-026	ESW-4825GB-077	<10	<100	<100	<100	NA	1000 D
	ESW-4825GB-078						
	ESW-4825GB-079						
SW-4825GB-CWM-027	ESW-4825GB-080	<10	<100	21 J	<100	NA	860 D
	ESW-4825GB-081						
	ESW-4825GB-082						
SW-4825GB-CWM-028	ESW-4825GB-083	<10	<100	23J	<100	NA	1000 D
	ESW-4825GB-084						
	ESW-4825GB-085						
SW-4825GB-CWM-029	ESW-4825GB-086	<10	<100	<100	<100	NA	640 D
	ESW-4825GB-087						
	ESW-4825GB-088						
SW-4825GB-CWM-030	ESW-4825GB-089	<10	<100	<100	<100	NA	830 D
	ESW-4825GB-090						
	ESW-4825GB-091						
SW-4825GB-CWM-031	ESW-4825GB-092	<10	<100	<100	<100	NA	650 D
	ESW-4825GB-093						
	ESW-4825GB-094						
SW-4825GB-CWM-032	ESW-4825GB-095	<10	<100	21J	<100	NA	980 D
	ESW-4825GB-096						

Table A.14a
ECBC Sampling Results for TP 138

Sample ID	Drum ID	HD (ug/kg)	L (ug/kg)	1,4-Dithiane (ug/kg)	1,4-Thioxane (ug/kg)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-033	ESW-4825GB-097						
	ESW-4825GB-098	<10	<100	<100	<100	NA	630 D
	ESW-4825GB-099						
SW-4825GB-CWM-034	ESW-4825GB-100						
	ESW-4825GB-101	<10	<100	<100	<100	NA	570 D
	ESW-4825GB-102						
SW-4825GB-CWM-035	ESW-4825GB-103						
	ESW-4825GB-104	<10	<100	<100	<100	NA	680 D
	ESW-4825GB-105						
SW-4825GB-CWM-036	ESW-4825GB-106						
	ESW-4825GB-107	<10	<100	<100	<100	NA	350 D
	ESW-4825GB-108						

NA - not analyzed
HD - Mustard
L - Lewisite

Detected L and/or HD and both ABPs
Detected L and/or HD and one ABP
Detected both ABPs
Detected one ABP
Cleared for Agent and ABPs

* Ricin was analyzed for this sample and the results was negative.

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
Intact Container Samples							
SW-4825GB-TP120-TE-001 (1/28/2010)	Open glass bottle with black sticky substance on bottom with small amount of liquid inside.	< 10	< 100	52,000 E	1,100 E	NA	NA
		Chlorodiphenylarsine which is also known as **DA** or **Clark I** (a vomiting agent) was identified in the full scan analysis of SW-4825-GB-TP120-TE-001.					
SW-4825GB-TP134-TE-005 (3/22/2010)	Clear glass test tube - 9" (L) X 3/4" (W) ~1 teaspoon (1' at top and 1" at base) of white granular substance Scraping of solid collected in (1) 4 OZ JAR for head spacing and low level/unknown analysis Glass deconed in kill bucket and sent for headspacing Container conbined in scrap bag - **SW-4825GB-SCR-080** Item placed in **DOT can** for transport to ECBC.	<20	<200	<200	<200	NA	NA
		There were no identifiable compounds in the qualitative full-scan analysis of the solid sample. The samples appeared to resemble lime or calcium carbonate by visual inspection. These compounds would not have been detected in the GCMS analysis.					
SW-4825GB-TP134-TE-006 (3/22/2010)	Broken clear glass jar - 4.75" (L) X 4" (W) solid crystalized pink/white material that "glistens" **"ATL E-Z SEAL"** Embossed on side Scraping of solid collected for head spacing and low level/unknown analysis Glass deconed in kill bucket and sent for headspacing Solid collected in (1) 4 OZ JAR for head spacing and (1) 32 oz Clear jar for low level/unknown analysis Container conbined in scrap bag - **SW-4825GB-SCR-080** Item placed in **DOT can** for transport to ECBC.	<20	<200	<200	<200	NA	NA
		The compound detected with the greatest percentage area in the full-scan analysis of the solid sample was **biphenyl**.					
SW-4825GB-TP134-TE-013 (3/26/2010)	Open container clear glass bottle, busted neck. 3.5" W x 7.75 H, filled with a white/blue/green solid and 2.5" liquid on top of solid. TE assessed and found Neg. on ICAM/M-8 paper, cleaned off and photographed, poured liquid out of container into bleach and placed jar with solids remaining in a DOT container and shipped to ECBC.	<44	<440	800	140 J	NA	NA
		The full scan analysis showed that there were no identifiable compounds unique to the sample other than a trace detection of **Benzamide**. No full-scan report was prepared for this sample.					
SW-4825GB-TP134-TE-015 (3/29/2010)	Open clear glass tube, 5"(L) X .75"(W), 4" of blue/grey colored solid in base and .75" of separated sandy colored solid Neg ICAM TE assesed item to have a stain in the base of vessle	1,100 D	<100	1,100 D	120	NA	NA
		There were very few identifiable compounds (**1,2,5-Trithiepane, 3,5,3',5'-Tetramethylbiphenyl, and (E)-.alpha.,.alpha.'-Dicyanostilbene**) detected in the full scan analysis.					

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-TP134-TE-017 (3/29/2010)	Open Clear glass jar - broken top 6"(L) X 2.75"(W) Dark oily soil Jar was smoking 2" of blue green soil on top of small amount of liquid-material reacted by smoking when shaken slightly. TE bagged item and a vapor sample was collected using DAAMS tubes on 3/30/10. The item was packaged and removed from ECS by TE on 4/19/10 and shipped to ECBC on 4/20/10.	**Vapor Analysis:** The full scan analysis results from the first vapor sample showed that **arsenic trichloride** was the primary compound identified. In addition, smaller area percentages of Mustard (HD) and 1,4-Dithiane (ABP) were identified. The second DAAMS tube was analyzed on 3/31/10 using a quantitative Select Ion Monitoring (SIM) GCMS method for HD and L because of the detection for HD in the full-scan analysis. HD was qualitatively detected again and L was not detected in the SIM analysis, but quantification was not available because of QC failures.					
		Solid Analysis:					
		150,000 E	<1,500	2,700	<1,500	NA	NA
		The most notable identifiable compound detected in the full-scan analysis of this solid sample was **arsenic trichloride**.					
SW-4825GB-TP134-TE-019 (3/31/2010)	Open clear glass bottle w/dirt plug 4" (L) X 1.5" (W) ~ 90% full Brown/red fiberglass type material TE sealed item with parafilm and placed item in DOT can	2,600	900,000 E	1,700	<1,700	NA	NA
		The most notable identifiable compound detected in the full-scan analysis of this solid sample was **Benzenecarboxylic acid**.					
SVS-10-001 (1/27/2010)	Glass stopper in 2" wide by 4" clear glass bottle. 1/4 full of liquid.	< 10	< 100	480	410	NA	NA
		Chlorinated aromatics identified as potential pesticide ingredients were detected in SVS-10-001.					
SVS-10-002 (1/28/2010)	Metal bottle shaped like a Rossi wine bottle with a cap on it, 8" length by 5" wide at the widest part, appears empty inside from handling	0.20 Q	<2.0	1.5 J	0.75 J	NA	NA
SVS-10-003 (1/29/2010)	4" long x 1.25" wide clear glass bottle with a glass stopper, clear liquid inside about 1/8 full.	< 10	< 100	< 100	< 100	NA	NA
SVS-10-004 (2/2/2010)	6" long by 2" wide clear glass bottle with a glass stopper, no liquid inside but black residue evident.	0.25 Q	<1.0	2.2	3.6	NA	NA
SVS-10-006 (2/2/2010)	Intact clear glass bottle, glass stopper with small hole in top, 1.5" wide by 2.5" long, has stem that extends to bottom of glass bottle. Blackish/brown liquid about 1/4 full.	3,100,000 EQ	<1,200 Q	17,000,000 E	660,000 E	NA	NA
SVS-10-007 (2/2/2010)	Intact clear glass bottle, closed with stopper (appears burned), 1" wide by 4.5" long with several teaspoons of clear liquid inside.	12 Q	<100	1,200 E	2,000 E	NA	NA
SVS-10-009 (2/3/2010)	4" to neck X 2.5" diameter, clear glass bottle with a deteriorating cork stopper - full with cotton. MRC #JJ238PB	0.024 JQ	<1.0	2.4	5.4 E	NA	NA
SVS-10-010 (2/4/2010)	Intact clear glass bottle - heat sealed, 4" long X 1.5" wide - 1/2 full, w/clear liquid and brownish powder	<0.10 Q	<1.0	0.40 J	0.62 J	NA	NA

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SVS-10-011 (2/4/2010)	Intact clear glass bottle - heat sealed, 10" long X 1.5" wide - 1/2 full, w/clear liquid and brownish powder	< 0.10	< 1.0	< 1.0	< 1.0	NA	NA
		EML101615 (SVS-10-011) was a sealed test tube containing black liquid. The container shattered when CTF personnel attempted to score the glass to access it. The broken pieces of the container were rinsed with extraction solvent. The sample was clear of the requested analytes to the laboratory Limit of Quantitation (LOQ). The LOQ was adjusted based on the volume of solvent used to rinse the broken pieces. There were no identifiable compounds detected in the full scan analysis.					
SVS-10-012 (2/18/2010)	Intact clear glass bottle w/glass stopper - 4.5" long X 1.5" wide - 1/8 full, w/clear liquid	<10 Q	150,000 E	87 J	110	NA	NA
SVS-10-013 (2/18/2010)	Intact clear glass bottle - w/cork stopper, 8.25" long X 3" wide - 7/8 full, w/clear liquid	<20 Q	<200	<200	<200	NA	NA
		Additionally, the liquid sample was analyzed using a qualitative GCMS full scan method. The primary compounds identified in the full scan analysis were **phosgene oxime** (**CX**), a chemical nettle agent, and **benzene, 1,2,4-trichloro-,** a pesticide.					
SVS-10-014 (2/18/2010)	Intact clear glass bottle - w/deteriorating rubber stopper, 8.5" long X 3.5" wide - brown residue caked near neck full with cotton balls - two pipettes through rubber stopper - no liquid - Total length w/pipette - 10.5" (L) X 4.5" (W)	<0.10 Q	0.65 J	0.64 J	0.25 J	NA	NA
SVS-10-015 (2/18/2010)	Intact clear glass test tube, heat sealed on one end - 11.5" (L) X 5/8" (W) - 3" of white crystal powder	830 E	< 100 Q	210	< 100	NA	NA
		Additionally, the solid sample was analyzed using a qualitative GCMS full scan method. The primary compounds identified in the full scan analysis were **2,4,6-trichloro-1,3,5-Triazine**, a chemical used in herbicides, and **DA**, **chlorodiphenylarsine**, an arsenic-based CWM.					
SVS-10-016 (2/22/2010)	Intact clear glass test tube, heat sealed on one end - 4.5" (L) X 1/2" (W) - ~1 1/4" of tan/brown solid residue in bottom	<40	130,000 E	84 J	<400	NA	NA
SVS-10-018 (2/22/2010)	Intact clear glass test tube, cork or wax stopper - 5.5" (L) X 2.25" (W) - ~appears full of brown/yellow solid	<40	<400	<400	<400	NA	NA
		The full scan analysis identified **benzene**, **1-chloro-4-nitro-**, **phenol**, **2,4,6-trichloro-**, **phenol**, **2,4-dichloro-6-nitro-**, and **phenothiazine** as the primary compounds.					
		< 0.050	< 0.050	< 0.050	< 0.050	NA	NA
		< 10	< 100	< 100	< 100	NA	NA

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SVS-10-019 (2/22/2010)	Organic Layer (top results) Aqueous Layer (bottom results) Intact copper bottle, 7.5" (L) X 4" (W), appears full	EML101617 (SVS-10-019) was a sealed copper container. A drill was used to access the top of the container. The container was rinsed with extraction solvent. The container rinse produced two distinct layers. Each layer was treated as a separate sample: the bottom organic layer retained the original EML sample number and the top aqueous layer was given a new EML sample number (EML101744). The samples were clear of the requested analytes to the laboratory Limit of Quantitation (LOQ). The LOQ was adjusted based on the volume of solvent used to rinse the container. There were identifiable organic compounds detected in the full scan analysis of each layer, but none could be directly related to CWM.					
SVS-10-020 (2/22/2010)	Clear glass bottle w/glass stopper, 4.25" (L) X 2" (W) ~3/8 full of clear liquid	<40	<400	<400	<400	NA	NA
		No organic compounds were identified in the full scan analysis.					
SVS-10-021 (2/23/2010)	Intact clear glass vial w/metal cap, 3" (L) X 1/2" (W), black material inside - size of a shotgun shell	<40	<400	<400	<400	NA	NA
		No organic compounds were identified in the full scan analysis.					
SVS-10-022 (2/23/2010)	Intact clear glass bottle w/glass stopper - 6" (L) X 2.5" (W), 75% full of bluish liquid	No quantitative results are reported for this sample. HD and 1,4-Dithiane were present in concentrations that saturated the detector for a prolonged period. The container is being managed at the CTF as **mustard**					
SVS-10-025 (3/12/2010)	Intact Clear glass bottle, heat sealed on one end. Red liquid residue at base 2.25" (L) x 7/8" (W)	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA
		EML101613 (SVS-10-025) was a small intact container containing an orange sludge. The container broke when the top to the container was removed. The broken pieces of the container were rinsed with extraction solvent. The sample was clear of the requested analytes to the laboratory Limit of Quantitation (LOQ). The LOQ was adjusted based on the volume of solvent used to rinse the broken pieces. The compounds detected in the full scan analysis with the greatest area percent were **Acetophenone**, a resin chemical, and **Chlorodiphenylarsine**, a vomiting agent.					
SVS-10-026 (3/16/2010)	Scraping of resin matrix inside cavity of round placed in DOT can and transported to Edgewood by CARA	< 20	< 200	< 200	< 200	NA	NA
		Additionally, the solid sample was analyzed using a qualitative GCMS full scan method. Many organic compounds were detected, however, those with the greatest area percent were unidentifiable. None of the compounds detected were related to CWM material. Ricin was also analyzed for this sample and the results was negative.					
SVS-10-029 (3/24/2010)	Closed glass jar with cork stopper. ~1/2" of solid yellow orange powder material. TE assessed and opened the cork stopper, negative reading on ICAM, no liquid present; replaced the stopper and taped shut. Placed in DOT Container. 3.25'(L) X 2.5"(W) w/cork; 2.75'(L) X 2.5"(W) without cork.	430 D	< 200	64,000 D	660	NA	NA
		There were many organic compounds detected in the qualitative full-scan analysis of the solid sample. None of the compounds were known to be related to CWM material.					
SVS-10-033 (3/29/2010)	Closed clear glass jar with stopper. Solid (black) sediment present in the base. Item packaged by TE and placed in DOT can. 2.5"(L) X 1"(W)	24 J	< 400	2,400 DJ	390 J	NA	NA
		The compound detected in the full-scan analysis of EML101995 with the greatest percentage area was **N-phenyl Benzenamine**.					

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SVS-10-035 (3/29/10)	Clear glass bottle w/broken glass stopper 3" of dark liquid 7.5" (L) X 3"(W) Item smoking - remained in ECS On 4-19-10, TE packaged the item and shipped to ECBC in Edgewood, MD	8,400 D	<400	1,000	<400	NA	NA
		The sample extract was also analyzed using a qualitative full-scan GCMS method for Tentatively Identified Compounds (TICs). One of the identifiable compounds in the analysis was **hexachloroethane**, which was used in smoke munitions.					
SVS-10-037 (3/31/2010)	Clear glass jar with reddish stopper. Some corrosion found around stopper. 1/3 full of pink/white solid Item packaged by TE and placed in DOT can. 3" (L) X 1.25" (W)	< 20	< 200	720	80 J	NA	NA
		The compound detected with the greatest area percentage in the full-scan analysis of EML101997 was **Chlorodiphenylarsine**.					
Grab Samples							
SW-4825GB-GS01 (11/19/2009)	Sample collected near location of **SCR-006** in TP 138	<10	<100	570 D	50 J	NA	NA
SW-4825GB-GS02 (1/26/2010)	Discolored silver soil near glass fragments from **SCR-013**	< 10	< 100	24 J	< 100	NA	NA
SW-4825GB-GS03 (1/26/2010)	Sample collected near location of **SCR-012**	< 10	< 100	35 J	< 100	NA	NA
SW-4825GB-GS04 (1/27/2010)	Sample collected near **TE-001**	< 10	< 100	36 J	< 100	NA	NA
SW-4825GB-GS05 (1/27/2010)	Sample collected from 3.5" diameter and 7" long broken bluish-green glass bottle with black solids inside and soil colocated (glass bottle put into batch glass scrap bag - not a separate scrap item)	< 10	< 100	95 J	45 J	NA	NA
SW-4825GB-GS06 (2/2/2010)	Sample collected near **TE-002 to 008** in white silver soil in **TP 120.**	150 D	5600 DQ	4000 D	1500 D	NA	NA
SW-4825GB-GS07 (2/3/2010)	Vein of greenish soil	21	500 DQ	1100 D	460	NA	NA
SW-4825GB-GS08 (2/18/10)	**Chalky White substance (09:00)**	<100	<1000	<1000	<1000	NA	NA
		Additionally, the sample extract for GS-08 was analyzed using a qualitative GCMS full scan method. The primary compound identified in the full scan analysis was Chloroacetophenone (CN), a tearing agent.					
SW-4825GB-GS09 (2/25/10)	Grab Sample collected near **SVS-10-025** w/chunks of wax or chalky substance **'TE-013 and 'TE-014**	27	2400 D	53 J	22 J	NA	NA
SW-4825GB-GS10 (3/1/2010)	Grab Sample collected near **SVS-10-023**	<10	250	<100	<100	NA	NA
SW-4825GB-GS11 (3/9/2010)	Grab Sample collected near **SVS-10-024**	< 10	< 100	<100	< 100	NA	NA
		Additional analysis were performed by ALSI for the Spring Valley grab sample parameters. Among the detected constituents, aluminum (22600 mg/kg) and arsenic (101 mg/kg) were detected at concentrations exceeding the comparison levels.					

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-GS12 (3/9/2010)	Grab Sample collected near **MD-4825GB-TP-134-001**	< 10	< 100	<100	< 100	NA	NA
		Additional analysis were performed by ALSI for the Spring Valley grab sample parameters. Among the detected constituents, aluminum (21400 mg/kg), iron (37600 mg/kg), magnesium (9400 mg/kg), and thallium (2.3 J mg/kg) were detected at concentrations exceeding the comparison levels.					
SW-4825GB-GS13 (3/10/2010)	Grab Sample collected near **MD-4825GB-TP-134-002**	< 10	< 100	<100	< 100	NA	NA
		Additional analysis were performed by ALSI for the Spring Valley grab sample parameters. Among the detected constituents, only magnesium (9650 mg/kg) was detected at a concentration exceeding the comparison level.					
SW-4825GB-GS14 (3/12/2010)	Grab Sample collected near **SVS-10-025** w/chunks of wax or chalky substance	< 10	< 100	<100	< 100	NA	NA
		The full-scan analysis results show that CN, a tearing agent, was the primary compound identified.					
SW-4825GB-GS15 (3/16/2010)	Grab Sample collected near **SVS-10-026**	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-GS16 (3/23/2010)	Grab Sample collected near **SW-4825GB-TP134-TE-005, 006 and 007**	< 10	3,700 D	410	74 J	NA	NA
SW-4825GB-GS17 (3/23/2010)	Grab Sample collected near **SW-4825GB-TP134-TE-008 and SVS-10-027**	< 10	14,000 D	240	58 J	NA	NA
SW-4825GB-GS18 (3/24/2010)	Grab Sample collected near **SW-4825GB-TP134-TE-011 & 012**	The headspace analysis results show detection of HD by DAMMS. The sample is double bagged and will be sealed in a drum.					
SW-4825GB-GS19 (3/26/2010)	Grab Sample collected in rusted broken bucket with white and rainbow solid material in it.	The headspace analysis results show detection of HD by DAMMS. The sample is double bagged and will be sealed in a drum.					
SW-4825GB-GS20 (3/26/2010)	Grab Sample collected in area of large amount of green soil near broken jar.	The headspace analysis results show detection of HD by DAMMS. The sample is double bagged and will be sealed in a drum.					
SW-4825GB-GS21 (3/31/2010)	Composite grab sample collected from excavated soil in several bucket liners - from area around SW-4825GB-TP134-TE-017 & SVS-10-034 and SVS-10-035 - (Smoking bottleware)	The headspace analysis results show detection of HD by DAMMS. The sample is double bagged and will be sealed in a drum.					
SW-4825GB-GS22 (4/5/2010)	Grab Sample taken due to high HCl readings in excavation	< 10	61 J	<100	<100	NA	NA
Drum Composite Samples							
SW-4825GB-CWM-037	ESW-4825GB-109 ESW-4825GB-110 ESW-4825GB-111	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-038	ESW-4825GB-112 ESW-4825GB-113 ESW-4825GB-114	< 10	< 100	<100	< 100	NA	NA

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-039	ESW-4825GB-115 ESW-4825GB-116 ESW-4825GB-117	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-040	ESW-4825GB-118 ESW-4825GB-119 ESW-4825GB-120	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-041	ESW-4825GB-121 ESW-4825GB-122 ESW-4825GB-123	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-042	ESW-4825GB-124 ESW-4825GB-125 ESW-4825GB-126	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-043	ESW-4825GB-127 ESW-4825GB-128 ESW-4825GB-129	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-044	ESW-4825GB-130 ESW-4825GB-131 ESW-4825GB-132	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-045	ESW-4825GB-133 ESW-4825GB-134 ESW-4825GB-135	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-046	ESW-4825GB-136 ESW-4825GB-137 ESW-4825GB-138	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-047	ESW-4825GB-139 ESW-4825GB-140 ESW-4825GB-141	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-048	ESW-4825GB-142 ESW-4825GB-143 ESW-4825GB-144	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-049	ESW-4825GB-145 ESW-4825GB-146 ESW-4825GB-147	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-050	ESW-4825GB-148 ESW-4825GB-149 ESW-4825GB-150	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-051	ESW-4825GB-151 ESW-4825GB-152 ESW-4825GB-153	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-052	ESW-4825GB-154 ESW-4825GB-155 ESW-4825GB-156	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-053	ESW-4825GB-157 ESW-4825GB-158 ESW-4825GB-159	< 10	< 100	<100	< 100	NA	NA

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-054	ESW-4825GB-160 ESW-4825GB-161 ESW-4825GB-162	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-055	ESW-4825GB-163 ESW-4825GB-164 ESW-4825GB-165	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-056	ESW-4825GB-166 ESW-4825GB-167 ESW-4825GB-168	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-057	ESW-4825GB-169 ESW-4825GB-170 ESW-4825GB-171	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-058	ESW-4825GB-172 ESW-4825GB-173 ESW-4825GB-174	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-059	ESW-4825GB-175 ESW-4825GB-176 ESW-4825GB-177	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-060	ESW-4825GB-178 ESW-4825GB-179 ESW-4825GB-180	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-061	ESW-4825GB-181 ESW-4825GB-182 ESW-4825GB-183	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-062	ESW-4825GB-184 ESW-4825GB-185 ESW-4825GB-186	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-063	ESW-4825GB-187 ESW-4825GB-188 ESW-4825GB-189	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-064	ESW-4825GB-190 ESW-4825GB-191 ESW-4825GB-192	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-065	ESW-4825GB-193 ESW-4825GB-194 ESW-4825GB-195	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-066	ESW-4825GB-196 ESW-4825GB-197 ESW-4825GB-198	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-067	ESW-4825GB-199 ESW-4825GB-200 ESW-4825GB-201	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-068	ESW-4825GB-202 ESW-4825GB-203 ESW-4825GB-204	< 10	< 100	<100	< 100	NA	NA

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-069	ESW-4825GB-205 ESW-4825GB-206 ESW-4825GB-207	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-070	ESW-4825GB-208 ESW-4825GB-209 ESW-4825GB-210	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-071	ESW-4825GB-211 ESW-4825GB-212 ESW-4825GB-213	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-072	ESW-4825GB-214 ESW-4825GB-215 ESW-4825GB-216	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-073	ESW-4825GB-217 ESW-4825GB-218 ESW-4825GB-219	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-074	ESW-4825GB-220 ESW-4825GB-221 ESW-4825GB-222	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-075	ESW-4825GB-223 ESW-4825GB-224 ESW-4825GB-225	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-076	ESW-4825GB-226 ESW-4825GB-227 ESW-4825GB-228	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-077	ESW-4825GB-229 ESW-4825GB-230 ESW-4825GB-231	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-078	ESW-4825GB-232 ESW-4825GB-233 ESW-4825GB-234	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-079	ESW-4825GB-235 ESW-4825GB-236 ESW-4825GB-237	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-080	ESW-4825GB-238 ESW-4825GB-239 ESW-4825GB-240	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-081	ESW-4825GB-241 ESW-4825GB-242 ESW-4825GB-243	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-082	ESW-4825GB-244 ESW-4825GB-245 ESW-4825GB-246	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-083	ESW-4825GB-247 ESW-4825GB-248 ESW-4825GB-249	< 10	< 100	<100	< 100	NA	NA

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-084	ESW-4825GB-250 ESW-4825GB-251 ESW-4825GB-252	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-085	ESW-4825GB-253 ESW-4825GB-254 ESW-4825GB-255	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-086	ESW-4825GB-256 ESW-4825GB-257 ESW-4825GB-258	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-087	ESW-4825GB-259 ESW-4825GB-260 ESW-4825GB-261	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-088	ESW-4825GB-262 ESW-4825GB-263 ESW-4825GB-264	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-089	ESW-4825GB-265 ESW-4825GB-266 ESW-4825GB-267	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-090	ESW-4825GB-268 ESW-4825GB-269 ESW-4825GB-270	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-091	ESW-4825GB-271 ESW-4825GB-272 ESW-4825GB-273	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-092	ESW-4825GB-274 ESW-4825GB-275 ESW-4825GB-276	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-093	ESW-4825GB-277 ESW-4825GB-278 ESW-4825GB-279	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-094	ESW-4825GB-280 ESW-4825GB-281 ESW-4825GB-282	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-095	ESW-4825GB-283 ESW-4825GB-284 ESW-4825GB-285	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-096	ESW-4825GB-286 ESW-4825GB-287 ESW-4825GB-288	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-097	ESW-4825GB-289 ESW-4825GB-290 ESW-4825GB-291	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-098	ESW-4825GB-292 ESW-4825GB-293 ESW-4825GB-294	< 10	< 100	<100	< 100	NA	NA

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-099	ESW-4825GB-295 ESW-4825GB-296 ESW-4825GB-297	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-100	ESW-4825GB-298 ESW-4825GB-299 ESW-4825GB-300	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-101	ESW-4825GB-301 ESW-4825GB-302 ESW-4825GB-303	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-102	ESW-4825GB-304 ESW-4825GB-305 ESW-4825GB-306	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-103	ESW-4825GB-307 ESW-4825GB-308 ESW-4825GB-309	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-104	ESW-4825GB-310 ESW-4825GB-311 ESW-4825GB-312	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-105	ESW-4825GB-313 ESW-4825GB-314 ESW-4825GB-315	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-106	ESW-4825GB-316 ESW-4825GB-317 ESW-4825GB-318	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-107	ESW-4825GB-319 ESW-4825GB-320 ESW-4825GB-321	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-108	ESW-4825GB-322 ESW-4825GB-323 ESW-4825GB-324	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-109	ESW-4825GB-325 ESW-4825GB-326 ESW-4825GB-327	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-110	ESW-4825GB-328 ESW-4825GB-329 ESW-4825GB-330	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-111	ESW-4825GB-331 ESW-4825GB-332 ESW-4825GB-333	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-112	ESW-4825GB-334 ESW-4825GB-335 ESW-4825GB-336	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-113	ESW-4825GB-337 ESW-4825GB-338 ESW-4825GB-339	< 10	< 100	<100	< 100	NA	NA

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-114	ESW-4825GB-340 ESW-4825GB-341 ESW-4825GB-342	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-115	ESW-4825GB-343 ESW-4825GB-344 ESW-4825GB-345	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-116	ESW-4825GB-346 ESW-4825GB-347 ESW-4825GB-348	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-117	ESW-4825GB-349 ESW-4825GB-350 ESW-4825GB-351	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-118	ESW-4825GB-352 ESW-4825GB-353 ESW-4825GB-354	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-119	ESW-4825GB-355 ESW-4825GB-356 ESW-4825GB-357	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-120	ESW-4825GB-358 ESW-4825GB-359 ESW-4825GB-360	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-121	ESW-4825GB-361 ESW-4825GB-362 ESW-4825GB-363	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-122	ESW-4825GB-364 ESW-4825GB-365 ESW-4825GB-366	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-123	ESW-4825GB-367 ESW-4825GB-368 ESW-4825GB-369	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-124	ESW-4825GB-370 ESW-4825GB-371 ESW-4825GB-372	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-125	ESW-4825GB-373 ESW-4825GB-374 ESW-4825GB-375	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-126	ESW-4825GB-376 ESW-4825GB-377 ESW-4825GB-378	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-127	ESW-4825GB-379 ESW-4825GB-380 ESW-4825GB-381	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-128	ESW-4825GB-382 ESW-4825GB-383 ESW-4825GB-384	< 10	< 100	<100	< 100	NA	NA

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-129	ESW-4825GB-385 ESW-4825GB-386 ESW-4825GB-387	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-130	ESW-4825GB-388 ESW-4825GB-389 ESW-4825GB-390	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-131	ESW-4825GB-391 ESW-4825GB-392 ESW-4825GB-393	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-132	ESW-4825GB-394 ESW-4825GB-395 ESW-4825GB-396	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-133	ESW-4825GB-397 ESW-4825GB-398 ESW-4825GB-399	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-134	ESW-4825GB-400 ESW-4825GB-401 ESW-4825GB-402	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-135	ESW-4825GB-403 ESW-4825GB-404 ESW-4825GB-405	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-136	ESW-4825GB-406 ESW-4825GB-407 ESW-4825GB-408	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-137	ESW-4825GB-409 ESW-4825GB-410 ESW-4825GB-411	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-138	ESW-4825GB-412 ESW-4825GB-413 ESW-4825GB-414	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-139	ESW-4825GB-415 ESW-4825GB-416 ESW-4825GB-417	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-140	ESW-4825GB-418 ESW-4825GB-419 ESW-4825GB-420	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-141	ESW-4825GB-421 ESW-4825GB-422 ESW-4825GB-423	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-142	ESW-4825GB-424 ESW-4825GB-425 ESW-4825GB-426	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-143	ESW-4825GB-427 ESW-4825GB-428 ESW-4825GB-429	< 10	< 100	<100	< 100	NA	NA

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-144	ESW-4825GB-430 ESW-4825GB-431 ESW-4825GB-432	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-145	ESW-4825GB-433 ESW-4825GB-434 ESW-4825GB-435	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-146	ESW-4825GB-436 ESW-4825GB-437 ESW-4825GB-438	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-147	ESW-4825GB-439 ESW-4825GB-440 ESW-4825GB-441	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-148	ESW-4825GB-442 ESW-4825GB-443 ESW-4825GB-444	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-149	ESW-4825GB-445 ESW-4825GB-446 ESW-4825GB-447	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-150	ESW-4825GB-448 ESW-4825GB-449 ESW-4825GB-450	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-151	ESW-4825GB-451 ESW-4825GB-452 ESW-4825GB-453	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-152	ESW-4825GB-454 ESW-4825GB-455 ESW-4825GB-456	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-153	ESW-4825GB-457 ESW-4825GB-458 ESW-4825GB-459	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-154	ESW-4825GB-460 ESW-4825GB-461 ESW-4825GB-462	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-155	ESW-4825GB-463 ESW-4825GB-464 ESW-4825GB-465	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-156	ESW-4825GB-466 ESW-4825GB-467 ESW-4825GB-468	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-157	ESW-4825GB-469 ESW-4825GB-470 ESW-4825GB-471	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-158	ESW-4825GB-472 ESW-4825GB-473 ESW-4825GB-474	< 10	< 100	<100	< 100	NA	NA

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-159	ESW-4825GB-475 ESW-4825GB-476 ESW-4825GB-477	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-160	ESW-4825GB-478 ESW-4825GB-479 ESW-4825GB-480	3.1 J	< 100	130	29 J	< 250	1200 D
SW-4825GB-CWM-161	ESW-4825GB-481 ESW-4825GB-482 ESW-4825GB-483	3.2 J	< 100	83 J	27 J	NA	2500 D
SW-4825GB-CWM-162	ESW-4825GB-484 ESW-4825GB-485 ESW-4825GB-486	< 10	< 100	20 J	< 100	NA	500 D
SW-4825GB-CWM-163	ESW-4825GB-487 ESW-4825GB-488 ESW-4825GB-489	< 10	< 100	< 100	< 100	NA	NA
SW-4825GB-CWM-164	ESW-4825GB-490 ESW-4825GB-491 ESW-4825GB-492	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-165	ESW-4825GB-493 ESW-4825GB-494 ESW-4825GB-495	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-166	ESW-4825GB-496 ESW-4825GB-497 ESW-4825GB-498	< 10	< 100	25 J	< 100	NA	NA
SW-4825GB-CWM-167	ESW-4825GB-499 ESW-4825GB-500 ESW-4825GB-501	2.3 J	< 100	46 J	< 100	NA	NA
SW-4825GB-CWM-168	ESW-4825GB-502 ESW-4825GB-503 ESW-4825GB-504	2.4 J	<100	55 J	<100	NA	NA
SW-4825GB-CWM-169	ESW-4825GB-505 ESW-4825GB-506 ESW-4825GB-507	<10	<100	32 J	<100	NA	NA
SW-4825GB-CWM-170	ESW-4825GB-508 ESW-4825GB-509 ESW-4825GB-510	2.2 J	<100	54 J	<100	NA	NA
SW-4825GB-CWM-171	ESW-4825GB-511 ESW-4825GB-512 ESW-4825GB-513	3.3 J	<100	41 J	<100	NA	NA
SW-4825GB-CWM-172	ESW-4825GB-514 ESW-4825GB-515 ESW-4825GB-516	2.9 J	46 J	140	21 J	NA	620 D
SW-4825GB-CWM-173	ESW-4825GB-517 ESW-4825GB-518 ESW-4825GB-519	1.9 J	42 J	140	< 100	NA	390 D

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-174	ESW-4825GB-520 ESW-4825GB-521 ESW-4825GB-522	< 10	34 J	58 J	< 100	NA	630 D
SW-4825GB-CWM-175	ESW-4825GB-523 ESW-4825GB-524 ESW-4825GB-525	< 10	35 J	45 J	< 100	NA	550 D
SW-4825GB-CWM-176	ESW-4825GB-526 ESW-4825GB-527 ESW-4825GB-528	2.3 J	50 J	110	27 J	NA	NA
SW-4825GB-CWM-177	ESW-4825GB-529 ESW-4825GB-530 ESW-4825GB-531	<10	<100	48 J	<100	NA	NA
SW-4825GB-CWM-178	ESW-4825GB-532 ESW-4825GB-533 ESW-4825GB-534	3.4 J	47 J	100	25 J	NA	NA
SW-4825GB-CWM-179	ESW-4825GB-535 ESW-4825GB-536 ESW-4825GB-537	<10	1000 D	220	34 J	<250	1500
SW-4825GB-CWM-180	ESW-4825GB-538 ESW-4825GB-539 ESW-4825GB-540	<10	1100 D	380	87 J	<250	1800
SW-4825GB-CWM-181	ESW-4825GB-541 ESW-4825GB-542 ESW-4825GB-543	<10	250	220	41 J	<250	NA
SW-4825GB-CWM-182	ESW-4825GB-544 ESW-4825GB-545 ESW-4825GB-546	<10	130	140	27 J	<250	NA
SW-4825GB-CWM-183	ESW-4825GB-547 ESW-4825GB-548 ESW-4825GB-549	<10	220	80 J	21 J	NA	NA
SW-4825GB-CWM-184	ESW-4825GB-550 ESW-4825GB-551 ESW-4825GB-552	<10	<100	39 J	<100	NA	NA
SW-4825GB-CWM-185	ESW-4825GB-553 ESW-4825GB-554 ESW-4825GB-555	<10	30 J	33 J	<100	NA	NA
SW-4825GB-CWM-186	ESW-4825GB-556 ESW-4825GB-557 ESW-4825GB-558	<10	400 D	150	32 J	<250	NA
SW-4825GB-CWM-187	ESW-4825GB-559 ESW-4825GB-560 ESW-4825GB-561	<10	140	120	28 J	<250	NA
SW-4825GB-CWM-188	ESW-4825GB-562 ESW-4825GB-563 ESW-4825GB-564	<10	130	160	31 J	<250	NA

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-189	ESW-4825GB-565 ESW-4825GB-566 ESW-4825GB-567	<10	89 J	76 J	22 J	NA	NA
SW-4825GB-CWM-190	ESW-4825GB-568 ESW-4825GB-569 ESW-4825GB-570	<10	130	120	33 J	<250	NA
SW-4825GB-CWM-191	ESW-4825GB-571 ESW-4825GB-572 ESW-4825GB-573	<10	55 J	44 J	<100	NA	NA
SW-4825GB-CWM-192	ESW-4825GB-574 ESW-4825GB-575 ESW-4825GB-576	<10	83 J	130	77 J	<250	NA
SW-4825GB-CWM-193	ESW-4825GB-577 ESW-4825GB-578 ESW-4825GB-579	<10	170	130	36 J	<250	NA
SW-4825GB-CWM-194	ESW-4825GB-580 ESW-4825GB-581 ESW-4825GB-582	<10	92 J	96 J	40 J	NA	NA
SW-4825GB-CWM-195	ESW-4825GB-583 ESW-4825GB-584 ESW-4825GB-585	<10	85 J	95 J	31 J	NA	NA
SW-4825GB-CWM-196	ESW-4825GB-586 ESW-4825GB-587 ESW-4825GB-588	<10	92 J	110	29 J	<250	NA
SW-4825GB-CWM-197	ESW-4825GB-589 ESW-4825GB-590 ESW-4825GB-591	<10	120	36 J	<100	NA	NA
SW-4825GB-CWM-198	ESW-4825GB-592 ESW-4825GB-593 ESW-4825GB-594	<10	110	45 J	<100	NA	NA
SW-4825GB-CWM-199	ESW-4825GB-595 ESW-4825GB-596 ESW-4825GB-597	<10	200	88 J	<100	NA	NA
SW-4825GB-CWM-200	ESW-4825GB-598 ESW-4825GB-599 ESW-4825GB-600	<10	410 D	160	<100	<250	NA
SW-4825GB-CWM-201	ESW-4825GB-601 ESW-4825GB-602 ESW-4825GB-603	<10	360	120	<100	<250	NA
SW-4825GB-CWM-202	ESW-4825GB-604 ESW-4825GB-605 ESW-4825GB-606	<10	450	94 J	<100	NA	NA
SW-4825GB-CWM-203	ESW-4825GB-607 ESW-4825GB-608 ESW-4825GB-609	<10	300	65 J	<100	NA	NA

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-204	ESW-4825GB-610 ESW-4825GB-611 ESW-4825GB-612	<10	180	48 J	<100	NA	NA
SW-4825GB-CWM-205	ESW-4825GB-613 ESW-4825GB-614 ESW-4825GB-615	<10	110	40 J	<100	NA	NA
SW-4825GB-CWM-206	ESW-4825GB-616 ESW-4825GB-617 ESW-4825GB-618	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-207	ESW-4825GB-619 ESW-4825GB-620 ESW-4825GB-621	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-208	ESW-4825GB-622 ESW-4825GB-623 ESW-4825GB-624	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-209	ESW-4825GB-625 ESW-4825GB-626 ESW-4825GB-627	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-210	ESW-4825GB-628 ESW-4825GB-629 ESW-4825GB-630	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-211	ESW-4825GB-631 ESW-4825GB-632 ESW-4825GB-633	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-212	ESW-4825GB-634 ESW-4825GB-635 ESW-4825GB-636	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-213	ESW-4825GB-637 ESW-4825GB-638 ESW-4825GB-639	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-214	ESW-4825GB-640 ESW-4825GB-641 ESW-4825GB-642	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-215	ESW-4825GB-643 ESW-4825GB-644 ESW-4825GB-645	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-216	ESW-4825GB-646 ESW-4825GB-647 ESW-4825GB-648	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-217	ESW-4825GB-649 ESW-4825GB-650 ESW-4825GB-651	2.2 J	<100	<100	< 100	NA	NA
SW-4825GB-CWM-218	ESW-4825GB-652 ESW-4825GB-653 ESW-4825GB-654	1.9 J	<100	<100	< 100	NA	NA

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-219	ESW-4825GB-655 ESW-4825GB-656 ESW-4825GB-657	1.9 J	<100	<100	< 100	NA	NA
SW-4825GB-CWM-220	ESW-4825GB-658 ESW-4825GB-659 ESW-4825GB-660	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-221	ESW-4825GB-661 ESW-4825GB-662 ESW-4825GB-663	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-222	ESW-4825GB-664 ESW-4825GB-665 ESW-4825GB-666	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-223	ESW-4825GB-667 ESW-4825GB-668 ESW-4825GB-669	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-224	ESW-4825GB-670 ESW-4825GB-671 ESW-4825GB-672	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-225	ESW-4825GB-673 ESW-4825GB-674 ESW-4825GB-675	< 10	26 J	<100	< 100	NA	NA
SW-4825GB-CWM-226	ESW-4825GB-676 ESW-4825GB-677 ESW-4825GB-678	1.9 J	<100	<100	< 100	NA	NA
SW-4825GB-CWM-227	ESW-4825GB-679 ESW-4825GB-680 ESW-4825GB-681	2.2 J	<100	<100	< 100	NA	NA
SW-4825GB-CWM-228	ESW-4825GB-682 ESW-4825GB-683 ESW-4825GB-684	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-229	ESW-4825GB-685 ESW-4825GB-686 ESW-4825GB-687	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-230	ESW-4825GB-688 ESW-4825GB-689 ESW-4825GB-690	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-231	ESW-4825GB-691 ESW-4825GB-692 ESW-4825GB-693	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-232	ESW-4825GB-694 ESW-4825GB-695 ESW-4825GB-696	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-233	ESW-4825GB-697 ESW-4825GB-698 ESW-4825GB-699	< 10	< 100	<100	< 100	NA	NA

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-234	ESW-4825GB-700 ESW-4825GB-701 ESW-4825GB-702	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-235	ESW-4825GB-703 ESW-4825GB-704 ESW-4825GB-705	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-236	ESW-4825GB-706 ESW-4825GB-707 ESW-4825GB-708	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-237	ESW-4825GB-709 ESW-4825GB-710 ESW-4825GB-711	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-238	ESW-4825GB-712 ESW-4825GB-713 ESW-4825GB-714	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-239	ESW-4825GB-715 ESW-4825GB-716 ESW-4825GB-717	< 10	< 100	<100	< 100	NA	NA
SW-4825GB-CWM-240	ESW-4825GB-718 ESW-4825GB-719 ESW-4825GB-720	<10	<100	20 J	<100	NA	NA
SW-4825GB-CWM-241	ESW-4825GB-721 ESW-4825GB-722 ESW-4825GB-723	<10	<100	20 J	<100	NA	NA
SW-4825GB-CWM-242	ESW-4825GB-724 ESW-4825GB-725 ESW-4825GB-726	<10	<100	22 J	<100	NA	NA
SW-4825GB-CWM-243	ESW-4825GB-727 ESW-4825GB-728 ESW-4825GB-729	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-244	ESW-4825GB-730 ESW-4825GB-731 ESW-4825GB-732	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-245	ESW-4825GB-733 ESW-4825GB-734 ESW-4825GB-735	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-246	ESW-4825GB-736 ESW-4825GB-737 ESW-4825GB-738	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-247	ESW-4825GB-739 ESW-4825GB-740 ESW-4825GB-741	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-248	ESW-4825GB-742 ESW-4825GB-743 ESW-4825GB-744	<10	<100	<100	<100	NA	NA

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-249	ESW-4825GB-745 ESW-4825GB-746 ESW-4825GB-747	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-250	ESW-4825GB-748 ESW-4825GB-749 ESW-4825GB-750	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-251	ESW-4825GB-751 ESW-4825GB-752 ESW-4825GB-753	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-252	ESW-4825GB-754 ESW-4825GB-755 ESW-4825GB-756	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-253	ESW-4825GB-757 ESW-4825GB-758 ESW-4825GB-759	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-254	ESW-4825GB-760 ESW-4825GB-761 ESW-4825GB-762	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-255	ESW-4825GB-763 ESW-4825GB-764 ESW-4825GB-765	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-256	ESW-4825GB-766 ESW-4825GB-767 ESW-4825GB-768	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-257	ESW-4825GB-769 ESW-4825GB-770 ESW-4825GB-771	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-258	ESW-4825GB-772 ESW-4825GB-773 ESW-4825GB-774	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-259	ESW-4825GB-775 ESW-4825GB-776 ESW-4825GB-777	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-260	ESW-4825GB-778 ESW-4825GB-779 ESW-4825GB-780	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-261	ESW-4825GB-781 ESW-4825GB-782 ESW-4825GB-783	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-262	ESW-4825GB-784 ESW-4825GB-785 ESW-4825GB-786	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-263	ESW-4825GB-787 ESW-4825GB-788 ESW-4825GB-789	<10	<100	<100	<100	NA	NA

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-264	ESW-4825GB-790 ESW-4825GB-791 ESW-4825GB-792	<10	<100	<100	<100	NA	NA
SW-4825GB-CWM-265	ESW-4825GB-793 ESW-4825GB-794 ESW-4825GB-795	28	74 J	480	50 J	NA	NA
SW-4825GB-CWM-266	ESW-4825GB-796 ESW-4825GB-797 ESW-4825GB-798	590 D	440 D	5200 D	260	NA	NA
SW-4825GB-CWM-267	ESW-4825GB-799 ESW-4825GB-800 ESW-4825GB-801	<10	480	450	54 J	<250	NA
SW-4825GB-CWM-268	ESW-4825GB-802 ESW-4825GB-803 ESW-4825GB-804	<10	220 D	210	37 J	<250	NA
SW-4825GB-CWM-269	ESW-4825GB-805 ESW-4825GB-806 ESW-4825GB-807	<10	300	170	31 J	<250	NA
SW-4825GB-CWM-270	ESW-4825GB-808 ESW-4825GB-809 ESW-4825GB-810	<10	37 J	<100	<100	NA	NA
SW-4825GB-CWM-271	ESW-4825GB-811 ESW-4825GB-812 ESW-4825GB-813	2.8 J	60 J	82 J	<100	NA	NA
SW-4825GB-CWM-272	ESW-4825GB-814 ESW-4825GB-815 ESW-4825GB-816	2.0 J	36 J	31 J	<100	NA	NA
SW-4825GB-CWM-273	ESW-4825GB-817 ESW-4825GB-818 ESW-4825GB-819	<10	38 J	21 J	<100	NA	NA
SW-4825GB-CWM-274	ESW-4825GB-820 ESW-4825GB-821 ESW-4825GB-822	<10	46 J	<100	<100	NA	NA
SW-4825GB-CWM-275	ESW-4825GB-823 ESW-4825GB-824 ESW-4825GB-825	26	72 J	133	<100	NA	NA
SW-4825GB-CWM-276	ESW-4825GB-826 ESW-4825GB-827 ESW-4825GB-828	< 10	< 100	39 J	< 100	NA	NA
SW-4825GB-CWM-277	ESW-4825GB-829 ESW-4825GB-830 ESW-4825GB-831	< 10	< 100	65 J	< 100	NA	NA
SW-4825GB-CWM-278	ESW-4825GB-832 ESW-4825GB-833 ESW-4825GB-834	< 10	33 J	72 J	< 100	NA	NA

Table A.14b
ECBC Sampling Results for TPs 120 and 134

(Updated on 10/28/10)

Sample ID	Drum ID/Description	HD (ug/kg)/(ug/L)	L (ug/kg)/(ug/L)	1,4-Dithiane (ug/kg)/(ug/L)	1,4-Thioxane (ug/kg)/(ug/L)	Thiodiglycol (ug/kg)	Arsenic (mg/kg)
SW-4825GB-CWM-279	ESW-4825GB-835 ESW-4825GB-836 ESW-4825GB-837	< 10	< 100	51 J	< 100	NA	NA
SW-4825GB-CWM-280	ESW-4825GB-838 ESW-4825GB-839 ESW-4825GB-840	< 10	< 100	66 J	< 100	NA	440 D
SW-4825GB-CWM-281	ESW-4825GB-841 ESW-4825GB-842 ESW-4825GB-843	< 10	< 100	52 J	< 100	NA	260 D
SW-4825GB-CWM-282	ESW-4825GB-844 ESW-4825GB-845 ESW-4825GB-846	3.4 J	270	130	<100	NA	550 D
SW-4825GB-CWM-283	ESW-4825GB-847 ESW-4825GB-848 ESW-4825GB-849	4.2 J	570 D	110	20 J	NA	590 D
SW-4825GB-CWM-284	ESW-4825GB-850 ESW-4825GB-851 ESW-4825GB-852	2.8 J	500 D	110	<100	NA	310 D
SW-4825GB-CWM-285	ESW-4825GB-853 ESW-4825GB-854 ESW-4825GB-855	4.5 J	620 D	110	<100	NA	1,300 D
SW-4825GB-CWM-286	ESW-4825GB-856 ESW-4825GB-857 ESW-4825GB-858	< 10	250	43 J	< 100	NA	NA

NA - not analyzed
HD - Mustard
L - Lewisite

Detected L and/or HD and both ABPs
Detected L and/or HD and one ABP
Detected L or HD
Detected both ABPs
Detected one ABP
Cleared for Agent and ABPs

Table A.15

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD - TEST PITS GRAB SAMPLES

SAMPLE ID:			SW-4825GB-GRAB-01(TP120)		SW-4825GB-GS11		SW-4825GB-GS12		SW-4825GB-GS13	
DATE SAMPLED:			04/14/09		03/09/10		03/09/10		03/10/10	
LAB SAMPLE ID:			904159-001		9836341001		9836341002		9836341003	
	Units	Comparison Level								
Volatile Organics - OLM04.3_V										
1,1,1-Trichloroethane	ug/kg	870000	13	UL	2.7	U	2.7	UJ	2.2	U
1,1,2,2-Tetrachloroethane	ug/kg	560	13	UL	2.7	U	2.7	UJ	2.2	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/kg	4300000	13	UL	2.7	U	2.7	UJ	2.2	U
1,1,2-Trichloroethane	ug/kg	1100	13	UL	2.7	U	2.7	UJ	2.2	U
1,1-Dichloroethane	ug/kg	3300	13	UL	2.7	U	2.7	UJ	2.2	U
1,1-Dichloroethene	ug/kg	24000	13	UL	2.7	U	2.7	UJ	2.2	U
1,2,4-Trichlorobenzene	ug/kg	22000	13	UL	6.9	U	6.8	UJ	5.5	U
1,2-Dibromo-3-chloropropane	ug/kg	5.4	13	R	6.9	U	6.8	UJ	5.5	U
1,2-Dibromoethane	ug/kg	34	13	UL	2.7	U	2.7	UJ	2.2	U
1,2-Dichlorobenzene	ug/kg	190000	13	UL	2.7	U	2.7	UJ	2.2	U
1,2-Dichloroethane	ug/kg	430	13	UL	2.7	U	2.7	UJ	2.2	U
1,2-Dichloropropane	ug/kg	890	13	UL	2.7	U	2.7	UJ	2.2	U
1,3-Dichlorobenzene	ug/kg	18	13	UL	2.7	U	2.7	UJ	2.2	U
1,4-Dichlorobenzene	ug/kg	2400	13	UL	2.7	U	2.7	UJ	2.2	U
Acetone	ug/kg	6100000	13	UL	**45.8**	L	**54.4**	J	**25.2**	L
Acetonitrile	ug/kg	87000	130	UL	13.7	R	13.6	R	10.9	R
Acrolein	ug/kg	15	65	UL	68.7	R	67.9	R	54.7	R
Benzene	ug/kg	1100	13	UL	2.7	U	2.7	UJ	**1.6**	J
Benzyl Bromide	ug/kg	16000	13	UL						
Benzyl chloride	ug/kg	1000	13	UL	2.7	U	2.7	UJ	2.2	U
Bromobenzene	ug/kg	30000	13	UL	2.7	U	2.7	UJ	2.2	U
Bromodichloromethane	ug/kg	270	13	UL	2.7	U	2.7	UJ	2.2	U
Bromoform	ug/kg	61000	13	UL	2.7	U	2.7	UJ	2.2	U
Carbon disulfide	ug/kg	82000	13	UL	2.7	U	2.7	UJ	2.2	U
Carbon tetrachloride	ug/kg	610	13	UL	2.7	U	2.7	UJ	2.2	U

Table A.15

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD - TEST PITS GRAB SAMPLES

SAMPLE ID:			SW-4825GB-GRAB-01(TP120)		SW-4825GB-GS11		SW-4825GB-GS12		SW-4825GB-GS13	
DATE SAMPLED:			04/14/09		03/09/10		03/09/10		03/10/10	
LAB SAMPLE ID:			904159-001		9836341001		9836341002		9836341003	
	Units	Comparison Level								
Chlorobenzene	ug/kg	29000	13	UL	2.7	U	2.7	UJ	**1.8**	J
Chlorodibromomethane	ug/kg	680	13	UL	2.7	U	2.7	UJ	2.2	U
Chloroethane	ug/kg	1500000	13	UL	6.9	U	6.8	UJ	5.5	U
Chloroform	ug/kg	290	13	UL	**3.4**		2.7	UJ	2.2	U
Chloropicrin	ug/kg	57000000	65	UL						
Cis-1,2-Dichloroethene	ug/kg	78000	13	UL	2.7	U	2.7	UJ	2.2	U
cis-1,3-Dichloropropene	ug/kg	18	13	UL	2.7	U	2.7	UJ	2.2	U
Cyclohexane	ug/kg	700000	13	UL	2.7	U	2.7	UJ	2.2	U
Dichlorodifluoromethane	ug/kg	18000	13	UL	2.7	U	2.7	UJ	2.2	U
Diphenyl Ether	ug/kg	NA	13	UL						
Ethyl benzene	ug/kg	5400	13	UL	2.7	U	2.7	UJ	**0.95**	J
Isopropylbenzene	ug/kg	210000	13	UL	2.7	U	2.7	UJ	2.2	U
Methyl Acetate	ug/kg	7800000	13	UL	2.7	U	2.7	UJ	2.2	U
Methyl bromide	ug/kg	730	13	UL	2.7	UJ	2.7	UJ	2.2	U
Methyl butyl ketone	ug/kg	21000	13	UL	13.7	U	13.6	UJ	10.9	U
Methyl chloride	ug/kg	12000	13	UL	2.7	U	2.7	UJ	2.2	U
Methyl ethyl ketone	ug/kg	2800000	13	UL	13.7	R	13.6	R	10.9	R
Methyl isobutyl ketone	ug/kg	530000	13	UL	13.7	U	13.6	UJ	10.9	U
Methyl Tertbutyl Ether	ug/kg	43000	13	UL	**19.7**	J	**18.2**	K	**0.84**	J
MethylCyclohexane	ug/kg	18	13	UL	2.7	U	2.7	UJ	2.2	U
Methylene chloride	ug/kg	11000	13	UL	**1.7**	J	**2.9**	K	**5.2**	J
Styrene	ug/kg	630000	13	UL	2.7	U	2.7	UJ	2.2	UJ
Tetrachloroethene	ug/kg	550	13	UL	2.7	U	2.7	UJ	2.2	U
Toluene	ug/kg	500000	13	UL	2.7	U	2.7	UJ	**7.1**	
Trans-1,2-Dichloroethene	ug/kg	15000	13	UL	2.7	U	2.7	UJ	2.2	U
trans-1,3-dichloropropene	ug/kg	18	13	UL	2.7	U	2.7	UJ	2.2	U

Table A.15

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD - TEST PITS GRAB SAMPLES

SAMPLE ID:			SW-4825GB-GRAB-01(TP120)		SW-4825GB-GS11		SW-4825GB-GS12		SW-4825GB-GS13	
DATE SAMPLED:			04/14/09		03/09/10		03/09/10		03/10/10	
LAB SAMPLE ID:			904159-001		9836341001		9836341002		9836341003	
	Units	Comparison Level								
Trichloroethene	ug/kg	2800	**8**	L	2.7	U	2.7	UJ	2.2	U
Trichlorofluoromethane	ug/kg	79000	13	UL	2.7	U	2.7	UJ	2.2	U
Vinyl chloride	ug/kg	60	13	UL	2.7	U	2.7	UJ	2.2	U
Xylenes (Total)	ug/kg	63000	13	UL	8.2	U	8.1	UJ	**13**	
Semivolatile Organics - OLM04.3_SV										
1,1'-Biphenyl	ug/kg	390000	430	U	117	UJ	115	UJ	116	U
1-chloro-2,4-dinitrobenzene	ug/kg	510	430	U						
2,4,5-Trichlorophenol	ug/kg	610000	1100	U	317	U	310	U	314	U
2,4,6-Trichlorophenol	ug/kg	44000	430	U	317	U	310	U	314	U
2,4-Dichlorophenol	ug/kg	18000	430	U	317	U	310	U	314	U
2,4-Dimethylphenol	ug/kg	120000	430	U	317	U	310	U	314	U
2,4-Dinitrophenol	ug/kg	12000	1100	U	634	U	619	U	627	U
2-Bromo-4'-chloroacetophenone	ug/kg	510	430	U						
2-Chloronaphthalene	ug/kg	630000	430	U	117	U	115	U	116	U
2-Chlorophenol	ug/kg	39000	430	U	317	U	310	U	314	U
2-Methylnaphthalene	ug/kg	31000	430	U	58.7	U	57.4	U	58.1	U
2-Methylphenol	ug/kg	310000	430	U	317	UJ	310	UJ	314	U
2-Nitroaniline	ug/kg	61000	1100	U	317	U	310	U	314	U
2-Nitrophenol	ug/kg	510	430	U	317	U	310	U	314	U
3,3'-Dichlorobenzidine	ug/kg	1100	430	U	634	U	619	U	627	U
3-Nitroaniline	ug/kg	1300	1100	U	317	U	310	U	314	U
4,6-Dinitro-2-methylphenol	ug/kg	490	1100	U	317	U	310	U	314	U
4-Bromophenyl-phenylether	ug/kg	510	430	U	117	U	115	U	116	U
4-Chloro-3-methylphenol	ug/kg	610000	430	U	317	U	310	U	314	U
4-Chloroacetophenone	ug/kg	510	430	U						

Table A.15

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD - TEST PITS GRAB SAMPLES

SAMPLE ID:			SW-4825GB-GRAB-01(TP120)		SW-4825GB-GS11		SW-4825GB-GS12		SW-4825GB-GS13	
DATE SAMPLED:			04/14/09		03/09/10		03/09/10		03/10/10	
LAB SAMPLE ID:			904159-001		9836341001		9836341002		9836341003	
	Units	Comparison Level								
4-Chloroaniline	ug/kg	2400	430	U	317	U	310	U	314	U
4-Chlorophenyl-PhenylEther	ug/kg	510	430	U	117	U	115	U	116	U
4-Methylphenol	ug/kg	31000	430	U	317	UJ	310	UJ	314	U
4-Nitroaniline	ug/kg	24000	1100	U	317	U	310	U	314	U
4-Nitrophenol	ug/kg	1300	1100	U	317	U	310	U	314	U
Acenaphthene	ug/kg	340000	430	U	58.7	UJ	57.4	UJ	58.1	U
Acenaphthylene	ug/kg	510	430	U	58.7	UJ	57.4	UJ	58.1	U
Acetophenone	ug/kg	780000	430	U	117	UJ	115	UJ	116	U
Anthracene	ug/kg	1700000	430	U	58.7	UJ	57.4	UJ	58.1	U
Atrazine	ug/kg	2100	430	U	117	U	115	U	116	U
Benzal Chloride	ug/kg	510	430	U						
Benzaldehyde	ug/kg	780000	430	U	**24**	J	310	UJ	314	U
Benzo(a)anthracene	ug/kg	150	430	U	58.7	UJ	57.4	UJ	58.1	U
Benzo(a)pyrene	ug/kg	15	430	U	58.7	UJ	57.4	UJ	58.1	U
Benzo(b)fluoranthene	ug/kg	150	430	U	58.7	UJ	57.4	UJ	58.1	U
Benzo(g,h,i)perylene	ug/kg	331.5	430	U	58.7	U	57.4	U	58.1	U
Benzo(k)fluoranthene	ug/kg	1500	430	U	58.7	UJ	57.4	UJ	58.1	U
Benzoic Acid	ug/kg	24000000	NA		634	U	619	U	**251**	J
Bis(2-Chloroethoxy)methane	ug/kg	18000	430	U	117	UJ	115	UJ	116	U
Bis(2-Chloroethyl)ether	ug/kg	210	430	U	117	U	115	U	116	U
Bis(2-Chloroisopropyl)ether	ug/kg	4600	430	U	117	UJ	115	UJ	116	U
Bis(2-Ethylhexyl)phthalate	ug/kg	35000	**450**	K	117	UJ	115	UJ	**28.2**	J
Bromacetophenone	ug/kg	510	430	U	ND		ND		ND	
Bromchloracetophenone	ug/kg	510	430	U	ND		ND		ND	
Butylbenzylphthalate	ug/kg	260000	430	U	117	UJ	115	UJ	116	U
Caprolactam	ug/kg	3100000	430	U	317	UJ	310	UJ	314	U

Table A.15
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD - TEST PITS GRAB SAMPLES

SAMPLE ID:			SW-4825GB-GRAB-01(TP120)		SW-4825GB-GS11		SW-4825GB-GS12		SW-4825GB-GS13	
DATE SAMPLED:			04/14/09		03/09/10		03/09/10		03/10/10	
LAB SAMPLE ID:			904159-001		9836341001		9836341002		9836341003	
	Units	Comparison Level								
Carbazole	ug/kg	510	430	U	117	UJ	115	UJ	116	U
Chrysene	ug/kg	15000	430	U	58.7	UJ	57.4	UJ	58.1	U
Dibenz(a,h)anthracene	ug/kg	15	430	U	58.7	U	57.4	U	58.1	U
Dibenzofuran	ug/kg	7800	430	U	117	UJ	115	UJ	116	U
Diethyl phthalate	ug/kg	4900000	430	U	117	UJ	115	UJ	116	U
Dimethylaniline	ug/kg	16000	430	U						
Dimethylphthalate	ug/kg	510	430	U	117	UJ	115	UJ	116	U
Di-n-butylphthalate	ug/kg	610000	430	U	117	UJ	115	UJ	116	U
di-n-Octyl Phthalate	ug/kg	510	430	U	317	U	310	U	314	U
					117	UJ	115	UJ	116	U
Fluoranthene	ug/kg	230000	430	U	58.7	UJ	57.4	UJ	58.1	U
Fluorene	ug/kg	230000	430	U	58.7	UJ	57.4	UJ	58.1	U
Glycol-bromohydrin	ug/kg	510	430	U						
Hexachlorobenzene	ug/kg	300	430	U	117	UJ	115	UJ	116	U
Hexachlorobutadiene	ug/kg	6200	430	U	117	U	115	U	116	U
Hexachlorocyclopentadiene	ug/kg	37000	430	U	317	U	310	U	314	U
Hexachloroethane	ug/kg	35000	430	U	117	UJ	115	UJ	116	U
Indeno(1,2,3-cd)pyrene	ug/kg	150	430	U	58.7	UJ	57.4	UJ	58.1	U
Isophorone	ug/kg	510000	430	U	117	UJ	115	UJ	116	U
Naphthalene	ug/kg	3600	430	U	58.7	UJ	57.4	UJ	58.1	U
N-Nitrosodiphenylamine	ug/kg	99000	430	U	117	U	115	U	116	U
N-Nitrosodipropylamine	ug/kg	69	430	U	117	UJ	115	UJ	116	U
Pentachlorophenol	ug/kg	3000	1100	U	634	U	619	U	627	U
Phenanthrene	ug/kg	407.4	430	U	58.7	UJ	57.4	UJ	58.1	U
Phenol	ug/kg	1800000	430	U	317	UJ	310	UJ	314	U
Phenyl isocyanate	ug/kg	510	430	R						

Table A.15

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD - TEST PITS GRAB SAMPLES

SAMPLE ID:			SW-4825GB-GRAB-01(TP120)		SW-4825GB-GS11		SW-4825GB-GS12		SW-4825GB-GS13	
DATE SAMPLED:			04/14/09		03/09/10		03/09/10		03/10/10	
LAB SAMPLE ID:			904159-001		9836341001		9836341002		9836341003	
	Units	Comparison Level								
Phenyl isothiocyanate	ug/kg	510	430	U						
Pyrene	ug/kg	170000	430	U	58.7	U	57.4	U	58.1	U
Tolidine	ug/kg	44	430	U	ND		ND		ND	
Explosives - SW8330A										
1,3,5-Trinitrobenzene	mg/kg	220	0.04	U	0.16	UJ	0.1	UJ	0.1	UJ
1,3-Dinitrobenzene	mg/kg	0.61	0.04	U	0.16	UJ	0.1	UJ	0.1	UJ
2,4,6-Trinitrotoluene	mg/kg	19	0.04	U	0.32	UJ	0.2	UJ	0.2	UJ
2,4-Dinitrotoluene	mg/kg	1.6	0.04	U	0.16	UJ	0.1	UJ	0.1	UJ
2,6-Dinitrotoluene	mg/kg	6.1	0.04	U	0.32	UJ	0.2	UJ	0.2	UJ
2-amino-4,6-Dinitrotoluene	mg/kg	15	0.04	U	0.32	UJ	0.2	UJ	0.2	UJ
2-Nitrotoluene	mg/kg	2.9	0.08	U	0.32	UJ	0.2	UJ	0.2	UJ
3-Nitrotoluene	mg/kg	0.61	0.08	U	0.32	UJ	0.2	UJ	0.2	UJ
4-amino-2,6-Dinitrotoluene	mg/kg	15	0.04	U	0.16	UJ	0.1	UJ	0.1	UJ
4-Nitrotoluene	mg/kg	30	0.08	U	0.32	UJ	0.2	UJ	0.2	UJ
HMX	mg/kg	380	0.08	U	0.16	UJ	0.1	UJ	0.1	UJ
Nitrobenzene	mg/kg	4.8	0.04	U	0.32	UJ	0.2	UJ	0.2	UJ
Nitroglycerine	mg/kg	0.61	4	U	1.9	UJ	1.2	UJ	1.2	UJ
RDX	mg/kg	5.5	0.08	U	0.32	UJ	0.2	UJ	0.2	UJ
Tetryl	mg/kg	24	0.08	U	0.32	UJ	0.2	UJ	0.2	UJ
Metals - ILM05.4										
Aluminum	mg/kg	19100	**23400**		**22600**		**21400**		**18300**	
Antimony	mg/kg	5.2	29	R	2.3	U	2.3	U	2.3	U
Arsenic	mg/kg	20	**4280**		**101**		**7.1**		**20**	
Barium	mg/kg	1500	**163**		**108**		**109**		**95.9**	

Table A.15
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD - TEST PITS GRAB SAMPLES

SAMPLE ID:			SW-4825GB-GRAB-01(TP120)		SW-4825GB-GS11		SW-4825GB-GS12		SW-4825GB-GS13	
DATE SAMPLED:			04/14/09		03/09/10		03/09/10		03/10/10	
LAB SAMPLE ID:			904159-001		9836341001		9836341002		9836341003	
	Units	Comparison Level								
Beryllium	mg/kg	16	**2.9**	J	**1**		**0.89**		**0.98**	
Cadmium	mg/kg	7	0.48	U	0.58	U	0.58	U	0.58	U
Chromium	mg/kg	12000	**88.6**		**66.2**		**56.4**		**99.3**	
Cobalt	mg/kg	17.8	**12.7**	J	**11.8**		**12.2**		**11.7**	
Copper	mg/kg	310	**20.5**		**37.8**		**37.9**		**35.2**	
Iron	mg/kg	32400	**27100**		**26400**		**37600**		**24400**	
Lead	mg/kg	400	**8.7**		**7.8**		**49.6**		**11.1**	
Magnesium	mg/kg	6950	**11500**		**10100**		**9400**		**9650**	
Manganese	mg/kg	968	**175**	K	**309**		**419**		**318**	
Mercury, Elemental	mg/kg	0.56	**0.63**		**0.047**	J	**0.14**	J	**0.12**	J
Nickel	mg/kg	150	**31.2**		**27**		**28.5**		**32.3**	
Selenium	mg/kg	39	16.9	U	1.2	U	**0.61**	B	**0.69**	B
Silver	mg/kg	39	4.8	U	0.58	U	**0.32**	J	0.58	U
Strontium	mg/kg	4700	**48.3**		**4.5**		**5.7**		**6.4**	
Tellurium	mg/kg	39.11	**2.4**	J	1.2	U	1.1	U	1	U
Thallium	mg/kg	2.2	**12.1**		**2.1**	J	**2.3**	J	**1.7**	J
Tin	mg/kg	4700	24.2	U	**3**	J	5.8	U	**4.3**	J
Titanium	mg/kg	31000	**1430**		**520**		**675**		**607**	
Vanadium	mg/kg	75.5	**56.3**		**52.5**		**57.3**		**42.3**	
Zinc	mg/kg	2300	**88.5**	J	**40.8**		**63.2**		**38.9**	
Zirconium	mg/kg	48.3	**7.2**	B	**3.4**	L	**2.7**	L	**3.3**	L
Other Parameters										
Cyanide	mg/kg	160	**1.3**		**0.18**	J	0.29	U	**0.12**	B
Fluoride	mg/kg	310	**3**		**5.2**	L	**5.4**	L	**1.2**	B
Iodine (as Iodide)	mg/kg	78	0.03	U	47	UL	45.9	UL	46.8	UL

Table A.15
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SV 4825 GLENBROOK ROAD - TEST PITS GRAB SAMPLES

SAMPLE ID:			**SW-4825GB-GRAB-01(TP120)**		**SW-4825GB-GS11**		**SW-4825GB-GS12**		**SW-4825GB-GS13**	
DATE SAMPLED:			**04/14/09**		**03/09/10**		**03/09/10**		**03/10/10**	
LAB SAMPLE ID:			**904159-001**		**9836341001**		**9836341002**		**9836341003**	
	Units	**Comparison Level**								
Iodine Pentafluoride	mg/kg	NA	**24**		NA		NA		NA	
Perchlorate	ug/kg	5500	2.6	U	2.3	U	2.3	U	2.3	U

Note: The soil samples were submitted for agents and ABPs analysis. Agents and ABPs were not detected.

Soil represented by these data was removed.

QA NOTES AND DATA QUALIFIERS:

Comparison value based on the higher of the November 2010 Regional Screening Levels (RSLs), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL). The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.
(NO CODE) - Confirmed identification. NA - Not available or Not analyzed. ND - Not detected, but analyzed as a tentatively identified compound (TIC) so the reporting limit is not applicable.
U - Analyte was analyzed for but not detected at or above the adjusted practical quantitation limit (PQL).
UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.
J - Analyte detected, estimated concentration.
UL - Analyte not detected, reported PQL is biased low, actual PQL may be higher.
L - Analyte detected, reported value is biased low, actual value may be higher.
K - Analyte detected, reported value is biased high, actual value may be lower.
R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.
ug/kg - Microgram per kilogram. mg/kg - Milligram per kilogram.
Detections are bolded.

Table A.16
ECBC Agent and ABP Analytical Results
4825 Glenbrook Road
Spring Valley, Washington DC

Sample ID	HD (ug/kg)	L (ug/kg)	1,4-Dithiane (ug/kg)	1,4-Thioxane (ug/kg)
Comparison Levels*	**0.01**	**0.03**	**61,000**	**61,000**
4825GR-ABP-1 (1.5')			<12	<23
4825GR-ABP-2 (1.5')			<11	<23
4825GR-ABP-3 (0.5')			<12	<24
4825GR-ABP-4 (2')			<11	<22
4825GR-ABP-4 (4')			<12	<24
4825GR-ABP-5 (2')			<12	<23
4825GR-ABP-9 [Dup of 5(2')]			<12	<23
4825GR-ABP-5 (4')			<12	<25
4825GR-ABP-6 (1.5')			<11	<21
SW-BP3-EFL-(-10)/-C	< 10	< 100	< 100	< 100
SW-BP3-WFL-(-1)/-C	< 10	< 100	< 100	< 100
SW-BP3-NEW01/-5-1	< 10	< 100	< 100	< 100
SW-BP3-NEW01-5-2	< 10	< 100	< 100	< 100
SW-BP3-NEW01-5-3	< 10	< 100	< 100	< 100
SW-BP3-NEW01-5-4	< 10	< 100	< 100	< 100
SW-BP3-NWW01-2	< 10	< 100	< 100	< 100
SW-BP3-SEW01-5	< 10	< 100	< 100	< 100
SW-BP3-SWW02-2	< 10	< 100	< 100	< 100
SW-BP3-EAST-FL-11.5/-C	< 10	< 100	< 100	< 100
SW-BP3-EAST-SW(02)-8	< 10	< 100	< 100	< 100
SW-BP3-EAST-SW(02)-11	< 10	< 100	< 100	< 100
SW-BP3-East2-FL(01)-5.0	< 10	< 100	< 100	< 100
SW-BP3-East2-FL(01)-5.0-C	< 10	< 100	< 100	< 100
SW-BP3-East2-NEW(01)-2.5	< 10	< 100	< 100	< 100
SW-BP3-East2-NEW(02)-2.5	< 10	< 100	< 100	< 100
SW-BP3-East2-SWW(01)-2.5	< 10	< 100	< 100	< 100
SW-BP3-East2-SWW(02)-2.5	< 10	< 100	< 100	< 100
SW-4825GB-EW01-LE01[2]	< 10	< 100	< 100	< 100
SW-4825GB-EW02-LE01[2]	< 10	< 100	< 100	< 100
SW-4825GB-NW01-LN01[2]	< 10	< 100	< 100	< 100
SW-4825GB-SW01-LS01[2]	< 10	< 100	< 100	< 100
SW-4825GB-FLOOR-[6.5]	< 10	< 100	< 100	< 100
SW-4825GB-GS01(8"-13.5")	< 10	< 100	< 100	< 100
SW-4825GB-GS02(8"-12")	< 10	< 100	< 100	< 100
SW-4825GB-GS03(8"-12")	< 10	< 100	< 100	< 100
SW-4825GB-GS04(9"-13")	< 10	< 100	< 100	< 100
SW-4825GB-GS05(14"-17")	< 10	< 100	< 100	< 100
SW-4825GB-GS06(10"-15")	< 10	< 100	< 100	< 100
SW-4825GB-AA1	< 10	< 100	< 100	< 100

Table A.16
ECBC Agent and ABP Analytical Results
4825 Glenbrook Road
Spring Valley, Washington DC

Sample ID	HD (ug/kg)	L (ug/kg)	1,4-Dithiane (ug/kg)	1,4-Thioxane (ug/kg)
Comparison Levels*	**0.01**	**0.03**	**61,000**	**61,000**
SW-4825GB-AA2	< 10	< 100	< 100	< 100
SW-4825GB-BB1	< 10	< 100	< 100	< 100
SW-4825GB-BB2	< 10	< 100	< 100	< 100
SW-4825GB-CC(4.5)	< 10	< 100	< 100	< 100
SW-4825GB-DD(4.5)	< 10	< 100	< 100	< 100
SW-4825GB-EE(4.5)	< 10	< 100	< 100	< 100
SW-4825GB-FF1	< 10	< 100	< 100	< 100
SW-4825GB-FF2	< 10	< 100	< 100	< 100
SW-4825GB-GG1	< 10	< 100	< 100	< 100
SW-4825GB-GG2	< 10	< 100	< 100	< 100
SW-4825GB-HH1	< 10	< 100	< 100	< 100
SW-4825GB-HH2	< 10	< 100	< 100	< 100
SW-4825GB-JJ1	< 10	< 100	< 100	< 100
SW-4825GB-JJ2	< 10	< 100	< 100	< 100
SW-4825GB-KK1	< 10	< 100	< 100	< 100
SW-4825GB-KK2	< 10	< 100	< 100	< 100
SW-4825GB-LL1	< 10	< 100	< 100	< 100
SW-4825GB-LL2	< 10	< 100	< 100	< 100
SW-4825GB-MM1	< 10	< 100	< 100	< 100
SW-4825GB-MM2	< 10	**70 J**	< 100	< 100
SW-4825GB-NN1	< 10	< 100	< 100	< 100
SW-4825GB-NN2	< 10	< 100	< 100	< 100
SW-4825GB-OO1	< 10	< 100	< 100	< 100
SW-4825GB-OO2	< 10	< 100	< 100	< 100
SW-4825GB-PP1	< 10	< 100	< 100	< 100
SW-4825GB-PP2	< 10	**47 J**	< 100	< 100

*2007 recalculated residential soil levels (ORNL, 2007) for HD and L and Residential Regional Screening Levels (November, 2010) for 1,4-Dithiane and 1,4-Thioxane. Non-carcinogen compound adjusted downward by factor of 10 to account for cumulative effects.

See 2008 Parameters Report (USACE 2008d) for derivation of oxathiane comparison value.

HD - mustard
L - Lewisite
Soil represented by these data was removed.
Bold - Detected Concentrations
J - Estimated Concentration

Table A.17

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR 4825 GLENBROOK ROAD - GEOTECHNICAL BORINGS AND BACKYARD SOIL SAMPLES (2010)

SAMPLE ID:			SW-4825GB-AA2		SW-4825GB-GG2		SW-4825GB-GS01 [8-13.5]		SW-4825GB-GS02 [8-12]		SW-4825GB-GS03 [19-26]		SW-4825GB-GS04 [9-13]		SW-4825GB-GS05 [14-17]		SW-4825GB-GS06 [10-15]		SW-4825GB-GS07	
DATE SAMPLED:	Units	Comparison Level	08/16/10		08/16/10		08/19/10		08/19/10		08/19/10		08/24/10		08/23/10		08/23/10		08/24/10	
LAB SAMPLE ID:			9862796001		9862796002		9862796003		9862796004		9862796005		9862796006		9862796007		9862796008		9862796009	
Volatile Organics - SW-846 8260B																				
1,1,1-Trichloroethane	ug/kg	870000	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
1,1,2,2-Tetrachloroethane	ug/kg	560	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/kg	4300000	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
1,1,2-Trichloroethane	ug/kg	1100	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
1,1-Dichloroethane	ug/kg	3300	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
1,1-Dichloroethene	ug/kg	24000	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
1,2,4-Trichlorobenzene	ug/kg	22000	5.6	UL	5.6	UL	4.9	U	4.9	U	5.3	U	5.2	U	5.3	U	5.3	U	4.9	U
1,2-Dibromo-3-chloropropane	ug/kg	5.4	5.6	UL	5.6	UL	4.9	U	4.9	U	5.3	U	5.2	U	5.3	U	5.3	U	4.9	U
1,2-Dibromoethane	ug/kg	34	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
1,2-Dichlorobenzene	ug/kg	190000	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
1,2-Dichloroethane	ug/kg	430	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
1,2-Dichloropropane	ug/kg	890	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
1,3-Dichlorobenzene	ug/kg	18	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
1,4-Dichlorobenzene	ug/kg	2400	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Acetone	ug/kg	6100000	11.1	R	11.1	R	9.8	R	**236**	L	10.6	R	10.3	R	**352**	L	10.6	R	9.7	R
Acetonitrile	ug/kg	87000	11.1	R	11.1	R	9.8	R	9.8	R	10.6	R	10.3	R	10.6	R	10.6	R	9.7	R
Acrolein	ug/kg	15	55.6	R	55.6	R	49	R	49.2	R	53.1	R	51.6	R	52.9	R	53	R	48.7	R
Benzene	ug/kg	1100	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Benzyl chloride	ug/kg	1000	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Bromobenzene	ug/kg	30000	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Bromodichloromethane	ug/kg	270	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Bromoform	ug/kg	61000	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Carbon disulfide	ug/kg	82000	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Carbon tetrachloride	ug/kg	610	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Chlorobenzene	ug/kg	29000	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	**2**	J	2.1	U	1.9	U
Chlorodibromomethane	ug/kg	680	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Chloroethane	ug/kg	1500000	5.6	UL	5.6	UL	4.9	U	4.9	U	5.3	U	5.2	U	5.3	U	5.3	U	4.9	U
Chloroform	ug/kg	290	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Cis-1,2-Dichloroethene	ug/kg	78000	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
cis-1,3-Dichloropropene	ug/kg	18	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Cyclohexane	ug/kg	700000	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Dichlorodifluoromethane	ug/kg	18000	2.2	UL	2.2	UL	2	UJ	2	UJ	2.1	UJ	2.1	UJ	2.1	UJ	2.1	UJ	1.9	UJ
Ethyl benzene	ug/kg	5400	2.2	UL	2.2	UL	2	U	2	U	2.1	UJ	2.1	U	2.1	UJ	2.1	UJ	1.9	UJ
Isopropylbenzene	ug/kg	210000	2.2	UL	2.2	UL	2	U	2	U	2.1	UJ	2.1	U	2.1	UJ	2.1	UJ	1.9	UJ
Methyl Acetate	ug/kg	7800000	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Methyl bromide	ug/kg	730	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Methyl butyl ketone	ug/kg	21000	11.1	UL	11.1	UL	9.8	U	9.8	U	10.6	U	10.3	U	10.6	U	10.6	U	9.7	U
Methyl chloride	ug/kg	12000	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Methyl cyclohexane	ug/kg	18	2.2	UL	2.2	UL	2	U	2	U	2.1	UJ	2.1	U	2.1	U	2.1	U	1.9	U
Methyl ethyl ketone	ug/kg	2800000	11.1	R	11.1	R	9.8	R	9.8	R	10.6	R	10.3	R	10.6	R	10.6	R	9.7	R
Methyl isobutyl ketone	ug/kg	530000	11.1	UL	11.1	UL	9.8	U	9.8	U	10.6	U	10.3	U	10.6	U	10.6	U	9.7	U
Methyl Tertbutyl Ether	ug/kg	43000	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U

Table A.17

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR 4825 GLENBROOK ROAD - GEOTECHNICAL BORINGS AND BACKYARD SOIL SAMPLES (2010)

SAMPLE ID:			SW-4825GB-AA2		SW-4825GB-GG2		SW-4825GB-GS01 [8-13.5]		SW-4825GB-GS02 [8-12]		SW-4825GB-GS03 [19-26]		SW-4825GB-GS04 [9-13]		SW-4825GB-GS05 [14-17]		SW-4825GB-GS06 [10-15]		SW-4825GB-GS07	
DATE SAMPLED:	Units	Comparison Level	08/16/10		08/16/10		08/19/10		08/19/10		08/19/10		08/24/10		08/23/10		08/23/10		08/24/10	
LAB SAMPLE ID:			9862796001		9862796002		9862796003		9862796004		9862796005		9862796006		9862796007		9862796008		9862796009	
Methylene chloride	ug/kg	11000	**8.1**	L	**9**	L	**6.9**		**8.2**		**8.4**	J	**8.3**		**9.4**	J	**8.1**	J	**8.1**	J
Styrene	ug/kg	630000	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Tetrachloroethene	ug/kg	550	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Toluene	ug/kg	500000	2.2	UL	2.2	UL	2	U	2	U	2.1	UJ	2.1	U	2.1	U	2.1	U	1.9	U
Total Xylenes	ug/kg	63000	6.7	UL	6.7	UL	5.9	U	5.9	U	6.4	UJ	6.2	U	6.3	UJ	6.4	UJ	5.8	UJ
Trans-1,2-Dichloroethene	ug/kg	15000	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
trans-1,3-dichloropropene	ug/kg	18	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Trichloroethene	ug/kg	2800	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Trichlorofluoromethane	ug/kg	79000	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Vinyl chloride	ug/kg	60	2.2	UL	2.2	UL	2	U	2	U	2.1	U	2.1	U	2.1	U	2.1	U	1.9	U
Semivolatile Organics - SW-846 8270D																				
1,1'-Biphenyl	ug/kg	390000	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
1-chloro-2,4-dinitrobenzene	ug/kg	510	389	UJ	391	UJ	340	U	340	U	367	U	362	U	375	U	374	U	347	U
2,4,5-Trichlorophenol	ug/kg	610000	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
2,4,6-Trichlorophenol	ug/kg	44000	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
2,4-Dichlorophenol	ug/kg	18000	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
2,4-Dimethylphenol	ug/kg	120000	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
2,4-Dinitrophenol	ug/kg	12000	633	UJ	639	UJ	565	UJ	567	UJ	593	UJ	595	U	616	U	603	U	573	U
2-Chloronaphthalene	ug/kg	630000	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
2-Chlorophenol	ug/kg	39000	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
2-Methylnaphthalene	ug/kg	31000	58.6	UJ	59.2	UJ	52.3	UJ	52.5	U	54.9	U	55.1	U	57	U	55.9	U	53	U
2-Methylphenol	ug/kg	310000	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
2-Nitroaniline	ug/kg	61000	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
2-Nitrophenol	ug/kg	510	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
3,3'-Dichlorobenzidine	ug/kg	1100	633	UJ	639	UJ	565	UJ	567	U	593	U	595	U	616	U	603	U	573	U
3-Nitroaniline	ug/kg	1300	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
4,6-Dinitro-2-methylphenol	ug/kg	490	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
4-Bromophenyl-phenylether	ug/kg	510	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
4-Chloro-3-methylphenol	ug/kg	610000	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
4-Chloroaniline	ug/kg	2400	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
4-Chlorophenyl-PhenylEther	ug/kg	510	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
4-Nitroaniline	ug/kg	24000	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
4-Nitrophenol	ug/kg	1300	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
Acenaphthene	ug/kg	340000	58.6	UJ	59.2	UJ	52.3	UJ	52.5	U	54.9	U	55.1	U	57	U	55.9	U	53	U
Acenaphthylene	ug/kg	510	58.6	UJ	59.2	UJ	52.3	UJ	52.5	U	54.9	U	55.1	U	57	U	55.9	U	53	U
Acetophenone	ug/kg	780000	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
Anthracene	ug/kg	1700000	58.6	UJ	59.2	UJ	52.3	UJ	52.5	U	54.9	U	55.1	U	57	U	55.9	U	53	U
Atrazine	ug/kg	2100	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
Benzal Chloride	ug/kg	510	389	UJ	391	UJ	340	U	340	U	367	U	362	U	375	U	374	U	347	U
Benzaldehyde	ug/kg	780000	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
Benzo(a)anthracene	ug/kg	150	58.6	UJ	59.2	UJ	52.3	UJ	52.5	U	54.9	U	55.1	U	57	U	55.9	U	53	U
Benzo(a)pyrene	ug/kg	15	58.6	UJ	59.2	UJ	52.3	UJ	52.5	U	54.9	U	55.1	U	57	U	55.9	U	53	U

Table A.17

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR 4825 GLENBROOK ROAD - GEOTECHNICAL BORINGS AND BACKYARD SOIL SAMPLES (2010)

SAMPLE ID:			SW-4825GB-AA2		SW-4825GB-GG2		SW-4825GB-GS01 [8-13.5]		SW-4825GB-GS02 [8-12]		SW-4825GB-GS03 [19-26]		SW-4825GB-GS04 [9-13]		SW-4825GB-GS05 [14-17]		SW-4825GB-GS06 [10-15]		SW-4825GB-GS07	
DATE SAMPLED:	Units	Comparison Level	08/16/10		08/16/10		08/19/10		08/19/10		08/19/10		08/24/10		08/23/10		08/23/10		08/24/10	
LAB SAMPLE ID:			9862796001		9862796002		9862796003		9862796004		9862796005		9862796006		9862796007		9862796008		9862796009	
Benzo(b)fluoranthene	ug/kg	150	58.6	UJ	59.2	UJ	52.3	UJ	52.5	U	54.9	U	55.1	U	57	U	55.9	U	53	U
Benzo(g,h,i)perylene	ug/kg	331.5	58.6	UJ	59.2	UJ	52.3	UJ	52.5	U	54.9	U	55.1	U	57	U	55.9	U	53	U
Benzo(k)fluoranthene	ug/kg	1500	58.6	UJ	59.2	UJ	52.3	UJ	52.5	U	54.9	U	55.1	U	57	U	55.9	U	53	U
Benzoic Acid	ug/kg	24000000	633	UJ	639	UJ	565	UJ	567	UJ	593	UJ	595	U	616	U	603	U	573	U
Benzyl Bromide	ug/kg	16000	389	UJ	391	UJ	340	U	340	U	367	U	362	U	375	U	374	U	347	U
Bis(2-Chloroethoxy)methane	ug/kg	18000	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
Bis(2-Chloroethyl)ether	ug/kg	210	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
Bis(2-Chloroisopropyl)ether	ug/kg	4600	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
Bis(2-Ethylhexyl)phthalate	ug/kg	35000	**43.6**	B	**35.9**	B	**105**	B	**40.2**	B	**34.9**	B	**33.4**	B	**32.7**	B	**34.5**	B	**110**	B
Butylbenzylphthalate	ug/kg	260000	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
Caprolactam	ug/kg	3100000	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
Carbazole	ug/kg	510	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
Chloropicrin	ug/kg	57000000	625	UJ	628	UJ	547	U	546	U	589	U	582	U	603	U	600	U	557	U
Chrysene	ug/kg	15000	58.6	UJ	59.2	UJ	52.3	UJ	52.5	U	54.9	U	55.1	U	57	U	55.9	U	53	U
Dibenz(a,h)anthracene	ug/kg	15	58.6	UJ	59.2	UJ	52.3	UJ	52.5	U	54.9	U	55.1	U	57	U	55.9	U	53	U
Dibenzofuran	ug/kg	7800	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
Diethyl phthalate	ug/kg	4900000	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
Dimethylaniline	ug/kg	16000	389	UJ	391	UJ	340	U	340	U	367	U	362	U	375	U	374	U	347	U
Dimethylphthalate	ug/kg	510	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
Di-n-butylphthalate	ug/kg	610000	**16.1**	J	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
Di-n-octylphthalate	ug/kg	510	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
Diphenyl Ether	ug/kg	NA	389	UJ	391	UJ	340	U	340	U	367	U	362	U	375	U	374	U	347	U
Diphenylamine	ug/kg	150000	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
Ethylene Chlorohydrin	ug/kg	NA	389	UJ	391	UJ	340	U	340	U	367	U	362	U	375	U	374	U	347	U
Fluoranthene	ug/kg	230000	58.6	UJ	59.2	UJ	52.3	UJ	52.5	U	54.9	U	55.1	U	57	U	55.9	U	53	U
Fluorene	ug/kg	230000	58.6	UJ	59.2	UJ	52.3	UJ	52.5	U	54.9	U	55.1	U	57	U	55.9	U	53	U
Glycol-Bromhydrin	ug/kg	510	389	UJ	391	UJ	340	U	340	U	367	U	362	U	375	U	374	U	347	U
Hexachlorobenzene	ug/kg	300	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
Hexachlorobutadiene	ug/kg	6200	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
Hexachlorocyclopentadiene	ug/kg	37000	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
Hexachloroethane	ug/kg	35000	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
Indeno(1,2,3-cd)pyrene	ug/kg	150	58.6	UJ	59.2	UJ	52.3	UJ	52.5	U	54.9	U	55.1	U	57	U	55.9	U	53	U
Isophorone	ug/kg	510000	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
mp-Cresol	ug/kg	NA	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
Naphthalene	ug/kg	3600	58.6	UJ	59.2	UJ	52.3	UJ	52.5	U	54.9	U	55.1	U	57	U	55.9	U	53	U
N-Nitrosodiphenylamine	ug/kg	99000	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
N-Nitrosodipropylamine	ug/kg	69	117	UJ	118	UJ	105	UJ	105	U	110	U	110	U	114	U	112	U	106	U
P-Chloracetophenone	ug/kg	NA	389	UJ	391	UJ	340	U	340	U	367	U	362	U	375	U	374	U	347	U
Pentachlorophenol	ug/kg	3000	633	UJ	639	UJ	565	UJ	567	U	593	U	595	U	616	U	603	U	573	U
Phenanthrene	ug/kg	407.4	58.6	UJ	59.2	UJ	52.3	UJ	52.5	U	54.9	U	55.1	U	57	U	55.9	U	53	U
Phenol	ug/kg	1800000	316	UJ	320	UJ	282	UJ	283	U	296	U	297	U	308	U	302	U	286	U
Pyrene	ug/kg	170000	58.6	UJ	59.2	UJ	52.3	UJ	52.5	U	54.9	U	55.1	U	57	U	55.9	U	53	U

Table A.17
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR 4825 GLENBROOK ROAD - GEOTECHNICAL BORINGS AND BACKYARD SOIL SAMPLES (2010)

SAMPLE ID:			SW-4825GB-AA2		SW-4825GB-GG2		SW-4825GB-GS01 [8-13.5]		SW-4825GB-GS02 [8-12]		SW-4825GB-GS03 [19-26]		SW-4825GB-GS04 [9-13]		SW-4825GB-GS05 [14-17]		SW-4825GB-GS06 [10-15]		SW-4825GB-GS07	
DATE SAMPLED:	Units	Comparison Level	08/16/10		08/16/10		08/19/10		08/19/10		08/19/10		08/24/10		08/23/10		08/23/10		08/24/10	
LAB SAMPLE ID:			9862796001		9862796002		9862796003		9862796004		9862796005		9862796006		9862796007		9862796008		9862796009	
Explosives - SW846 8330B																				
1,3,5-Trinitrobenzene	mg/kg	220	0.2	UJ	0.19	UJ	0.19	U	0.18	U	0.2	UJ	0.2	UJ	0.19	U	0.19	U	0.2	U
1,3-Dinitrobenzene	mg/kg	0.61	0.2	UJ	0.19	UJ	0.19	U	0.18	U	0.2	U	0.2	U	0.19	U	0.19	U	0.2	U
2,4,6-Trinitrotoluene	mg/kg	19	0.25	UJ	0.24	UJ	0.23	U	0.23	U	0.25	U	0.25	U	0.24	U	0.24	U	0.24	U
2,4-Dinitrotoluene	mg/kg	1.6	0.2	UJ	0.19	UJ	0.19	U	0.18	U	0.2	U	0.2	U	0.19	U	0.19	U	0.2	U
2,6-Dinitrotoluene	mg/kg	6.1	0.2	UJ	0.19	UJ	0.19	U	0.18	U	0.2	U	0.2	U	0.19	U	0.19	U	0.2	U
2-amino-4,6-Dinitrotoluene	mg/kg	15	0.2	UJ	0.19	UJ	0.19	U	0.18	U	0.2	U	0.2	U	0.19	U	0.19	U	0.2	U
2-Nitrotoluene	mg/kg	2.9	0.2	UJ	0.19	UJ	0.19	U	0.18	U	0.2	U	0.2	U	0.19	U	0.19	U	0.2	U
3,5-Dinitroaniline	mg/kg	NA	0.25	UJ	0.24	UJ	0.23	U	0.23	U	0.25	U	0.25	U	0.24	U	0.24	U	0.24	U
3-Nitrotoluene	mg/kg	0.61	0.2	UJ	0.19	UJ	0.19	U	0.18	U	0.2	U	0.2	U	0.19	U	0.19	U	0.2	U
4-amino-2,6-Dinitrotoluene	mg/kg	NA	0.2	UJ	0.19	UJ	0.19	U	0.18	U	0.2	U	0.2	U	0.19	U	0.19	U	0.2	U
4-Nitrotoluene	mg/kg	30	0.2	UJ	0.19	UJ	0.19	U	0.18	U	0.2	U	0.2	U	0.19	U	0.19	U	0.2	U
HMX	mg/kg	380	0.2	UJ	0.19	UJ	0.19	U	0.18	U	0.2	UJ	0.2	UJ	0.19	U	0.19	U	0.2	U
Nitrobenzene	mg/kg	4.8	0.2	UJ	0.19	UJ	0.19	U	0.18	U	0.2	U	0.2	U	0.19	U	0.19	U	0.2	U
Nitroglycerine	mg/kg	0.61	1.2	UJ	1.2	UJ	1.1	U	1.1	U	1.2	U	1.2	U	1.2	U	1.1	U	1.2	U
PETN	mg/kg	NA	1.2	UJ	1.2	UJ	1.1	U	1.1	U	1.2	U	1.2	U	1.2	U	1.1	U	1.2	U
RDX	mg/kg	5.5	0.2	UJ	0.19	UJ	0.19	U	0.18	U	0.2	UJ	0.2	UJ	0.19	U	0.19	U	0.2	U
Tetryl	mg/kg	24	0.2	UJ	0.19	UJ	0.19	U	0.18	U	0.2	UJ	0.2	UJ	0.19	U	0.19	U	0.2	U
Metals - SW846 6010C																				
Aluminum	mg/kg	19100	**27300**		**25800**		**11300**		**15700**		**23100**		**28200**		**24600**		**25800**		**12300**	
Antimony	mg/kg	5.2	2.4	U	2.3	U	1.9	U	2.1	U	2.1	U	2.2	U	2.2	U	2	U	2.1	U
Arsenic	mg/kg	0.39	**2**	L	**15.2**	L	**0.39**	L	**0.38**	L	**0.92**	L	**3.6**	L	**13.7**	L	**17.3**	L	**0.38**	L
Barium	mg/kg	1500	**75.6**		**92.6**		**36.1**		**54.3**		**209**		**179**		**143**		**165**		**41.6**	
Beryllium	mg/kg	16	NA		NA		**0.83**		**0.99**		**0.66**		**0.98**		**1.4**		**1.2**		**0.85**	
Boron	mg/kg	1600	NA		NA		9.4	U	10.4	U	10.6	U	11.2	U	11	U	10.1	U	10.6	U
Cadmium	mg/kg	7	0.59	U	0.58	U	**0.17**	J	0.52	U	0.53	U	0.56	U	0.55	U	0.51	U	**0.28**	J
Chromium	mg/kg	12000	NA		NA		**23.6**	L	**29.6**	L	**48**	L	**133**	L	**81.7**	L	**91.6**	L	**27.4**	L
Cobalt	mg/kg	17.8	NA		NA		**12.8**		**15.5**		**16.5**		**17.3**		**14.9**		**15.6**		**14.5**	
Copper	mg/kg	310	**250**		**142**		**1.3**	J	**10.1**		**37.9**		**26**		**35.7**		**35.9**		**2**	J
Iron	mg/kg	32400	NA		NA		**19800**		**29900**		**26300**		**30000**		**27200**		**24100**		**23800**	
Lead	mg/kg	400	**4.9**		**8.7**		**5.8**		**6.6**		**3.3**		**3.9**		**6.9**		**7.9**		**6.2**	
Magnesium	mg/kg	6950	NA		NA		**7810**		**10100**		**13900**		**19800**		**14600**		**16200**		**8390**	
Manganese	mg/kg	968	**1320**		**628**		**263**		**307**		**309**		**443**		**381**		**379**		**394**	
Mercury	mg/kg	0.56	0.21	U	**0.22**	J	0.19	U	0.19	U	0.19	U	**0.023**	J	**0.52**		**0.062**	J	0.19	U
Nickel	mg/kg	150	**114**		**73**		**27.1**		**36.2**		**28.8**		**50.1**		**31.1**		**42.3**		**31.2**	
Selenium	mg/kg	39	NA		NA		**2.6**		**2.7**		**2.6**		**2.5**		**2.8**		**2.7**		**2.3**	
Silver	mg/kg	39	NA		NA		0.47	U	0.52	U	0.53	U	0.56	U	0.55	U	0.51	U	0.53	U
Strontium	mg/kg	4700	NA		NA		**5.2**		**7.5**		**10.5**		**13.3**		**3.4**		**11.5**		**5.4**	
Tellurium	mg/kg	39.11	NA		NA		**2.4**		**2.7**		**2.5**		**2.6**		**2.8**		**2.7**		**2.4**	
Thallium	mg/kg	2.2	3.5	U	3.5	U	2.8	U	3.1	U	3.2	U	3.4	U	3.3	U	3	U	3.2	U
Tin	mg/kg	4700	NA		NA		4.7	U	5.2	U	5.3	U	5.6	U	5.5	U	5.1	U	5.3	U
Titanium	mg/kg	31000/2690	NA		NA		**582**	J	**713**	J	**1570**	J	**1560**	J	**1410**	J	**1470**	J	**626**	J

Table A.17
SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR 4825 GLENBROOK ROAD - GEOTECHNICAL BORINGS AND BACKYARD SOIL SAMPLES (2010)

SAMPLE ID:			SW-4825GB-AA2		SW-4825GB-GG2		SW-4825GB-GS01 [8-13.5]		SW-4825GB-GS02 [8-12]		SW-4825GB-GS03 [19-26]		SW-4825GB-GS04 [9-13]		SW-4825GB-GS05 [14-17]		SW-4825GB-GS06 [10-15]		SW-4825GB-GS07	
DATE SAMPLED:	Units	Comparison Level	08/16/10		08/16/10		08/19/10		08/19/10		08/19/10		08/24/10		08/23/10		08/23/10		08/24/10	
LAB SAMPLE ID:			9862796001		9862796002		9862796003		9862796004		9862796005		9862796006		9862796007		9862796008		9862796009	
Vanadium	mg/kg	75.5	**264**	J	**118**	J	**18.9**	J	**41.1**	J	**86.2**	J	**73.6**	J	**67.1**	J	**57.3**	J	**22.8**	J
Zinc	mg/kg	2300	**70.8**		**67.5**		**89.9**		**92.1**		**45.9**		**55.9**		**49.1**		**46.6**		**93.1**	
Zirconium	mg/kg	48.3	NA		NA		**3.4**	B	**2.4**	B	**2.4**	B	**1.9**	B	**1.6**	B	**1.8**	B	**3.3**	B
Other Parameters																				
Total Cyanide	mg/kg	160	NA		NA		0.26	U	0.26	U	0.28	U	0.29	U	0.29	U	**0.12**	J	0.25	U
Fluoride	mg/kg	310	NA		NA		**1.1**	B	**0.96**	B	**1.9**	L	**2.1**	L	**2.8**	L	**1.7**	L	**1.2**	B
Iodine (as Iodide)	ug/kg	78000	NA		NA		42.3	U	42.5	U	44.9	U	45.1	U	46	U	45.3	U	42.6	U
Perchlorate	ug/kg	5500	NA		NA		2.1	UL	2.2	UL	2.1	UL	2.2	UL	**2.7**	J	**1.9**	J	2.1	UL
QA NOTES AND DATA QUALIFIERS:																				

Comparison value based on the higher of the 2010 Regional Screening Levels (RSLs), formerly RBCs (if non-carcinogenic), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL). The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.
(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.
U - Analyte was analyzed for but not detected at or above the adjusted practical quantitation limit (PQL).
UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.
J - Analyte detected, estimated concentration.
UL - Analyte not detected, reported PQL is biased low, actual PQL may be higher.
L - Analyte detected, reported value is biased low, actual value may be higher.
K - Analyte detected, reported value is biased high, actual value may be lower.
R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.
ug/kg - Microgram per kilogram. mg/kg - Milligram per kilogram.
Detections are bolded.
Detections exceeding the comparison level are shown shaded and bolded.

Table A.18
SUMMARY OF BACKFILL SOIL RESULTS

SAMPLE ID:			203-BF(G1)-2751-0		203-BF(G2)-2752-0		203-BF(G3)-2753-0		203-BF(C)-2754-0 7H07004-	
DATE SAMPLED:			08/02/07		08/02/07		08/02/07		08/02/07	
LAB SAMPLE ID:			7H07004-01		7H07004-02		7H07004-03		7H07004-04	
	Units	Comparison Level								
Metals - ILM05.4										
Aluminum	mg/kg	19100	11800		9700		11500		12900	
Antimony	mg/kg	5.2	7	U	7	U	7	U	7	U
Arsenic	mg/kg	20	2.28		1.77		2.04		2.21	
Barium	mg/kg	1500	23.2		28.5		41.4		40.9	
Beryllium	mg/kg	16	2.5	u	2.5	U	2.5	U	2.5	U
Boron, Total	mg/kg		25	U	25	U	25	U	25	U
Calcium	mg/kg		295	BJ	247	BJ	8290	J	15200	J
Cadmium	mg/kg	7	5	U	5	U	5	U	5	U
Chromium	mg/kg	12000	23.6		15.5		46		22.6	
Cobalt	mg/kg	17.8	5	U	9.64		10.2		8.35	
Copper	mg/kg	310	38.3		22.2		26.1		28.8	
Iron	mg/kg	32400	40700		26700		24800		31700	
Lead	mg/kg	400	20.5	U	20.5	U	20.5	U	20.5	U
Magnesium	mg/kg	6950	305		1460		6370		2750	
Manganese	mg/kg	968	64.6		164		258		186	
Mercury, Elemental	mg/kg	0.56	0.036		0.028		0.021		0.031	
Nickel	mg/kg	150	5.81		7.43		41.1		15.3	
Potassium	mg/kg		290		1260		2290		2040	
Selenium	mg/kg	39	7	U	7	U	7	U	7	U
Silver	mg/kg	39	3.35		2.5	U	2.5	U	2.5	U
Sodium	mg/kg		21.2	B	24.1	B	58.6	B	62.2	B
Thallium	mg/kg	2.2	5	U	5	U	5	U	5	U
Tin	mg/kg	4700	5	U	5	U	5	U	5	U
Vanadium	mg/kg	75.5	32.5		26.5		33.4		31.4	
Zinc	mg/kg	2300	31.2		28.5		41.2		36.8	

QA NOTES AND DATA QUALIFIERS:

Comparison value based on the higher of the May 2010 Regional Screening Levels (RSLs), formerly RBCs (if non-carcinogenic), a review of toxicological literature (tellurium), or the 2007 Background study, for metals (if higher than RSL). The non-carcinogenic RSLs were adjusted down by a factor of 10 to account for cumulative effects.
(NO CODE) - Confirmed identification. NA - Not available or Not analyzed.
U - Analyte was analyzed for but not detected at or above the adjusted practical quantitation limit (PQL).
UJ - Analyte not detected, reported PQL may be inaccurate or imprecise.
J - Analyte detected, estimated concentration.
UL - Analyte not detected, reported PQL is biased low, actual PQL may be higher.
L - Analyte detected, reported value is biased low, actual value may be higher.
K - Analyte detected, reported value is biased high, actual value may be lower.
R - Unreliable and rejected result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
B - Blank contamination, the analyte was detected in the associated blank at a comparable concentration.
mg/kg - Milligram per kilogram.
Detections are bolded.
Detections exceeding the comparison level are shown shaded and bolded.

APPENDIX B
STATISTICAL ANALYSIS

Table B.1 Samples Remaining at the Site
4825 Glenbrook Road
Spring Valley, Washington D.C.

Sample ID	Sample Depth	Aluminum	D_Aluminum	Antimony	D_Antimony	Arsenic	D_Arsenic	Barium	D_Barium	Beryllium	D_Beryllium	Boron, Total	D_Boron, Total
052692-1CM	0-0.5					10	0	145	1				
S-7	0-0.5	39600	1	6.9000001	0	1.7	1			15	1		
SS-8	0-0.5	18500	1			8	1	103	1	1.4	1		
SS-10	0-0.5	27900	1	1.2	1	5.3	1	132	1	1.2	1		
OU3-SB01	3.2-3.6	34300	1			5.3	1	128	1	1.5	1		
SB-02-02	3-4					3.9	1						
SB-02-03	6-7					3.2	1						
SB-02-04	6-7					2.6	1						
SB-02-05	9-10	27200	1	1.3	1	2	0	196	1	1.2	1		
SB-03-02	3-4					6.5	1						
SB-03-03	6-7					1.4	1						
SB-03-04	9-10					1.8	1						
Grid (-90, 50)-2	2-2					6.92	1						
Grid (-90, 110)	0-0.5					4.85	1						
Grid (-70,-50)	0-0.5					16.3	1						
Grid (-70,-30)-4	4-4					10.8	1						
Grid (-70, 30)	0-0.5					2.46	1						
Grid (-70, 50)	0-0.5					14.9	1						
Grid (-70, 70)	0-0.5					4.77	1						
Grid (-70, 70)-2	2-2					2.96	1						
Grid (-70, 90)-2	2-2					4.44	1						
Grid (-70, 110)	0-0.5					9.23	1						
Grid (-70, 130)	0-0.5					9.21	1						
Grid (-50, -50)-1	0-0.5					16.8	1						
Grid (-50, -50)-2	2-2					15.3	1						
Grid (-50, -30)-2	2-2					15.8	1						
Grid (-50, -10)-2	2-2					4.28	1						
Grid (-50, 70)-1	0-0.5					9.11	1						
Grid (-50, 70)-2	2-2					7.25	1						
Grid (-50, 90)-2	2-2					2.36	1						
Grid (-50, 110)	0-0.5					5.81	1						
Grid (-50, 130)	0-0.5					6.25	1						
Grid (-30, -50)	0-0.5					12.2	1						
Grid (-30, -30)-2	2-2					22.9	1						
Grid (-30, -10)-2	2-2					7.91	1						
Grid (-30, 70)-4	4-4					4.88	1						
Grid (-30, 90)-2	2-2					7.87	1						
Grid (-30, 110)-2	2-2					4.22	1						
Grid (-30, 130)-1	0-0.5					10.9	1						
Grid (-30, 130)-2	2-2					5.29	1						
Grid (-10, -50)	0-0.5					8.87	1						
Grid (-10, -30)	0-0.5					13.6	1						
Grid (-10, 70)-4	4-4					4.8	1						
Grid (-10, 90)-2	2-2					3.98	1						
Grid (-10, 110)-4	4-4					2.72	1						
Grid (-10, 130)	0-0.5					5.59	1						
Grid (-10, 130)	0-0.5					6.36	1						
Grid (0, 50)	2-2					4.9	1						
Grid (0, 70)-2	2-2					8.33	1						
Grid (0, 90)-4	4-4					3.5	1						
Grid (0, 110)-4	4-4					10.3	1						
Grid (0, 130)-2	2-2					13.5	1						
SW-BP3-EFL-(-10)/-C	0-0	25400	1	0.55	1	9.6	1	215	1	0.59	1		
SW-BP3-WFL-(-1)/-C	0-0	16300	1	4.8000002	0	3.4	1	77.1	1	2	1		
SW-BP3-NEW01-5/-1	0-0	29900	1	0.42	1	3.6	1	177	1	1.8	1		
SW-BP3-NEW01-5-2	0-0	32200	1										
SW-BP3-NEW01-5-3	0-0	30700	1										
SW-BP3-NEW01-5-4	0-0	28000	1										
SW-BP3-NWW01-2	2-2	18400	1	5	0	3.7	1	60.4	1	0.89	1		
SW-BP3-SEW01-5	5-5	15800	1	0.3	1	4.5	1	45.3	1	0.64	1		
SW-BP3-SWW01-2/02	2-2	19100	1	4.6999998	0	4.1	1	113	1	1.6	1		
SW-BP3-EAST-FL-11.5/-C	11.5-11.5	28700	1	0.75	1	7.8	1	219	1	0.6	1		

Sample ID	Calcium	D_Calcium	Cadmium	D_Cadmium	Chromium	D_Chromium	Cobalt	D_Cobalt	Copper	D_Copper	Iron	D_Iron	Lead
052692-1CM			0.5	0	54	1							100
S-7					62.599998	1							9.5
SS-8					83.300003	1	21.8	1	57.8	1	30200	1	22.9
SS-10					169	1	41.2	1	91.6	1	41800	1	12.4
OU3-SB01	273	1	2	1	113	1	53.6	1	15.7	1	50500	1	11.7
SB-02-02													
SB-02-03													
SB-02-04													
SB-02-05					98.900002	1	19.7	1	40.7	1	26100	1	5.1
SB-03-02													
SB-03-03													
SB-03-04					42.599998	1							
Grid (-90, 50)-2													
Grid (-90, 110)													
Grid (-70,-50)													
Grid (-70,-30)-4													
Grid (-70, 30)													
Grid (-70, 50)													
Grid (-70, 70)													
Grid (-70, 70)-2													
Grid (-70, 90)-2													
Grid (-70, 110)													
Grid (-70, 130)													
Grid (-50, -50)-1													
Grid (-50, -50)-2													
Grid (-50, -30)-2													
Grid (-50, -10)-2													
Grid (-50, 70)-1													
Grid (-50, 70)-2													
Grid (-50, 90)-2													
Grid (-50, 110)													
Grid (-50, 130)													
Grid (-30, -50)													
Grid (-30, -30)-2													
Grid (-30, -10)-2													
Grid (-30, 70)-4													
Grid (-30, 90)-2													
Grid (-30, 110)-2													
Grid (-30, 130)-1													
Grid (-30, 130)-2													
Grid (-10, -50)													
Grid (-10, -30)													
Grid (-10, 70)-4													
Grid (-10, 90)-2													
Grid (-10, 110)-4													
Grid (-10, 130)													
Grid (-10, 130)													
Grid (0, 50)													
Grid (0, 70)-2													
Grid (0, 90)-4													
Grid (0, 110)-4													
Grid (0, 130)-2													
SW-BP3-EFL-(-10)/-C			0.34	1	54	1	14.7	1	46.2	1	28100	1	4.1
SW-BP3-WFL-(-1)/-C			0.38	1	52	1	16.4	1	56.4	1	30900	1	17.6
SW-BP3-NEW01-5/-1			0.24	1	86.199997	1	12.9	1	49	1	40500	1	15.2
SW-BP3-NEW01-5-2							22	1					
SW-BP3-NEW01-5-3							17.5	1					
SW-BP3-NEW01-5-4							31.1	1					
SW-BP3-NWW01-2			0.061	1	43.5	1	13.1	1	29.5	1	32200	1	37
SW-BP3-SEW01-5			0.025	1	40.400002	1	10.6	1	33.8	1	36700	1	19.3
SW-BP3-SWW01-2/02			0.14	1	57.200001	1	23.9	1	47.3	1	30100	1	8.1
SW-BP3-EAST-FL-11.5/-C			0.12	1	81.199997	1	18.6	1	43.9	1	29200	1	4.9

Table B.1 Samples Remaining at the Site
4825 Glenbrook Road
Spring Valley, Washington D.C.

Sample ID	Sample Depth	Aluminum	D_Aluminum	Antimony	D_Antimony	Arsenic	D_Arsenic	Barium	D_Barium	Beryllium	D_Beryllium	Boron, Total	D_Boron, Total	Calcium	D_Calcium	Cadmium	D_Cadmium	Chromium	D_Chromium	Cobalt	D_Cobalt	Copper	D_Copper	Iron	D_Iron	Lead
SW-BP3-EAST-SW(01)-8/(02)	8-8	31000	1	0.69	1	1	0	240	1	0.78	1					0.086	1	88.400002	1	16.6	1	52.7	1	30100	1	5.7
SW-BP3-EAST-SW(02)-11	11-11	40200	1			1	1													23.7	1					
SW-BP3-East2-FL(01)-5.0	5-5	36700	1	0.99	1	2.8	1	241	1	0.76	1					0.12	1	51.799999	1	17.8	1	40.9	1	31100	1	5.7
SW-BP3-East2-FL(01)-5.0-C	5-5	44100	1																							
SW-BP3-East2-NEW(01)-2.5	2.5-2.5	18200	1			7.6	1	71	1	1.2	1					0.31	1	41.799999	1	16.2	1	7.9	1	27800	1	7.4
SW-BP3-East2-NEW(02)-2.5	2.5-2.5																									
SW-BP3-East2-SWW(01)-2.5	2.5-2.5	40800	1	1.2	1	1.5	1	277	1	0.68	1					0.17	1	65	1	19.4	1	60.6	1	34500	1	7.5
SW-BP3-East2-SWW(02)-2.5	2.5-2.5	19400	1																	17.4	1					
SW-4825GB-(-70,-30)-3.0	3-3	16600	1	12.2	0	4.4	1	70	1							0.051	1					77.8	1			5.1
SW-4825GB-(-70,-30)-4.0	4-4	18300	1	6.7	0	4.1	1	74.3	1							0.4	1					88.8	1			24.2
SW-4825GB-(-70,-10)-3.0	3-3	31100	1	12.7	0	0.87	1	179	1							0.53	1					4.9	1			3.2
SW-4825GB-(-70,-10)-4.0	4-4	29400	1	6.6999998	0	0.9	1	230	1							0.56	1					49	1			3.4
SW-4825GB-(-70,10)-3.0	3-3	36700	1	32.5	0	1.7	1	199	1							0.54	1					10.8	1			7.6
SW-4825GB-(-70,10)-4.0	4-4	36400	1	6.1999998	0	1.8	1	213	1							0.52	1					6.7	1			4.3
SW-4825GB-(-70,10)SW-E-0.5	0.5-0.5	20400	1	9.6999998	0	3.3	1	82.6	1							0.48	0					58.4	1			12
SW-4825GB-(-90, 30)-T2-6.0	6-6					2.9	1																			
SW-4825GB-(-90,50)-T2-5.0	5-5					3.2	1																			
SW-4825GB-(-70, 30)SW-S(5)-0.5	0.5-0.5					4.9	1																			
SW-4825GB-(-70,50)-T2-SW-N-4.5	4.5-4.5	22600	1	6.4000001	0	3.3	1	91	1							0.53	1					29.8	1			8.6
SW-4825GB-(-90,50)-T2-SW-E-4.5	4.5-4.5	25300	1	6.3000002	0	12.4	1	103	1							0.53	1					99.4	1			8.4
SW-4825GB-(-70,50)SW-T2-S1-0.5	0.5-0.5	24800	1	6.5999999	0	1.4	1	71.8	1							0.55	0					107	1			6.6
SW-4825GB-(-70,50)SW-T2-S1-4.5	4.5-4.5	26200	1	6	0	2.1	1	80.4	1							0.5	0					28	1			5.7
SW-4825GB-(-90,10)SW-E-2.5	2.5-2.5	34200	1	5.9000001	0	2.3	1	200	1							0.49	0					31.7	1			6.9
SW-4825GB-(-90,-10)SW-N1-0.5	0.5-0.5	22000	1	6.3000002	0	9.2	1	88.9	1							0.52	0					51.6	1			7.3
SW-4825GB-(-90,-10)SW-N1-2.5	2.5-2.5	31300	1	12.8	0	0.86	1	192	1							0.54	0					50.3	1			4.5
SW-4825GB-(-90,10)SW-N1-0.5	0.5-0.5	24400	1	5.6999998	0	10.5	1	114	1							0.47	0					62	1			6.7
SW-4825GB-(-90,10)SW-N1-2.5	2.5-2.5	20600	1	6.0999999	0	9	1	87.5	1							0.51	0					61	1			8
SW-4825GB-(-70,30)-T2-SW-S-5.0	5-5	29200	1			1.7	1	153	1							0.55	0					78.4	1			8.2
SW-4825GB-(-70,30)-T2-SW-S-6.0	6-6					2.9	1																			
SW-4825GB-(-90,-30)-SW-N-0.5	0.5-0.5	15000	1			9	1	82.7	1							0.023	1					61.9	1			8.3
SW-4825GB-(-90,-30)-SW-N-2.5	2.5-2.5	21200	1			14.8	1	100	1							0.53	0					46.4	1			8.5
SW-4825GB-(-90,-30)-SW-W-0.5	0.5-0.5	21200	1			13.3	1	103	1							0.55	0					36.2	1			9.6
SW-4825GB-(-90,-30)-SW-W-2.5	2.5-2.5	24800	1			19.5	1	129	1							0.53	0					60.5	1			7.5
SW-4825GB-(-70,10)-T2-6.0	6-6					596	1																			
SW-4825GB-(-70,10)-T2-SW-S-5.5	5.5-5.5					1.4	1																			
SW-4825GB-(-70,10)T2-SW-W2-5.5	5.5-5.5					1.5	1																			
SW-4825GB-(-70,30)-T2-SW-S-5.5	5.5-5.5					4.2	1																			
SW-4825GB-(-90,10)-T2-SW-N-5.5	5.5-5.5					597	1																			
SW-4825GB-(90,30)-T2-SW-N1-5.5	5.5-5.5					6.1	1																			
4825GB-TEST PIT 137-18 BGS	1.5-1.5					10.2	1																			
SW-4825GB-EW01-LE01[2]	2-2	54300	1	4.3000002	0	1.1	1	274	1	1.6	1	10.8	1			1.1	0	98.199997	1	21.1	1	133	1	55800	1	12.5
SW-4825GB-EW02-LE01[2]	2-2	57000	1	4.6999998	1	5.5	1	241	1	1.7	1	10.6	1			1.2	0	154	1	32.3	1	106	1	59600	1	12.4
SW-4825GB-NW01-LN01[2]	2-2	53800	1	4.8000002	0	8.2	1	188	1	1.5	1	8.3	1			1.2	0	127	1	30.2	1	103	1	46600	1	9.4
SW-4825GB-SW01-LS01[2]	2-2	59300	1	4.6999998	0	5	1	192	1	1	1	9	1			0.8	1	177	1	41.1	1	48.3	1	54700	1	7.3
SW-4825GB-FLOOR-[6.5]	6.5-6.5	35100	1	4.3000002	0	601	1	171	1	1.7	1	13.7	1			0.99	1	164	1	20.6	1	97.8	1	46000	1	12.5
SW-4825GB-AA2	3-3	27300	1	2.4000001	0	2	1	75.6	1							0.59	0					250	1			4.9
SW-4825GB-GG2	3-3	25800	1	2.3	0	15.2	1	92.6	1							0.58	0					142	1			8.7
SW-4825GB-GS01	0.66-1.125	11300	1	1.9	0	0.39	1	36.1	1	0.83	1	9.4	0			0.17	1	23.6	1	12.8	1	1.3	1	19800	1	5.8
SW-4825GB-GS02	0.66-1	15700	1	2.0999999	0	0.38	1	54.3	1	0.99	1	10.4	0			0.52	0	29.6	1	15.5	1	10.1	1	29900	1	6.6
SW-4825GB-GS03/SW-4825GB-GS07	1.58-2.16	17700	1	2.0999999	0	0.65	1	125.3	1	0.755	1	10.6	0			0.2725	1	37.700001	1	15.5	1	19.95	1	25050	1	4.75
SW-4825GB-GS04	0.75-1.08	27300	1	2.4000001	0	2	1	75.6	1							0.59	0					250	1			4.9
SW-4825GB-GS05	1.16-1.42	24600	1	2.2	0	13.7	1	143	1	1.4	1	11	0			0.55	0	81.699997	1	14.9	1	35.7	1	27200	1	6.9
SW-4825GB-GS06	0.83-1.25	25800	1	2	0	17.3	1	165	1	1.2	1	10.1	0			0.51	0	91.599998	1	15.6	1	35.9	1	24100	1	7.9
203-BF(G1)-2751-0	3-3	11800	1	7	0	2.28	1	23.2	1	2.5	0	25	0	295	1	5	0	23.6	1	5	0	38.3	1	40700	1	20.5
203-BF(G2)-2752-0	4-4	9700	1	7	0	1.77	1	28.5	1	2.5	0	25	0	247	1	5	0	15.5	1	9.64	1	22.2	1	26700	1	20.5
203-BF(G3)-2753-0	3-3	11500	1	7	0	2.04	1	41.4	1	2.5	0	25	0	8290	1	5	0	46	1	10.2	1	26.1	1	24800	1	20.5
203-BF(C)-2754-0 7H07004-	4-4	12900	1			2.21	1	40.9	1	2.5	0	25	0	15200	1	5	0	22.6	1	8.35	1	28.8	1	31700	1	20.5

Table B.1 Samples Remaining at the Site
4825 Glenbrook Road
Spring Valley, Washington D.C.

Sample ID	D_Lead	Magnesium	D_Magnesium	Manganese	D_Manganese	Mercury, Elemental	D_Mercury, Elemental	Nickel	D_Nickel	Potassium	D_Potassium	Selenium	D_Selenium	Silver	D_Silver	Sodium	D_Sodium	Strontium	D_Strontium	Tellurium	D_Tellurium	Thallium	D_Thallium	Tin	D_Tin
052692-1CM	1					0.1	0					10	0	1	0										
S-7	1			382	1	0.12	0	39.3	1													0.57	1		
SS-8	1	8460	1	591	1	0.07	1	36.8	1					6.2	1										
SS-10	1	12900	1	1290	1	0.1	1	113	1			1.2	1	8.6	1										
OU3-SB01	1	165000	1	2960	1			120	1	660	1											0.35	1		
SB-02-02																									
SB-02-03																									
SB-02-04																									
SB-02-05	1	17200	1	408	1			42.5	1			1	0	4.6	1										
SB-03-02																									
SB-03-03																									
SB-03-04																									
Grid (-90, 50)-2																									
Grid (-90, 110)																									
Grid (-70,-50)																									
Grid (-70,-30)-4																									
Grid (-70, 30)																									
Grid (-70, 50)																									
Grid (-70, 70)																									
Grid (-70, 70)-2																									
Grid (-70, 90)-2																									
Grid (-70, 110)																									
Grid (-70, 130)																									
Grid (-50, -50)-1																									
Grid (-50, -50)-2																									
Grid (-50, -30)-2																									
Grid (-50, -10)-2																									
Grid (-50, 70)-1																									
Grid (-50, 70)-2																									
Grid (-50, 90)-2																									
Grid (-50, 110)																									
Grid (-50, 130)																									
Grid (-30, -50)																									
Grid (-30, -30)-2																									
Grid (-30, -10)-2																									
Grid (-30, 70)-4																									
Grid (-30, 90)-2																									
Grid (-30, 110)-2																									
Grid (-30, 130)-1																									
Grid (-30, 130)-2																									
Grid (-10, -50)																									
Grid (-10, -30)																									
Grid (-10, 70)-4																									
Grid (-10, 90)-2																									
Grid (-10, 110)-4																									
Grid (-10, 130)																									
Grid (-10, 130)																									
Grid (0, 50)																									
Grid (0, 70)-2																									
Grid (0, 90)-4																									
Grid (0, 110)-4																									
Grid (0, 130)-2																									
SW-BP3-EFL-(-10)/-C	1	13600	1	256	1	0.1	1	28.8	1			2.7	0	0.031	1			70.5	1	3.2	1	1.9	0	5.5	1
SW-BP3-WFL-(-1)/-C	1	6630	1	504	1	0.095	0	42.6	1			2.8	0	4	0			24.6	1	2.5	1	2	0	1.8	1
SW-BP3-NEW01-5/-1	1	13200	1	254	1	0.095	0	44.2	1			3	1	0.86	1			28.799999	1	3.3	1	2.1	0	2.4	1
SW-BP3-NEW01-5-2				668	1																				
SW-BP3-NEW01-5-3				454	1																				
SW-BP3-NEW01-5-4				527	1																				
SW-BP3-NWW01-2	1	2750	1	274	1	0.11	0	18.9	1			2.9	1	0.83	1			20.6	1	2.9000001	1	2.1	0	2.4	1
SW-BP3-SEW01-5	1	1920	1	225	1	0.11	0	14.7	1			3.3	1	0.42	1			27.299999	1	4.4000001	1	2.3	0	2.8	1
SW-BP3-SWW01-2/02	1	9240	1	441	1	0.13	1	31.9	1			2.8	1	0.61	1			36.599998	1	3	1	2	0	3.3	1
SW-BP3-EAST-FL-11.5/-C	1	17100	1	332	1	0.096	1	44.6	1			0.87	1	0.94	0			10.9	1	3.0999999	1	4.7	0	2.2	1

Table B.1 Samples Remaining at the Site
4825 Glenbrook Road
Spring Valley, Washington D.C.

Sample ID	D_Lead	Magnesium	D_Magnesium	Manganese	D_Manganese	Mercury, Elemental	D_Mercury, Elemental	Nickel	D_Nickel	Potassium	D_Potassium	Selenium	D_Selenium	Silver	D_Silver	Sodium	D_Sodium	Strontium	D_Strontium	Tellurium	D_Tellurium	Thallium	D_Thallium	Tin	D_Tin
SW-BP3-EAST-SW(01)-8/(02)	1	18600	1	443	1	0.098	0	41.9	1			0.51	1	0.84	0			11.9	1	3.3	1	4.2	0	1	1
SW-BP3-EAST-SW(02)-11																									
SW-BP3-East2-FL(01)-5.0	1	16100	1	497	1	0.14	1	30.8	1			14.2	0	0.56	1			34.700001	1	3.3	1	3.7	1	3.3	1
SW-BP3-East2-FL(01)-5.0-C																						2	0		
SW-BP3-East2-NEW(01)-2.5	1	10400	1	452	1	0.24	1	37.6	1			14.5	0	0.42	1			30.6	1	1.7	1	2.4	1	3.4	1
SW-BP3-East2-NEW(02)-2.5																						0.35	0		
SW-BP3-East2-SWW(01)-2.5	1	19500	1	400	1	0.11	0	34.3	1			15.3	0	1	1			35.900002	1	3.0999999	1	3.7	1	3.1	1
SW-BP3-East2-SWW(02)-2.5																						0.39	0		
SW-4825GB-(-70,-30)-3.0	1			510	1	0.11	1	39	1													1.5	1		
SW-4825GB-(-70,-30)-4.0	1			896	1	0.1	1	39.3	1													2.8	1		
SW-4825GB-(-70,-10)-3.0	1			496	1	0.3	1	44.8	1													2.3	1		
SW-4825GB-(-70,-10)-4.0	1			442	1	0.32	1	34.8	1													2.4	1		
SW-4825GB-(-70,10)-3.0	1			642	1	0.43	1	52.4	1													2.4	1		
SW-4825GB-(-70,10)-4.0	1			575	1	0.3	1	55.9	1													3	1		
SW-4825GB-(-70,10)SW-E-0.5	1			199	1	0.26	1	16.9	1													12.1	1		
SW-4825GB-(-90, 30)-T2-6.0																									
SW-4825GB-(-90,50)-T2-5.0																									
SW-4825GB-(-70, 30)SW-S(5)-0.5																									
SW-4825GB-(-70,50)-T2-SW-N-4.5	1			736	1	0.088	0	49	1													2.9	1		
SW-4825GB-(-90,50)-T2-SW-E-4.5	1			536	1	0.043	1	62.5	1													3.1	1		
SW-4825GB-(-70,50)SW-T2-S1-0.5	1			478	1	0.069	1	44.8	1													6.9	1		
SW-4825GB-(-70,50)SW-T2-S1-4.5	1			558	1	0.23	1	56.6	1													5.1	1		
SW-4825GB-(-90,10)SW-E-2.5	1			782	1	0.039	1	75.8	1													4.4	1		
SW-4825GB-(-90,-10)SW-N1-0.5	1			411	1	0.085	1	36.8	1													2.3	1		
SW-4825GB-(-90,-10)SW-N1-2.5	1			455	1	0.028	1	50.7	1													2.5	1		
SW-4825GB-(-90,10)SW-N1-0.5	1			511	1	0.11	1	39.6	1													2.3	1		
SW-4825GB-(-90,10)SW-N1-2.5	1			477	1	0.068	1	36.1	1													1.7	1		
SW-4825GB-(-70,30)-T2-SW-S-5.0	1			378	1	0.07	1	51.4	1													3.1	1		
SW-4825GB-(-70,30)-T2-SW-S-6.0																									
SW-4825GB-(-90,-30)-SW-N-0.5	1			545	1	0.052	1	28.6	1													2.1	1		
SW-4825GB-(-90,-30)-SW-N-2.5	1			475	1	0.15	1	41.2	1													1.8	1		
SW-4825GB-(-90,-30)-SW-W-0.5	1			412	1	0.23	1	33.2	1													1.3	1		
SW-4825GB-(-90,-30)-SW-W-2.5	1			571	1	0.06	1	51	1													2.4	1		
SW-4825GB-(-70,10)-T2-6.0																									
SW-4825GB-(-70,10)-T2-SW-S-5.5																									
SW-4825GB-(-70,10)T2-SW-W2-5.5																									
SW-4825GB-(-70,30)-T2-SW-S-5.5																									
SW-4825GB-(-90,10)-T2-SW-N-5.5																									
SW-4825GB-(90,30)-T2-SW-N1-5.5																									
4825GB-TEST PIT 137-18 BGS																									
SW-4825GB-EW01-LE01[2]	1	17700	1	1330	1	0.029	1	99.5	1			2.8	0	1.1	0			16.200001	1	3	0	6.5	0	10.8	0
SW-4825GB-EW02-LE01[2]	1	22400	1	920	1	0.04	1	106	1			3.1	0	1.2	0			16.9	1	3	0	7	0	11.6	0
SW-4825GB-NW01-LN01[2]	1	17000	1	774	1	0.06	1	80.3	1			2.5	0	1.2	0			14	1	3	0	7.2	0	12	0
SW-4825GB-SW01-LS01[2]	1	30700	1	1340	1	0.044	1	135	1			3	0	1.2	0			16.9	1	3	0	7	0	11.7	0
SW-4825GB-FLOOR-[6.5]	1	21000	1	474	1	0.032	1	77.3	1			2.9	0	1.1	0			6.0999999	1	2.9000001	0	3.6	1	10.7	0
SW-4825GB-AA2	1			1320	1	0.21	0	114	1													3.5	0		
SW-4825GB-GG2	1			628	1	0.22	1	73	1													3.5	0		
SW-4825GB-GS01	1	7810	1	263	1	0.19	0	27.1	1			2.6	0	0.47	0			5.1999998	1	2.4000001	0	2.8	0	4.7	0
SW-4825GB-GS02	1	10100	1	307	1	0.19	0	36.2	1			2.7	0	0.52	0			7.5	1	2.7	0	3.1	0	5.2	0
SW-4825GB-GS03/SW-4825GB-GS07	1	11145	1	351.5	1	0.19	0	30	1			2.45	0	0.53	0			7.9499998	1	2.45	0	3.2	0	5.3	0
SW-4825GB-GS04	1			1320	1	0.21	1	114	1													3.5	0		
SW-4825GB-GS05	1	14600	1	381	1	0.52	1	31.1	1			2.8	0	0.55	0			3.4000001	1	2.8	0	3.3	0	5.5	0
SW-4825GB-GS06	1	16200	1	379	1	0.062	1	42.3	1			2.7	0	0.51	0			11.5	1	2.7	0	3	0	5.1	0
203-BF(G1)-2751-0	0	305	1	64.5999985	1	0.036	1	5.81	1	290	1	7	0	3.35	1	21.2	1					5	0	5	0
203-BF(G2)-2752-0	0	1460	1	164	1	0.028	1	7.43	1	1260	1	7	0			24.1	1					5	0	5	0
203-BF(G3)-2753-0	0	6370	1	258	1	0.021	1	41.1	1	2290	1	7	0	2.5	0	58.6	1					5	0	5	0
203-BF(C)-2754-0 7H07004-	0	2750	1	186	1	0.031	1	15.3	1	2040	1	7	0	2.5	0	62.2	1					5	0	5	0

Table B.1 Samples Remaining at the Site
4825 Glenbrook Road
Spring Valley, Washington D.C.

Sample ID	Titanium	D_Titanium	Vanadium	D_Vanadium	Zinc	D_Zinc	Zirconium	D_Zirconium	Cyanide	D_Cyanide	Fluoride	D_Fluoride	Iodine (as Iodide)	D_Iodine (as Iodide)	Iodine Pentafluoride	D_Iodine Pentafluoride	Perchlorate	D_Perchlorate	Hexavalent Chromium	D_Hexavalent Chromium
052692-1CM																				
S-7			122	1																
SS-8			66.8	1	65.9	1													2.5999999	1
SS-10			114	1	78.3	1														
OU3-SB01			90.3	1	57.3	1														
SB-02-02																				
SB-02-03																				
SB-02-04																				
SB-02-05			75	1	50	1			0.5	0										
SB-03-02																				
SB-03-03																				
SB-03-04			49.8	1																
Grid (-90, 50)-2																				
Grid (-90, 110)																				
Grid (-70,-50)																				
Grid (-70,-30)-4																				
Grid (-70, 30)																				
Grid (-70, 50)																				
Grid (-70, 70)																				
Grid (-70, 70)-2																				
Grid (-70, 90)-2																				
Grid (-70, 110)																				
Grid (-70, 130)																				
Grid (-50, -50)-1																				
Grid (-50, -50)-2																				
Grid (-50, -30)-2																				
Grid (-50, -10)-2																				
Grid (-50, 70)-1																				
Grid (-50, 70)-2																				
Grid (-50, 90)-2																				
Grid (-50, 110)																				
Grid (-50, 130)																				
Grid (-30, -50)																				
Grid (-30, -30)-2																				
Grid (-30, -10)-2																				
Grid (-30, 70)-4																				
Grid (-30, 90)-2																				
Grid (-30, 110)-2																				
Grid (-30, 130)-1																				
Grid (-30, 130)-2																				
Grid (-10, -50)																				
Grid (-10, -30)																				
Grid (-10, 70)-4																				
Grid (-10, 90)-2																				
Grid (-10, 110)-4																				
Grid (-10, 130)																				
Grid (-10, 130)																				
Grid (0, 50)																				
Grid (0, 70)-2																				
Grid (0, 90)-4																				
Grid (0, 110)-4																				
Grid (0, 130)-2																				
SW-BP3-EFL-(-10)/-C	1590	1	75.1	1	57.1	1	4.6999998	1	0.22	0	5.3	1	0.06	0	5.599999905	0	1.13	1		
SW-BP3-WFL-(-1)/-C	604	1	49.7	1	46	1	23.6	1	0.23	0	4.9	1	0.05	0	5.300000191	0	1.13	1		
SW-BP3-NEW01-5/-1	1240	1	79.5	1	64.3	1	13.1	1	0.15	0	16	1	0.06	0	110	1	2.46000004	0		
SW-BP3-NEW01-5-2			85.2	1																
SW-BP3-NEW01-5-3			82.4	1																
SW-BP3-NEW01-5-4			87	1																
SW-BP3-NWW01-2	402	1	54.9	1	45	1	25.799999	1	0.16	0	17	1	0.06	0	160	1	2.25	0		
SW-BP3-SEW01-5	307	1	49.8	1	38.8	1	27.299999	1	0.17	0	16	1	0.06	0	180	1	1.19000006	1		
SW-BP3-SWW01-2/02	826	1	60.8	1	52.7	1	14.9	1	0.15	0	5.8	1	0.06	0	59	1	2.3900001	1		
SW-BP3-EAST-FL-11.5/-C	1750	1	95.4	1	60.9	1	0.93	1	0.17	0	6.8	1	0.03	0	64	1	2.33999991	0		

Table B.1 Samples Remaining at the Site
4825 Glenbrook Road
Spring Valley, Washington D.C.

Sample ID	Titanium	D_Titanium	Vanadium	D_Vanadium	Zinc	D_Zinc	Zirconium	D_Zirconium	Cyanide	D_Cyanide	Fluoride	D_Fluoride	Iodine (as Iodide)	D_Iodine (as Iodide)	Iodine Pentafluoride	D_Iodine Pentafluoride	Perchlorate	D_Perchlorate	Hexavalent Chromium	D_Hexavalent Chromium
SW-BP3-EAST-SW(01)-8/(02)	1960	1	85.4	1	48.1	1	0.53	1	0.15	0	3.4	1	0.02	0	31	1	2.25999999	0		
SW-BP3-EAST-SW(02)-11			108	1																
SW-BP3-East2-FL(01)-5.0	1740	1	91.3	1	64.8	1	2.2	1	0.15	0	5.9	1	0.02	0	51	1	2.29999995	0		
SW-BP3-East2-FL(01)-5.0-C			110	1																
SW-BP3-East2-NEW(01)-2.5	1040	1	42.2	1	89.5	1	16.700001	1	0.15	0	2	1	0.02	0	19	1	2.29999995	0		
SW-BP3-East2-NEW(02)-2.5																				
SW-BP3-East2-SWW(01)-2.5	2140	1	103	1	66.9	1	1.7	1	0.15	0	5	1	0.02	0	40	1	2.29999995	0		
SW-BP3-East2-SWW(02)-2.5			41.9	1					0.15	0	5	1	0.02	0	40	1	2.29999995	0		
SW-4825GB-(-70,-30)-3.0			76.6	1	92.7	1														
SW-4825GB-(-70,-30)-4.0			54.1	1	91	1														
SW-4825GB-(-70,-10)-3.0			70	1	52.2	1														
SW-4825GB-(-70,-10)-4.0			93.6	1	55	1														
SW-4825GB-(-70,10)-3.0			87.5	1	64.3	1														
SW-4825GB-(-70,10)-4.0			79.9	1	71.1	1														
SW-4825GB-(-70,10)SW-E-0.5			45.9	1	33.4	1														
SW-4825GB-(-90, 30)-T2-6.0																				
SW-4825GB-(-90,50)-T2-5.0																				
SW-4825GB-(-70, 30)SW-S(5)-0.5																				
SW-4825GB-(-70,50)-T2-SW-N-4.5			119	1	76.9	1														
SW-4825GB-(-90,50)-T2-SW-E-4.5			111	1	63.1	1														
SW-4825GB-(-70,50)SW-T2-S1-0.5			231	1	33	1														
SW-4825GB-(-70,50)SW-T2-S1-4.5			171	1	126	1														
SW-4825GB-(-90,10)SW-E-2.5			116	1	150	1														
SW-4825GB-(-90,-10)SW-N1-0.5			67	1	64.6	1														
SW-4825GB-(-90,-10)SW-N1-2.5			72.3	1	52.2	1														
SW-4825GB-(-90,10)SW-N1-0.5			75.7	1	79.3	1														
SW-4825GB-(-90,10)SW-N1-2.5			59.5	1	56.5	1														
SW-4825GB-(-70,30)-T2-SW-S-5.0			225	1	52.8	1														
SW-4825GB-(-70,30)-T2-SW-S-6.0																				
SW-4825GB-(-90,-30)-SW-N-0.5			65.4	1	51.1	1														
SW-4825GB-(-90,-30)-SW-N-2.5			62.9	1	64.8	1														
SW-4825GB-(-90,-30)-SW-W-0.5			63.6	1	66	1														
SW-4825GB-(-90,-30)-SW-W-2.5			98.3	1	67.9	1														
SW-4825GB-(-70,10)-T2-6.0																				
SW-4825GB-(-70,10)-T2-SW-S-5.5																				
SW-4825GB-(-70,10)T2-SW-W2-5.5																				
SW-4825GB-(-70,30)-T2-SW-S-5.5																				
SW-4825GB-(-90,10)-T2-SW-N-5.5																				
SW-4825GB-(90,30)-T2-SW-N1-5.5																				
4825GB-TEST PIT 137-18 BGS																				
SW-4825GB-EW01-LE01[2]	1000	1	134	1	90.4	1	5.9000001	1	0.3	0	7.3	1	0.0483	0			2.4000001	0		
SW-4825GB-EW02-LE01[2]	1040	1	177	1	123	1	4.8000002	1	0.3	0	6.2	1	0.0491	0			2.4000001	0		
SW-4825GB-NW01-LN01[2]	1270	1	129	1	111	1	3.2	1	0.3	0	2.5	1	0.0476	0			2.4000001	0		
SW-4825GB-SW01-LS01[2]	976	1	139	1	438	1	3.0999999	1	0.12	1	4	1	0.0475	0			2.4000001	0		
SW-4825GB-FLOOR-[6.5]	1310	1	142	1	191	1	3.0999999	1	0.48	1	1.6	1	0.0487	0			2.4000001	0		
SW-4825GB-AA2			264	1	70.8	1														
SW-4825GB-GG2			118	1	67.5	1														
SW-4825GB-GS01	582	1	18.9	1	89.9	1	3.4000001	1	0.26	0	1.1	1	0.0423	0			2.0999999	0		
SW-4825GB-GS02	713	1	41.1	1	92.1	1	2.4000001	1	0.26	0	0.96	1	0.0425	0			2.20000005	0		
SW-4825GB-GS03/SW-4825GB-GS07	1098	1	54.5	1	69.5	1	2.8499999	1	0.265	0	1.55	1	0.04375	0			2.0999999	0		
SW-4825GB-GS04			264	1	70.8	1														
SW-4825GB-GS05	1410	1	67.1	1	49.1	1	1.6	1	0.29	0	2.8	1	0.046	0			2.70000005	1		
SW-4825GB-GS06	1470	1	57.3	1	46.6	1	1.8	1	0.12	1	1.7	1	0.0453	0			1.89999998	1		
203-BF(G1)-2751-0			32.5	1	31.2	1														
203-BF(G2)-2752-0			26.5	1	28.5	1														
203-BF(G3)-2753-0			33.4	1	41.2	1														
203-BF(C)-2754-0 7H07004-			31.4	1	36.8	1														

Table B.2
Summary Statistics
4825 Glenbrook Road
Spring Valley, Washington, D.C.

Depth	Chemical	N	#D	%D	Units	MinD	MaxD	Distribution	UCL Calculated Using[1]	Central Tendency[2]	UCL	RME
0-0.5	Aluminum	13	13	100%	mg/kg	9700	39600	Gamma	95% Student's-t UCL	19977	24058	24,058.00
0-2	Aluminum	26	26	100%	mg/kg	9700	59300	Gamma	95% Approximate Gamma UCL	25,431	30,605	30,605.00
0-10	Aluminum	61	56	92%	mg/kg	9700	59300	Gamma	95% Student's-t UCL	27,221	29,590	29,590.00
0-0.5	Arsenic	32	31	97%	mg/kg	1.4	16.8	Kaplan-Meir	95% KM (t) UCL	7.421	8.779	9
0-2	Arsenic	63	62	98%	mg/kg	0.38	22.9	Kaplan-Meir	95% KM (Chebyshev) UCL	7.182	9.915	10
0-10	Arsenic	113	111	98%	mg/kg	0.38	601	Kaplan-Meir	95% KM (Chebyshev) UCL	21.84	61.08	61
0-0.5	Cobalt	6	5	83%	mg/kg	8.35	41.2	Kaplan-Meir	95% KM (t) UCL	16.59	27.59	27.59
0-2	Cobalt	19	18	95%	mg/kg	8.35	41.2	Kaplan-Meir	95% KM (BCA) UCL	19.43	23.47	23
0-10	Cobalt	36	35	97%	mg/kg	8.35	53.6	Kaplan-Meir	95% KM (BCA) UCL	19.93	22.77	23
0-0.5	Manganese	13	13	100%	mg/kg	64.6	1290	Gamma	95% Approximate Gamma UCL	422.4	614.2	614.20
0-2	Manganese	26	26	100%	mg/kg	64.6	1340	Gamma	95% Approximate Gamma UCL	507.7	638	638.00
0-10	Manganese	58	57	98%	mg/kg	64.6	2960	None	95% Chebyshev (Mean, Sd) UCL	474.5	802.8	802.80
0-0.5	Thallium	11	7	64%	mg/kg	0.57	12.1	Kaplan-Meir	95% KM (BCA) UCL	3.13	5.009	5.01
0-2	Thallium	24	7	29%	mg/kg	0.57	12.1	Kaplan-Meir	95% KM (t) UCL	2.129	3.157	3.16
0-10	Thallium	55	28	51%	mg/kg	0.35	12.1	Kaplan-Meir	95% KM (t) UCL	2.236	2.715	2.72
0-0.5	Vanadium	13	13	100%	mg/kg	26.5	231	Gamma	95% Approximate Gamma UCL	75.02	105.7	105.70
0-2	Vanadium	26	26	100%	mg/kg	18.9	231	Gamma	95% Approximate Gamma UCL	78.16	96.48	96.48
0-10	Vanadium	61	60	98%	mg/kg	18.9	264	Gamma	95% Approximate Gamma UCL	88.59	99.07	99.07

Notes:

1 UCLs were calculated by ProUCL using the indicated technique

2 Value presented as the Central Tendency is determined by the distribution as follows:

Kaplan-Meier: the Kaplan-Meier mean

None: data is not parametrically distributed. The median is presented.

Lognormal: the backtransformed mean of the lognormal data

Gamma: k star * theta star

3 UCLs and Central Tendencies not calculated for datasets with less than ten samples [n<10] and/or less than 20 percent detections.

Definitions:

N Total number of samples analyzed
NA Not applicable
#D Number of detects
%D Percentage of detects
MinD Minimum detected value
MaxD Maximum detected value
UCL Upper confidence limit
RME Reasonable maximum exposure

Table B.3
ProUCL Output for 0-0.5 feet bgs
4825 Glenbrook Road
Spring Valley, Washington, D.C.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\Documents and Settings\78495\My Documents\4825 GR\4825 GR HHRA\EPC Calculations\COPCs 0-0.5 UCL re
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	13

Raw Statistics		**Log-transformed Statistics**	
Minimum	9700	Minimum of Log Data	9.18
Maximum	39600	Maximum of Log Data	10.59
Mean	19977	Mean of log Data	9.826
Median	20400	SD of log Data	0.407
SD	8255		
Std. Error of Mean	2290		
Coefficient of Variation	0.413		
Skewness	0.97		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.924	Shapiro Wilk Test Statistic	0.966
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	24058	95% H-UCL	25467
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	29977
95% Adjusted-CLT UCL (Chen-1995)	24401	97.5% Chebyshev (MVUE) UCL	34306
95% Modified-t UCL (Johnson-1978)	24160	99% Chebyshev (MVUE) UCL	42808
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	5.224	**Data appear Normal at 5% Significance Level**	
Theta Star	3824		
MLE of Mean	19977		
MLE of Standard Deviation	8740		
nu star	135.8		
Approximate Chi Square Value (.05)	109.9	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	23743
Adjusted Chi Square Value	106.6	95% Jackknife UCL	24058
		95% Standard Bootstrap UCL	23572
Anderson-Darling Test Statistic	0.254	95% Bootstrap-t UCL	25154
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	25891
Kolmogorov-Smirnov Test Statistic	0.13	95% Percentile Bootstrap UCL	23738
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	24092
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	29957
		97.5% Chebyshev(Mean, Sd) UCL	34276
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	42758
95% Approximate Gamma UCL	24690		
95% Adjusted Gamma UCL	25459		
Potential UCL to Use		Use 95% Student's-t UCL	24058

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Data	32	Number of Detected Data	31
Number of Distinct Detected Data	31	Number of Non-Detect Data	1
		Percent Non-Detects	3.13%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	1.4	Minimum Detected	0.336
Maximum Detected	16.8	Maximum Detected	2.821
Mean of Detected	7.487	Mean of Detected	1.791
SD of Detected	4.528	SD of Detected	0.733
Minimum Non-Detect	10	Minimum Non-Detect	2.303
Maximum Non-Detect	10	Maximum Non-Detect	2.303

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.934	Shapiro Wilk Test Statistic	0.923
5% Shapiro Wilk Critical Value	0.929	5% Shapiro Wilk Critical Value	0.929
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	7.41	Mean	1.785
SD	4.476	SD	0.721
95% DL/2 (t) UCL	8.751	95% H-Stat (DL/2) UCL	10.19
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	6.406	Mean in Log Scale	1.783
SD	5.501	SD in Log Scale	0.722
95% MLE (t) UCL	8.055	Mean in Original Scale	7.399
95% MLE (Tiku) UCL	9.687	SD in Original Scale	4.483
		95% t UCL	8.742
		95% Percentile Bootstrap UCL	8.688
		95% BCA Bootstrap UCL	8.791
		95% H UCL	10.17
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	2.188	Data appear Normal at 5% Significance Level	
Theta Star	3.421		
nu star	135.7		
A-D Test Statistic	0.519	**Nonparametric Statistics**	
5% A-D Critical Value	0.756	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.756	Mean	7.421
5% K-S Critical Value	0.159	SD	4.427
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.801
		95% KM (t) UCL	8.779
Assuming Gamma Distribution		95% KM (z) UCL	8.738
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	8.779
Minimum	1.4	95% KM (bootstrap t) UCL	8.799
Maximum	16.8	95% KM (BCA) UCL	8.768
Mean	7.451	95% KM (Percentile Bootstrap) UCL	8.721
Median	6.342	95% KM (Chebyshev) UCL	10.91
SD	4.459	97.5% KM (Chebyshev) UCL	12.42
k star	2.257	99% KM (Chebyshev) UCL	15.39
Theta star	3.301		

Nu star	144.5	**Potential UCLs to Use**	
AppChi2	117.7	95% KM (t) UCL	8.779
95% Gamma Approximate UCL	9.146	95% KM (Percentile Bootstrap) UCL	8.721
95% Adjusted Gamma UCL	9.248		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Data	6	Number of Detected Data	5
Number of Distinct Detected Data	5	Number of Non-Detect Data	1
		Percent Non-Detects	16.67%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	8.35	Minimum Detected	2.122
Maximum Detected	41.2	Maximum Detected	3.718
Mean of Detected	18.24	Mean of Detected	2.702
SD of Detected	13.93	SD of Detected	0.68
Minimum Non-Detect	5	Minimum Non-Detect	1.609
Maximum Non-Detect	5	Maximum Non-Detect	1.609

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.79	Shapiro Wilk Test Statistic	0.856
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	15.62	Mean	2.405
SD	14.02	SD	0.949
95% DL/2 (t) UCL	27.15	95% H-Stat (DL/2) UCL	92.44
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	14.61	Mean in Log Scale	2.42
SD	14.26	SD in Log Scale	0.921
95% MLE (t) UCL	26.34	Mean in Original Scale	15.65
95% MLE (Tiku) UCL	26.26	SD in Original Scale	13.97
		95% t UCL	27.15
		95% Percentile Bootstrap UCL	24.4
		95% BCA Bootstrap UCL	27.33
		95% H UCL	83.53
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	1.189	**Data appear Normal at 5% Significance Level**	
Theta Star	15.34		
nu star	11.89		

A-D Test Statistic	0.528	**Nonparametric Statistics**	
5% A-D Critical Value	0.683	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.683	Mean	16.59
5% K-S Critical Value	0.36	SD	11.96
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	5.457
		95% KM (t) UCL	27.59
Assuming Gamma Distribution		95% KM (z) UCL	25.57
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	27.29
Minimum	1E-06	95% KM (bootstrap t) UCL	121
Maximum	41.2	95% KM (BCA) UCL	25.7
Mean	15.2	95% KM (Percentile Bootstrap) UCL	25.3
Median	9.92	95% KM (Chebyshev) UCL	40.38
SD	14.52	97.5% KM (Chebyshev) UCL	50.67
k star	0.239	99% KM (Chebyshev) UCL	70.89
Theta star	63.65		
Nu star	2.866	**Potential UCLs to Use**	
AppChi2	0.334	95% KM (t) UCL	27.59
95% Gamma Approximate UCL	130.5	95% KM (Percentile Bootstrap) UCL	25.3
95% Adjusted Gamma UCL	290.5		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	13
Raw Statistics		**Log-transformed Statistics**	
Minimum	64.6	Minimum of Log Data	4.168
Maximum	1290	Maximum of Log Data	7.162
Mean	422.4	Mean of log Data	5.814
Median	411	SD of log Data	0.747
SD	307.8		
Std. Error of Mean	85.36		
Coefficient of Variation	0.729		
Skewness	1.921		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.818	Shapiro Wilk Test Statistic	0.952
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	574.6	95% H-UCL	748.3
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	840.1
95% Adjusted-CLT UCL (Chen-1995)	611.4	97.5% Chebyshev (MVUE) UCL	1017
95% Modified-t UCL (Johnson-1978)	582.1	99% Chebyshev (MVUE) UCL	1365
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.823	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	231.7		
MLE of Mean	422.4		
MLE of Standard Deviation	312.8		
nu star	47.41		
Approximate Chi Square Value (.05)	32.6	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	562.8

Adjusted Chi Square Value	30.86	95% Jackknife UCL	574.6
		95% Standard Bootstrap UCL	559
Anderson-Darling Test Statistic	0.322	95% Bootstrap-t UCL	659.2
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	1249
Kolmogorov-Smirnov Test Statistic	0.148	95% Percentile Bootstrap UCL	566.8
Kolmogorov-Smirnov 5% Critical Value	0.239	95% BCA Bootstrap UCL	609.7
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	794.5
		97.5% Chebyshev(Mean, Sd) UCL	955.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1272
95% Approximate Gamma UCL	614.2		
95% Adjusted Gamma UCL	648.9		
Potential UCL to Use		Use 95% Approximate Gamma UCL	614.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics			
Number of Valid Data	11	Number of Detected Data	7
Number of Distinct Detected Data	6	Number of Non-Detect Data	4
		Percent Non-Detects	36.36%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.57	Minimum Detected	-0.562
Maximum Detected	12.1	Maximum Detected	2.493
Mean of Detected	3.939	Mean of Detected	0.933
SD of Detected	4.132	SD of Detected	1.014
Minimum Non-Detect	5	Minimum Non-Detect	1.609
Maximum Non-Detect	5	Maximum Non-Detect	1.609

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.775	Shapiro Wilk Test Statistic	0.951
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	0.803
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	3.415	Mean	0.927
SD	3.282	SD	0.786
95% DL/2 (t) UCL	5.209	95% H-Stat (DL/2) UCL	6.577
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	0.758
		SD in Log Scale	0.889
		Mean in Original Scale	3.161
		SD in Original Scale	3.425
		95% t UCL	5.032
		95% Percentile Bootstrap UCL	4.844

95% BCA Bootstrap UCL	5.531
95% H-UCL	6.946

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.829
Theta Star	4.752
nu star	11.6
A-D Test Statistic	0.437
5% A-D Critical Value	0.724
K-S Test Statistic	0.724
5% K-S Critical Value	0.318

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	1E-06
Maximum	12.1
Mean	3.338
Median	2.3
SD	3.516
k star	0.357
Theta star	9.342
Nu star	7.862
AppChi2	2.655
95% Gamma Approximate UCL	9.884
95% Adjusted Gamma UCL	11.99

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	3.13
SD	3.26
SE of Mean	1.077
95% KM (t) UCL	5.081
95% KM (z) UCL	4.901
95% KM (jackknife) UCL	5.038
95% KM (bootstrap t) UCL	9.069
95% KM (BCA) UCL	5.009
95% KM (Percentile Bootstrap) UCL	4.925
95% KM (Chebyshev) UCL	7.823
97.5% KM (Chebyshev) UCL	9.853
99% KM (Chebyshev) UCL	13.84

Potential UCLs to Use

95% KM (BCA) UCL	5.009

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations 13

Number of Distinct Observations 13

Raw Statistics

Minimum	26.5
Maximum	231
Mean	75.02
Median	65.4
SD	55.57
Std. Error of Mean	15.41
Coefficient of Variation	0.741
Skewness	2.057

Log-transformed Statistics

Minimum of Log Data	3.277
Maximum of Log Data	5.442
Mean of log Data	4.122
SD of log Data	0.625

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.772
Shapiro Wilk Critical Value	0.866

Data not Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	102.5

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	109.8
95% Modified-t UCL (Johnson-1978)	104

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.939
Shapiro Wilk Critical Value	0.866

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

95% H-UCL	112.9
95% Chebyshev (MVUE) UCL	131.6
97.5% Chebyshev (MVUE) UCL	156.6
99% Chebyshev (MVUE) UCL	205.8

Gamma Distribution Test		Data Distribution
k star (bias corrected)	2.138	Data appear Gamma Distributed at 5% Significance Level
Theta Star	35.08	
MLE of Mean	75.02	
MLE of Standard Deviation	51.3	
nu star	55.6	
Approximate Chi Square Value (.05)	39.46	
Adjusted Level of Significance	0.0301	
Adjusted Chi Square Value	37.53	
Anderson-Darling Test Statistic	0.503	
Anderson-Darling 5% Critical Value	0.74	
Kolmogorov-Smirnov Test Statistic	0.183	
Kolmogorov-Smirnov 5% Critical Value	0.239	
Data appear Gamma Distributed at 5% Significance Level		

Assuming Gamma Distribution

95% Approximate Gamma UCL	105.7
95% Adjusted Gamma UCL	111.1

Nonparametric Statistics

95% CLT UCL	100.4
95% Jackknife UCL	102.5
95% Standard Bootstrap UCL	99.27
95% Bootstrap-t UCL	123.7
95% Hall's Bootstrap UCL	209.2
95% Percentile Bootstrap UCL	101.9
95% BCA Bootstrap UCL	110
95% Chebyshev(Mean, Sd) UCL	142.2
97.5% Chebyshev(Mean, Sd) UCL	171.3
99% Chebyshev(Mean, Sd) UCL	228.4

Potential UCL to Use — Use 95% Approximate Gamma UCL 105.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Table B.4
ProUCL Output for 0-2 feet bgs
4825 Glenbrook Road
Spring Valley, Washington, D.C.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\Documents and Settings\78495\My Documents\4825 GR\4825 GR HHRA\EPC Calculations\COPCs 0-2 UCL ready.xl
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	26

Raw Statistics		**Log-transformed Statistics**	
Minimum	9700	Minimum of Log Data	9.18
Maximum	59300	Maximum of Log Data	10.99
Mean	25431	Mean of log Data	10.01
Median	20800	SD of log Data	0.519
SD	14862		
Std. Error of Mean	2915		
Coefficient of Variation	0.584		
Skewness	1.343		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.805	Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	30409	95% H-UCL	31117
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	36860
95% Adjusted-CLT UCL (Chen-1995)	31045	97.5% Chebyshev (MVUE) UCL	41909
95% Modified-t UCL (Johnson-1978)	30537	99% Chebyshev (MVUE) UCL	51827
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	3.367	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	7553		
MLE of Mean	25431		
MLE of Standard Deviation	13860		
nu star	175.1		
Approximate Chi Square Value (.05)	145.5	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0398	95% CLT UCL	30225
Adjusted Chi Square Value	143.7	95% Jackknife UCL	30409
		95% Standard Bootstrap UCL	30172
Anderson-Darling Test Statistic	0.938	95% Bootstrap-t UCL	32551
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	30944
Kolmogorov-Smirnov Test Statistic	0.161	95% Percentile Bootstrap UCL	30508
Kolmogorov-Smirnov 5% Critical Value	0.172	95% BCA Bootstrap UCL	30812
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	38136
		97.5% Chebyshev(Mean, Sd) UCL	43633
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	54431
95% Approximate Gamma UCL	30605		
95% Adjusted Gamma UCL	30985		
Potential UCL to Use		Use 95% Approximate Gamma UCL	30605

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Data	63	Number of Detected Data	62
Number of Distinct Detected Data	61	Number of Non-Detect Data	1
		Percent Non-Detects	1.59%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.38	Minimum Detected	-0.968
Maximum Detected	22.9	Maximum Detected	3.131
Mean of Detected	7.218	Mean of Detected	1.678
SD of Detected	4.985	SD of Detected	0.886
Minimum Non-Detect	10	Minimum Non-Detect	2.303
Maximum Non-Detect	10	Maximum Non-Detect	2.303

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Lilliefors Test Statistic	0.128	Lilliefors Test Statistic	0.0946
5% Lilliefors Critical Value	0.113	5% Lilliefors Critical Value	0.113
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	7.183	Mean	1.677
SD	4.952	SD	0.879
95% DL/2 (t) UCL	8.225	95% H-Stat (DL/2) UCL	10.02
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	4.926	Mean in Log Scale	1.674
SD	7.248	SD in Log Scale	0.88
95% MLE (t) UCL	6.451	Mean in Original Scale	7.168
95% MLE (Tiku) UCL	8.092	SD in Original Scale	4.96
		95% t UCL	8.212
		95% Percentile Bootstrap UCL	8.248
		95% BCA Bootstrap UCL	8.204
		95% H UCL	9.997
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	1.747	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	4.132		
nu star	216.6		
A-D Test Statistic	0.236	**Nonparametric Statistics**	
5% A-D Critical Value	0.765	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.765	Mean	7.182
5% K-S Critical Value	0.115	SD	4.925
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.627
		95% KM (t) UCL	8.229
Assuming Gamma Distribution		95% KM (z) UCL	8.213
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	8.229
Minimum	0.38	95% KM (bootstrap t) UCL	8.377
Maximum	22.9	95% KM (BCA) UCL	8.322
Mean	7.199	95% KM (Percentile Bootstrap) UCL	8.179
Median	5.81	95% KM (Chebyshev) UCL	9.915
SD	4.947	97.5% KM (Chebyshev) UCL	11.1
k star	1.773	99% KM (Chebyshev) UCL	13.42
Theta star	4.061		
Nu star	223.4	**Potential UCLs to Use**	
AppChi2	189.8	95% KM (Chebyshev) UCL	9.915
95% Gamma Approximate UCL	8.473		
95% Adjusted Gamma UCL	8.505		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Data	19	Number of Detected Data	18
Number of Distinct Detected Data	17	Number of Non-Detect Data	1
		Percent Non-Detects	5.26%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	8.35	Minimum Detected	2.122
Maximum Detected	41.2	Maximum Detected	3.718
Mean of Detected	20.05	Mean of Detected	2.891
SD of Detected	10.04	SD of Detected	0.47
Minimum Non-Detect	5	Minimum Non-Detect	1.609
Maximum Non-Detect	5	Maximum Non-Detect	1.609

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.868	Shapiro Wilk Test Statistic	0.955
5% Shapiro Wilk Critical Value	0.897	5% Shapiro Wilk Critical Value	0.897
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	19.13	Mean	2.787
SD	10.56	SD	0.643
95% DL/2 (t) UCL	23.33	95% H-Stat (DL/2) UCL	27.67
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	19	Mean in Log Scale	2.83
SD	10.54	SD in Log Scale	0.528
95% MLE (t) UCL	23.19	Mean in Original Scale	19.29
95% MLE (Tiku) UCL	23.14	SD in Original Scale	10.3
		95% t UCL	23.39
		95% Percentile Bootstrap UCL	23.6
		95% BCA Bootstrap UCL	23.41
		95% H UCL	25.1
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	4.048	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	4.953		
nu star	145.7		
A-D Test Statistic	0.485	**Nonparametric Statistics**	
5% A-D Critical Value	0.743	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.743	Mean	19.43
5% K-S Critical Value	0.204	SD	9.851
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	2.326
		95% KM (t) UCL	23.47
Assuming Gamma Distribution		95% KM (z) UCL	23.26
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	23.43
Minimum	0.000001	95% KM (bootstrap t) UCL	24.44
Maximum	41.2	95% KM (BCA) UCL	23.47
Mean	18.99	95% KM (Percentile Bootstrap) UCL	23.46
Median	15.6	95% KM (Chebyshev) UCL	29.57
SD	10.79	97.5% KM (Chebyshev) UCL	33.96
k star	0.586	99% KM (Chebyshev) UCL	42.57
Theta star	32.41		
Nu star	22.27	**Potential UCLs to Use**	
AppChi2	12.54	95% KM (BCA) UCL	23.47
95% Gamma Approximate UCL	33.73		
95% Adjusted Gamma UCL	35.53		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	26

Raw Statistics		**Log-transformed Statistics**	
Minimum	64.6	Minimum of Log Data	4.168
Maximum	1340	Maximum of Log Data	7.2
Mean	507.7	Mean of log Data	6.019
Median	411.5	SD of log Data	0.681
SD	349.9		
Std. Error of Mean	68.63		
Coefficient of Variation	0.689		
Skewness	1.464		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.816	Shapiro Wilk Test Statistic	0.954
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	624.9	95% H-UCL	693.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	833.9
95% Adjusted-CLT UCL (Chen-1995)	641.6	97.5% Chebyshev (MVUE) UCL	972.7
95% Modified-t UCL (Johnson-1978)	628.2	99% Chebyshev (MVUE) UCL	1245
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	2.265	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	224.2		
MLE of Mean	507.7		
MLE of Standard Deviation	337.3		
nu star	117.8		
Approximate Chi Square Value (.05)	93.7	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0398	95% CLT UCL	620.5
Adjusted Chi Square Value	92.28	95% Jackknife UCL	624.9
		95% Standard Bootstrap UCL	618.3
Anderson-Darling Test Statistic	0.613	95% Bootstrap-t UCL	654.8
Anderson-Darling 5% Critical Value	0.754	95% Hall's Bootstrap UCL	637.3
Kolmogorov-Smirnov Test Statistic	0.143	95% Percentile Bootstrap UCL	624.1
Kolmogorov-Smirnov 5% Critical Value	0.173	95% BCA Bootstrap UCL	639.4
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	806.8
		97.5% Chebyshev(Mean, Sd) UCL	936.2
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1190
95% Approximate Gamma UCL	638		
95% Adjusted Gamma UCL	647.8		

Potential UCL to Use		Use 95% Approximate Gamma UCL	638

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Data	24	Number of Detected Data	7
Number of Distinct Detected Data	6	Number of Non-Detect Data	17
		Percent Non-Detects	70.83%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.57	Minimum Detected	-0.562
Maximum Detected	12.1	Maximum Detected	2.493
Mean of Detected	3.939	Mean of Detected	0.933
SD of Detected	4.132	SD of Detected	1.014
Minimum Non-Detect	2	Minimum Non-Detect	0.693
Maximum Non-Detect	7.2	Maximum Non-Detect	1.974

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	23
Number treated as Detected	1
Single DL Non-Detect Percentage	95.83%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.775	Shapiro Wilk Test Statistic	0.951
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	0.803
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2.661	Mean	0.746
SD	2.395	SD	0.649
95% DL/2 (t) UCL	3.499	95% H-Stat (DL/2) UCL	3.467
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	0.368
		SD in Log Scale	0.71
		Mean in Original Scale	2.015
		SD in Original Scale	2.49
		95% t UCL	2.886
		95% Percentile Bootstrap UCL	2.955
		95% BCA Bootstrap UCL	3.229
		95% H-UCL	2.571

Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.829	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	4.752		
nu star	11.6		
A-D Test Statistic	0.437	**Nonparametric Statistics**	
5% A-D Critical Value	0.724	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.724	Mean	2.129
5% K-S Critical Value	0.318	SD	2.475
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.6
		95% KM (t) UCL	3.157
Assuming Gamma Distribution		95% KM (z) UCL	3.116
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	3.181
Minimum	0.000001	95% KM (bootstrap t) UCL	3.783
Maximum	12.1	95% KM (BCA) UCL	3.517
Mean	2.126	95% KM (Percentile Bootstrap) UCL	3.291
Median	1.452	95% KM (Chebyshev) UCL	4.744
SD	2.622	97.5% KM (Chebyshev) UCL	5.875
k star	0.316	99% KM (Chebyshev) UCL	8.098
Theta star	6.736		

Nu star	15.15	Potential UCLs to Use	
AppChi2	7.365	95% KM (t) UCL	3.157
95% Gamma Approximate UCL	4.372		
95% Adjusted Gamma UCL	4.61		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations	26	Number of Distinct Observations	26

Raw Statistics		Log-transformed Statistics	
Minimum	18.9	Minimum of Log Data	2.939
Maximum	231	Maximum of Log Data	5.442
Mean	78.16	Mean of log Data	4.18
Median	64.5	SD of log Data	0.607
SD	50.61		
Std. Error of Mean	9.925		
Coefficient of Variation	0.648		
Skewness	1.473		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.851	Shapiro Wilk Test Statistic	0.976
Shapiro Wilk Critical Value	0.92	Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	95.11	95% H-UCL	100.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	120.8
95% Adjusted-CLT UCL (Chen-1995)	97.55	97.5% Chebyshev (MVUE) UCL	139.3
95% Modified-t UCL (Johnson-1978)	95.59	99% Chebyshev (MVUE) UCL	175.7

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.64	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	29.6		
MLE of Mean	78.16		
MLE of Standard Deviation	48.1		
nu star	137.3		
Approximate Chi Square Value (.05)	111.2	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0398	95% CLT UCL	94.48
Adjusted Chi Square Value	109.7	95% Jackknife UCL	95.11
		95% Standard Bootstrap UCL	94.18
Anderson-Darling Test Statistic	0.56	95% Bootstrap-t UCL	99.78
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	101.6
Kolmogorov-Smirnov Test Statistic	0.177	95% Percentile Bootstrap UCL	94.19
Kolmogorov-Smirnov 5% Critical Value	0.172	95% BCA Bootstrap UCL	98.78
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	121.4
		97.5% Chebyshev(Mean, Sd) UCL	140.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	176.9
95% Approximate Gamma UCL	96.48		
95% Adjusted Gamma UCL	97.84		

Potential UCL to Use		Use 95% Approximate Gamma UCL	96.48

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Table B.5
ProUCL Output for 0-12 feet bgs
4825 Glenbrook Road
Spring Valley, Washington, D.C.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\Documents and Settings\78495\My Documents\4825 GR\4825 GR HHRA\EPC Calculations\COPCs mix
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	61	Number of Distinct Observations	56

Raw Statistics		Log-transformed Statistics	
Minimum	9700	Minimum of Log Data	9.18
Maximum	59300	Maximum of Log Data	10.99
Mean	27221	Mean of log Data	10.13
Median	25800	SD of log Data	0.403
SD	11075		
Std. Error of Mean	1418		
Coefficient of Variation	0.407		
Skewness	1.017		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.11	Lilliefors Test Statistic	0.0924
Lilliefors Critical Value	0.113	Lilliefors Critical Value	0.113
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	29590	95% H-UCL	29979
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	33595
95% Adjusted-CLT UCL (Chen-1995)	29751	97.5% Chebyshev (MVUE) UCL	36338
95% Modified-t UCL (Johnson-1978)	29621	99% Chebyshev (MVUE) UCL	41726
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	6.222	Data appear Normal at 5% Significance Level	
Theta Star	4375		
MLE of Mean	27221		
MLE of Standard Deviation	10913		
nu star	759		
Approximate Chi Square Value (.05)	696.1	**Nonparametric Statistics**	
Adjusted Level of Significance	0.046	95% CLT UCL	29554
Adjusted Chi Square Value	694.6	95% Jackknife UCL	29590
		95% Standard Bootstrap UCL	29598
Anderson-Darling Test Statistic	0.272	95% Bootstrap-t UCL	29807
Anderson-Darling 5% Critical Value	0.753	95% Hall's Bootstrap UCL	29821
Kolmogorov-Smirnov Test Statistic	0.066	95% Percentile Bootstrap UCL	29582
Kolmogorov-Smirnov 5% Critical Value	0.114	95% BCA Bootstrap UCL	29751
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	33402
		97.5% Chebyshev(Mean, Sd) UCL	36077
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	41330

95% Approximate Gamma UCL	29682
95% Adjusted Gamma UCL	29744

Potential UCL to Use — Use 95% Student's-t UCL 29590

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics

Number of Valid Data	113	Number of Detected Data	111
Number of Distinct Detected Data	98	Number of Non-Detect Data	2
		Percent Non-Detects	1.77%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.38	Minimum Detected	-0.968
Maximum Detected	601	Maximum Detected	6.399
Mean of Detected	22.19	Mean of Detected	1.626
SD of Detected	96.52	SD of Detected	1.176
Minimum Non-Detect	1	Minimum Non-Detect	0
Maximum Non-Detect	10	Maximum Non-Detect	2.303

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	89
Number treated as Detected	24
Single DL Non-Detect Percentage	78.76%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Lilliefors Test Statistic	0.475	Lilliefors Test Statistic	0.104
5% Lilliefors Critical Value	0.084	5% Lilliefors Critical Value	0.0841
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	21.84	Mean	1.606
SD	95.69	SD	1.186
95% DL/2 (t) UCL	36.77	95% H-Stat (DL/2) UCL	13.17
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	1.605
		SD in Log Scale	1.183
		Mean in Original Scale	21.83
		SD in Original Scale	95.69
		95% t UCL	36.76
		95% Percentile Bootstrap UCL	37.77
		95% BCA Bootstrap UCL	47.61
		95% H-UCL	13.1

Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**
k star (bias corrected)	0.434	**Data do not follow a Discernable Distribution (0.05)**
Theta Star	51.11	
nu star	96.36	
A-D Test Statistic	17.49	**Nonparametric Statistics**

5% A-D Critical Value	0.833	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.833	Mean	21.84
5% K-S Critical Value	0.092	SD	95.27
Data not Gamma Distributed at 5% Significance Level		SE of Mean	9.003
		95% KM (t) UCL	36.77
Assuming Gamma Distribution		95% KM (z) UCL	36.65
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	36.77
Minimum	1E-06	95% KM (bootstrap t) UCL	277.2
Maximum	601	95% KM (BCA) UCL	38.17
Mean	21.79	95% KM (Percentile Bootstrap) UCL	37.61
Median	4.8	95% KM (Chebyshev) UCL	61.08
SD	95.7	97.5% KM (Chebyshev) UCL	78.06
k star	0.379	99% KM (Chebyshev) UCL	111.4
Theta star	57.5		
Nu star	85.66	**Potential UCLs to Use**	
AppChi2	65.33	95% KM (Chebyshev) UCL	61.08
95% Gamma Approximate UCL	28.58		
95% Adjusted Gamma UCL	28.68		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics

Number of Valid Data	36	Number of Detected Data	35
Number of Distinct Detected Data	34	Number of Non-Detect Data	1
		Percent Non-Detects	2.78%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	8.35	Minimum Detected	2.122
Maximum Detected	53.6	Maximum Detected	3.982
Mean of Detected	20.26	Mean of Detected	2.919
SD of Detected	9.721	SD of Detected	0.414
Minimum Non-Detect	5	Minimum Non-Detect	1.609
Maximum Non-Detect	5	Maximum Non-Detect	1.609

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.827	Shapiro Wilk Test Statistic	0.96
5% Shapiro Wilk Critical Value	0.934	5% Shapiro Wilk Critical Value	0.934
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	19.77	Mean	2.863
SD	10.03	SD	0.527
95% DL/2 (t) UCL	22.59	95% H-Stat (DL/2) UCL	23.91
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	19.71	Mean in Log Scale	2.89
SD	10.01	SD in Log Scale	0.444
95% MLE (t) UCL	22.53	Mean in Original Scale	19.88

95% MLE (Tiku) UCL	22.48	SD in Original Scale	9.851
		95% t UCL	22.65
		95% Percentile Bootstrap UCL	22.79
		95% BCA Bootstrap UCL	22.9
		95% H UCL	22.84

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	5.261
Theta Star	3.851
nu star	368.2
A-D Test Statistic	0.952
5% A-D Critical Value	0.75
K-S Test Statistic	0.75
5% K-S Critical Value	0.149

Data follow Appr. Gamma Distribution at 5% Significance Level

Data Distribution Test with Detected Values Only

Data Follow Appr. Gamma Distribution at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	1E-06
Maximum	53.6
Mean	19.7
Median	17.35
SD	10.16
k star	1.014
Theta star	19.42
Nu star	73.02
AppChi2	54.34
95% Gamma Approximate UCL	26.47
95% Adjusted Gamma UCL	26.83

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	19.93
SD	9.648
SE of Mean	1.631
95% KM (t) UCL	22.69
95% KM (z) UCL	22.61
95% KM (jackknife) UCL	22.66
95% KM (bootstrap t) UCL	23.61
95% KM (BCA) UCL	22.77
95% KM (Percentile Bootstrap) UCL	22.74
95% KM (Chebyshev) UCL	27.04
97.5% KM (Chebyshev) UCL	30.12
99% KM (Chebyshev) UCL	36.16

Potential UCLs to Use

95% KM (BCA) UCL	22.77

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Manganese

General Statistics

Number of Valid Observations	58	Number of Distinct Observations	57

Raw Statistics

Minimum	64.6
Maximum	2960
Mean	560.4
Median	474.5
SD	423.4
Std. Error of Mean	55.6
Coefficient of Variation	0.756
Skewness	3.623

Log-transformed Statistics

Minimum of Log Data	4.168
Maximum of Log Data	7.993
Mean of log Data	6.152
SD of log Data	0.583

Relevant UCL Statistics

Normal Distribution Test

Lognormal Distribution Test

Lilliefors Test Statistic	0.247	Lilliefors Test Statistic	0.131
Lilliefors Critical Value	0.116	Lilliefors Critical Value	0.116
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	653.4	95% H-UCL	646.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	752.7
95% Adjusted-CLT UCL (Chen-1995)	680.2	97.5% Chebyshev (MVUE) UCL	838.3
95% Modified-t UCL (Johnson-1978)	657.8	99% Chebyshev (MVUE) UCL	1006
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	2.845	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	197		
MLE of Mean	560.4		
MLE of Standard Deviation	332.2		
nu star	330		
Approximate Chi Square Value (.05)	289	**Nonparametric Statistics**	
Adjusted Level of Significance	0.046	95% CLT UCL	651.9
Adjusted Chi Square Value	288	95% Jackknife UCL	653.4
		95% Standard Bootstrap UCL	650.4
Anderson-Darling Test Statistic	1.902	95% Bootstrap-t UCL	709.2
Anderson-Darling 5% Critical Value	0.758	95% Hall's Bootstrap UCL	1005
Kolmogorov-Smirnov Test Statistic	0.164	95% Percentile Bootstrap UCL	662.6
Kolmogorov-Smirnov 5% Critical Value	0.118	95% BCA Bootstrap UCL	689
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	802.8
		97.5% Chebyshev(Mean, Sd) UCL	907.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1114
95% Approximate Gamma UCL	640.1		
95% Adjusted Gamma UCL	642.3		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	802.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Data	55	Number of Detected Data	28
Number of Distinct Detected Data	21	Number of Non-Detect Data	27
		Percent Non-Detects	49.09%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.35	Minimum Detected	-1.05
Maximum Detected	12.1	Maximum Detected	2.493
Mean of Detected	2.973	Mean of Detected	0.859
SD of Detected	2.254	SD of Detected	0.731
Minimum Non-Detect	0.35	Minimum Non-Detect	-1.05
Maximum Non-Detect	7.2	Maximum Non-Detect	1.974

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	54
Number treated as Detected	1
Single DL Non-Detect Percentage	98.18%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.741	Shapiro Wilk Test Statistic	0.912
5% Shapiro Wilk Critical Value	0.924	5% Shapiro Wilk Critical Value	0.924
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2.4	Mean	0.634
SD	1.821	SD	0.762
95% DL/2 (t) UCL	2.811	95% H-Stat (DL/2) UCL	3.13
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	0.521
		SD in Log Scale	0.691
		Mean in Original Scale	2.146
		SD in Original Scale	1.842
		95% t UCL	2.562
		95% Percentile Bootstrap UCL	2.581
		95% BCA Bootstrap UCL	2.699
		95% H-UCL	2.587

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	2.097	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	1.417		
nu star	117.4		
A-D Test Statistic	0.89	**Nonparametric Statistics**	
5% A-D Critical Value	0.757	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.757	Mean	2.236
5% K-S Critical Value	0.167	SD	1.899
Data follow Appr. Gamma Distribution at 5% Significance Level		SE of Mean	0.286
		95% KM (t) UCL	2.715
Assuming Gamma Distribution		95% KM (z) UCL	2.707
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	2.706
Minimum	1E-06	95% KM (bootstrap t) UCL	2.808
Maximum	12.1	95% KM (BCA) UCL	2.804
Mean	2.212	95% KM (Percentile Bootstrap) UCL	2.748
Median	2.1	95% KM (Chebyshev) UCL	3.484
SD	1.924	97.5% KM (Chebyshev) UCL	4.024
k star	0.431	99% KM (Chebyshev) UCL	5.084
Theta star	5.129		
Nu star	47.44	**Potential UCLs to Use**	
AppChi2	32.63	95% KM (t) UCL	2.715
95% Gamma Approximate UCL	3.216		
95% Adjusted Gamma UCL	3.249		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics

Number of Valid Observations	61	Number of Distinct Observations	60

Raw Statistics		Log-transformed Statistics	
Minimum	18.9	Minimum of Log Data	2.939
Maximum	264	Maximum of Log Data	5.576
Mean	88.59	Mean of log Data	4.353
Median	76.6	SD of log Data	0.519
SD	48.57		
Std. Error of Mean	6.218		
Coefficient of Variation	0.548		
Skewness	1.611		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.134	Lilliefors Test Statistic	0.0473
Lilliefors Critical Value	0.113	Lilliefors Critical Value	0.113
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	98.98	95% H-UCL	100.8
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	115.8
95% Adjusted-CLT UCL (Chen-1995)	100.2	97.5% Chebyshev (MVUE) UCL	127.6
95% Modified-t UCL (Johnson-1978)	99.19	99% Chebyshev (MVUE) UCL	150.7
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	3.784	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	23.41		
MLE of Mean	88.59		
MLE of Standard Deviation	45.54		
nu star	461.7		
Approximate Chi Square Value (.05)	412.8	**Nonparametric Statistics**	
Adjusted Level of Significance	0.046	95% CLT UCL	98.82
Adjusted Chi Square Value	411.7	95% Jackknife UCL	98.98
		95% Standard Bootstrap UCL	98.67
Anderson-Darling Test Statistic	0.376	95% Bootstrap-t UCL	101
Anderson-Darling 5% Critical Value	0.754	95% Hall's Bootstrap UCL	100.6
Kolmogorov-Smirnov Test Statistic	0.066	95% Percentile Bootstrap UCL	99.42
Kolmogorov-Smirnov 5% Critical Value	0.114	95% BCA Bootstrap UCL	100.4
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	115.7
		97.5% Chebyshev(Mean, Sd) UCL	127.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	150.5
95% Approximate Gamma UCL	99.07		
95% Adjusted Gamma UCL	99.33		
Potential UCL to Use		Use 95% Approximate Gamma UCL	99.07

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Table B.6
ProUCL Output for Arsenic (0-12 feet bgs) - Removal of Three Highest As Concentrations
4825 Glenbrook Road
Spring Valley, Washington, D.C.

General UCL Statistics for Full Data Sets

User Selected Options

From File	L:\ISEH\746040(NewDA01)\05_Suppl RA & MEC Haz Assess\4825 GR Risk Assessment\Draft Final\Appen
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Number of Valid Observations	110	Number of Distinct Observations	94

Raw Statistics		Log-transformed Statistics	
Minimum	0.38	Minimum of Log Data	-0.968
Maximum	22.9	Maximum of Log Data	3.131
Mean	6.18	Mean of log Data	1.488
Median	4.785	SD of log Data	0.883
SD	4.814		
Coefficient of Variation	0.779		
Skewness	1.135		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.154	Lilliefors Test Statistic	0.0665
Lilliefors Critical Value	0.0845	Lilliefors Critical Value	0.0845
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	6.941	95% H-UCL	7.819
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	9.285
95% Adjusted-CLT UCL	6.988	97.5% Chebyshev (MVUE) UCL	10.49
95% Modified-t UCL	6.949	99% Chebyshev (MVUE) UCL	12.85
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.607	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	3.844		
MLE of Mean	6.18		
MLE of Standard Deviation	4.874		
nu star	353.6		
Approximate Chi Square Value (.05)	311.1	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0478	95% CLT UCL	6.935
Adjusted Chi Square Value	310.5	95% Jackknife UCL	6.941
		95% Standard Bootstrap UCL	6.923
Anderson-Darling Test Statistic	0.382	95% Bootstrap-t UCL	7.007

Anderson-Darling 5% Critical Value	0.769	95% Hall's Bootstrap UCL	7.004
Kolmogorov-Smirnov Test Statistic	0.0534	95% Percentile Bootstrap UCL	6.949
Kolmogorov-Smirnov 5% Critical Value	0.0883	95% BCA Bootstrap UCL	6.953
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.18
		97.5% Chebyshev(Mean, Sd) UCL	9.046
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	10.75
95% Approximate Gamma UCL	7.026		
95% Adjusted Gamma UCL	7.037		
Potential UCL to Use		Use 95% Approximate Gamma UCL	7.026

APPENDIX C
DERIVATION OF THE PARTICULATE EMISSIONS FACTORS (PEFS)

Appendix C.1
Particulate Emissions Factor for Residents and Outdoor Workers
4825 Glenbrook Road
Spring Valley, Washington, D.C.

Equations

$$PEF = Q/C_{wind}\left[\frac{3{,}600\ \text{seconds/hour}}{0.036\times(1-V)\times(U_m/U_t)^3\times(F(x))}\right]$$

Parameter	Definition	Units	Value	Source
PEF	Particulate Emission Factor	(m^3/Kg)	1.27E+09	Calculated
Q/C	Inverse of the mean concentration at the center of source (g/m^2-s per Kg/m^3)	(g/m^2-s per kg/m^3)	87.37	Calculated (next page)
V	Fraction of vegetative cover (unitless)	(unitless)	0.5	USEPA (1996, 2002)
U_m	Mean annual wind speed	(m/s)	4.69	USEPA (1996, 2002)
U_t	Equivalent threshold value of wind speed at 7 m	(m/s)	11.32	USEPA (1996, 2002)
F(x)	Function dependent on U_m/U_t derived using Cowherd et al. (1985)	(unitless)	1.94E-01	USEPA (1996, 2002)

Appendix C.2
Dust Dispersion Factor
4825 Glenbrook Road
Spring Valley, Washington, D.C.

Residents and Industrial Workers (USEPA 2002a)

$$Q / C_{wind} = A \times \exp\left[\frac{(\ln A_{site} - B)^2}{C}\right]$$

Parameter		Value	Units	Reference
Q/C_{wind}	Inverse of the mean air concentration at the center of the source	87.37	(g/m^2-s per kg/m^3)	site-specific
A_{site}	Area of the site	0.5	acres	site-specific
A	Constant	14.0111	-	USEPA (2002) for Philadelphia, PA
B	Constant	19.6154	-	USEPA (2002) for Philadelphia, PA
C	Constant	225.3397	-	USEPA (2002) for Philadelphia, PA

APPENDIX D
ADVANCED JOHNSON AND ETTINGER SOIL GAS MODEL

Table D-1
Johnson and Ettinger Model Properties for Soil Gas
4825 Glenbrook Road
Washington, D.C

Property		Value	Units	Source/rationale
Building length	L_B	1,000	cm	USEPA 2004
Building width	W_B	1,000	cm	USEPA 2004
Building height	H_B	366	cm	USEPA 2004
Pressure-differential	ΔP	40	$g/cm\text{-}s^2$	USEPA 2004
Exchange rate (Residential)	ER	0.25	1/hr	USEPA 2004
Slab thickness	L_{crack}	10	cm	USEPA 2004
Depth below grade to bottom of slab	L_F	200	cm	USEPA 2004
Depth of soil gas samples	L_S	152.4	cm	Site-specific
Soil gas infiltration rate	Q_{soil}	5.0	L/min	USEPA 2004
Soil temperature	T_s	10.00	ºC	USEPA 2004
Floor-wall crack width	w	0.1	cm	USEPA 2004
Dry bulk density	ρ	1.38	g/cm^3	USEPA 2004, default value for silty clay soil
Total porosity	θ_T	0.481	cm^3/cm^3	USEPA 2004, default value for silty clay soil
Water filled porosity	θ_W	0.216	cm^3/cm^3	USEPA 2004, default value for silty clay soil

DATA ENTRY SHEET

SG-ADV
Version 3.1; 02/04

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
56235			8.00E-02	Carbon tetrachloride

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^{o}C)	ENTER Totals must add up to value of Ls (cell F24) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
200	259.08	10	259.08					1.00E-08

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SIC	1.38	0.481	0.216								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	24	24	350

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.0E-06	9.9E-03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

SG-ADV
Version 3.1; 02/04

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
67663			2.60E-02	Chloroform

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of Ls (cell F24)					
200	259.08	10	259.08					1.00E-08

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SIC	1.38	0.481	0.216								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	24	24	350

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.2E-06	2.9E-03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

SG-ADV
Version 3.1; 02/04

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
56235			4.01E-02	Carbon tetrachloride

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of Ls (cell F24)					
200	259.08	10	259.08					1.00E-08

MORE

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SIC	1.38	0.481	0.216								

MORE

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	24	24	350

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.0E-06	5.0E-03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

SG-ADV
Version 3.1; 02/04

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
67663			6.45E-03	Chloroform

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
200	259.08	10	259.08					1.00E-08

Totals must add up to value of Ls (cell F24)

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SIC	1.38	0.481	0.216								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	24	24	350

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.5E-07	7.1E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

SG-ADV
Version 3.1; 02/04

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
56235			8.00E-02	Carbon tetrachloride

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Totals must add up to value of Ls (cell F24) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
200	259.08	10	259.08					1.00E-08

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SIC	1.38	0.481	0.216								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
15	6	6	350

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.4E-06	9.9E-03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

SG-ADV
Version 3.1; 02/04

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
67663			2.60E-02	Chloroform

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Totals must add up to value of Ls (cell F24) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
200	259.08	10	259.08					1.00E-08

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SIC	1.38	0.481	0.216								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	6	6	350

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.5E-07	2.9E-03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

SG-ADV
Version 3.1; 02/04

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
56235			4.01E-02	Carbon tetrachloride

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
200	259.08	10	259.08					1.00E-08

Totals must add up to value of Ls (cell F24)

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SIC	1.38	0.481	0.216								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
15	6	6	350

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.2E-06	5.0E-03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

SG-ADV Version 3.1; 02/04

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
67663			6.45E-03	Chloroform

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Totals must add up to value of Ls (cell F24) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
200	259.08	10	259.08					1.00E-08

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SIC	1.38	0.481	0.216								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	6	6	350

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.4E-07	7.1E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

APPENDIX E
HOMEGROWN VEGETABLE INTAKE PARAMETERS

Appendix E.1
Moisture Content and Dry Weight of Various Vegetables
4825 Glenbrook Road
Spring Valley, Washington, D.C.

Vegetable	Moisture Content (%)	Dry Weight (%)
Alfalfa sprouts	91.14	8.86
Artichokes - globe & French	84.38	15.62
Artichokes - Jerusalem	78.01	21.99
Asparagus	92.25	7.75
Bamboo shoots	91	9
Beans - dry - blackeye peas (cowpeas)	66.8	33.2
Beans - dry - hyacinth (mature seeds)	87.87	12.13
Beans - dry - navy (pea)	79.15	20.85
Beans - dry - pinto	81.3	18.7
Beans - lima	70.24	29.76
Beans - snap - Italian - green - yellow	90.27	9.73
Beets	87.32	12.68
Beets - tops (greens)	92.15	7.85
Broccoli	90.69	9.31
Brussel sprouts	86	14
Cabbage - Chinese/celery, including bok choy	95.32	4.68
Cabbage - red	91.55	8.45
Cabbage - savoy	91	9
Carrots	87.79	12.21
Cassava (yucca blanca)	68.51	31.49
Cauliflower	92.26	7.74
Celeriac	88	12
Celery	94.7	5.3
Chili peppers	87.74	12.26
Chives	92	8
Cole slaw	81.5	18.5
Collards	93.9	6.1
Corn - sweet	75.96	24.04
Cress - garden - field	89.4	10.6
Cress - garden	89.4	10.6
Cucumbers	96.05	3.95
Dandelion - greens	85.6	14.4
Eggplant	91.93	8.07
Endive	93.79	6.21
Garlic	58.58	41.42
Kale	84.46	15.54
Kohlrabi	91	9
Lambsquarter	84.3	15.7
Leeks	83	17
Lentils - whole	67.34	32.66
Lettuce - iceberg	95.89	4.11
Lettuce - romaine	94.91	5.09
Mung beans (sprouts)	90.4	9.6
Mushrooms	91.81	8.19

Appendix E.1
Moisture Content and Dry Weight of Various Vegetables
4825 Glenbrook Road
Spring Valley, Washington, D.C.

Vegetable	Moisture Content (%)	Dry Weight (%)
Mustard greens	90.8	9.2
Okra	89.58	10.42
Onions	90.82	9.18
Onions - dehydrated or dried	3.93	96.07
Parsley	88.31	11.69
Parsley roots	88.31	11.69
Parsnips	79.53	20.47
Peas (garden) - mature seeds - dry	88.89	11.11
Peppers - sweet - garden	92.77	7.23
Potatoes (white) - peeled	78.96	21.04
Potatoes (white) - whole	83.29	16.71
Pumpkin	91.6	8.4
Radishes - roots	94.84	5.16
Rhubarb	93.61	6.39
Rutabagas - unspecified	89.66	10.34
Salsify (oyster plant)	77	23
Shallots	79.8	20.2
Soybeans - sprouted seeds	69.05	30.95
Spinach	91.58	8.42
Squash - summer	93.68	6.32
Squash - winter	88.71	11.29
Sweetpotatoes (including yams)	72.84	27.16
Swiss chard	92.66	7.34
Tapioca - pearl	10.99	89.01
Taro - greens	85.66	14.34
Taro - root	70.64	29.36
Tomatoes - raw	93.95	6.05
Tomatoes - whole	93.95	6.05
Towelgourd	93.85	6.15
Turnips - roots	91.87	8.13
Turnips - tops	91.07	8.93
Water chestnuts	73.46	26.54
Yambean - tuber	89.15	10.85
Average:	**84.43**	**15.57**

Source: USEPA (1997a), Table 9-27

Appendix E.2
Percent Weight Loss from Preparation of Various Vegetables
4825 Glenbrook Road
Spring Valley, Washington, D.C.

Vegetable	Preparation Loss (%)
Asparagus	23
Beets	28
Broccoli	14
Cabbage	11
Carrots	19
Corn	26
Cucumbers	18
Lettuce	22
Lima beans	-12
Okra	12
Onions	5
Peas, green	2
Peppers	13
Pumpkins	19
Snap beans	18
Tomatoes	15
Potatoes	-22
Average:	**12.41**

Source: USEPA (1997a), Table 13-7

APPENDIX F
SESOIL MODELING

APPENDIX F - SESOIL MODELING

Seasonal Soil Compartment (SESOIL) Modeling was performed to evaluate whether residual soil impacts at the Site pose a threat to groundwater, located at approximately 13 feet below ground surface (bgs) near the impacted source area. Depth to water information from the nearby wells is summarized in Table 1. MW 24 and 25 are down-gradient monitoring wells across Glenbrook Road. PZ-4 is an up-gradient piezometer near the front steps of Kreeger Hall. The shallowest depth to water was used for the modeling as a conservative approach.

Model Description and Setup

The SESOIL model is a one-dimensional vertical transport model for the unsaturated zone. It estimates pollutant concentrations in the soil profile and simulates hydrologic (e.g., rainfall, infiltration) and pollutant transport processes (e.g., volatilization, biodegradation, adsorption). SESOIL from SEVIEW (Integrated Contaminant Transport and Fate Modeling System) Version 6.3.10. software was used for the modeling at 4825 Glenbrook Road.

The chemicals of potential concern (COPCs) that were modeled included: carbon tetrachloride, chloroform, aluminum, arsenic, antimony, cadmium, cobalt, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and vanadium (Table 2). The maximum concentrations of the COPCs were used in the SESOIL model to perform 100 year simulations. Although the highest concentrations for each compound at different depths were detected in different sampling locations, they were considered to be collected from the same general area as a conservative approach. The estimated sizes of the source areas of 3.72E+05 cm^2 (20’ x 20’ grid) and WARSAW 2 NW climate data were used for the model simulations. The soil input parameters used in the SESOIL model were default values for silty clay soil. Based on the previous investigation observations, the model was setup with two soil layers: Layer 1: 0-6.5 feet, and Layer 2: 6.5-13.2 feet. These input parameters are summarized in Table 3.

Model Results

Site-specific SESOIL modeling at the Site consisted of a separate model run for each COPC. Model results are shown in the SESOIL Pollutant Cycle Report in this appendix. As indicated in the Pollutant Cycle Reports for carbon tetrachloride, chloroform, and selenium, the maximum leachate concentrations are below the risk-based regional screening levels, and the maximum leachate concentrations of the rest metals are all 0 mg/L; therefore, either none of the maximum soil concentrations will leach into groundwater located at approximately 13 feet bgs, or the estimated leaching concentrations will be less than the risk-based groundwater screening levels. SESOIL models for COPCs are included in Attachment A.

Conclusion

The site-specific SESOIL modeling results indicate that it is unlikely that the residual concentrations of COPCs detected in soil will impact groundwater beneath the Site.

Reference

SEVIEW, 2008. Integrated Contaminant Transport and Fate Modeling System, Version 6.3.10.

Spring Valley FUDS
Water Levels

Well ID	Top PVC Elevation	Well Type	8/1/2005		12/20/2005		6/27/2006 (a)		7/13/2006		6/4/2007	
			DTW (TOC)	GW Elevation	DTW (TOC)	GW Elevation	DTW (TOC)	GW Elevation	DTW (TOC)	GW Elevation	DTW (TOC)	GW Elevation
MW-24	319.25	Weathered Rock			17	302.25	13.19	306.06	16.8	302.45	17.47	301.78
MW-25	323.09	Weathered Rock			18.12	304.97	17.07	306.02	18.07	305.02	18.38	304.71
MW-26	349.62	Weathered Rock	20.84	328.78	20.05	329.57	19.14	330.48	19.75	329.87	19.48	330.14
MW-27	343.28	Overburden	6.78	336.5	6.08	337.2	4.8	338.48	5.67	337.61	5.53	337.75
PZ-4S	375.5347	Overburden	43.41	332.1247	43.59	331.9447	43.06	332.47	41.91	333.62	41.43	334.10
PZ-4D	375.5404	Bedrock	43.81	331.7304	44.09	331.4504	43.16	332.38	41.32	334.22	42.31	333.23

DTW (TOC) = Depth to water (top of casing)

Table F-2
COPCs for Groundwater Protection
4825 Glenbrook Road
Spring Valley, Washington, D.C.

	Site									
Parameter	**Sample Size**	**Number of Non-Detects**	**Frequency of Detection**	**Arithmetic Average of Detected Concentrations**	**Range of Detection Limits**	**Minimum Detect**	**Maximum Detect**	**Groundwater Protection SSL [1]**	**Maximum Detect Greater than Screening Level?**	**COPCs?**
	(-)	(-)	(-)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)		
1,1,2,2-Tetrachloroethane	26	25	4%	0.0020	0.001 - 0.013	0.002	0.002	2.6E-05	**Yes**	No, not SV specific
Acetone	28	13	54%	0.1812	0.002 - 0.012	0.0025	1.27	4.5E+00	No	No
Carbon Disulfide	27	24	11%	0.0010	0.002 - 0.013	0.00086	0.001	3.1E-01	No	No
Carbon Tetrachloride	25	24	4%	0.0009	0.001 - 0.013	0.00087	0.00087	1.7E-04	**Yes**	**Yes**
Chlorobenzene	25	22	12%	0.0083	0.001 - 0.013	0.002	0.0158	6.2E-02	No	No
Chloroform	25	20	20%	0.0012	0.001 - 0.013	0.0011	0.0013	5.3E-05	**Yes**	**Yes**
cis-1,2-Dichloroethene	24	22	8%	0.0034	0.002 - 0.013	0.0023	0.0045	2.1E-02	No	No
Methyl t-Butyl Ether	24	22	8%	0.0006	0.002 - 0.013	0.0006	0.0006	2.8E-03	No	No
Methylene Chloride	29	5	83%	0.0088	ND - 0.013	0.0019	0.074	1.2E-03	**Yes**	No, not SV specific
Tetrachloroethene	29	25	14%	0.0265	0.001 - 0.013	0.02	0.039	4.9E-05	**Yes**	No, not SV specific
Toluene	28	24	14%	0.0015	0.002 - 0.013	0.001	0.002	1.6E+00	No	No
trans-1,2-Dichloroethene	24	23	4%	0.0008	0.002 - 0.013	0.00081	0.00081	3.1E-02	No	No
Trichloroethene	26	25	4%	0.0010	0.001 - 0.013	0.001	0.001	7.2E-04	**Yes**	No, not SV specific
Xylenes (Total)	29	24	17%	0.0032	0.005 - 0.013	0.00081	0.005	2.0E-01	No	No
4-Nitrophenol	25	24	4%	0.0380	0.1 - 1.1	0.038	0.038	NA	No	No
Benzaldehyde	24	23	4%	0.2180	0.282 - 0.42	0.218	0.218	8.1E-01	No	No
Benzo(a)anthracene	27	26	4%	0.0240	0.000398 - 0.42	0.024	0.024	1.0E-02	**Yes**	No, not SV specific
Benzo(b)fluoranthene	27	26	4%	0.0260	0.000398 - 0.42	0.026	0.026	7.7E-02	No	No
Benzo(k)fluoranthene	26	25	4%	0.0210	0.0523 - 0.42	0.021	0.021	3.5E-01	No	No
Benzoic acid	14	13	7%	0.5630	0.1 - 0.86	0.563	0.563	3.4E+01	No	No
bis(2-Ethylhexyl)phthalate	27	5	81%	0.0599	0.1 - 0.38	0.021	0.11	1.1E+00	No	No
Chrysene	26	25	4%	0.0310	0.0523 - 0.42	0.031	0.031	1.1E+00	No	No
Di-n-Butylphthalate	27	19	30%	0.0579	0.1 - 0.42	0.0161	0.11	9.2E+00	No	No
Diethylphthalate	26	24	8%	0.5640	0.1 - 0.42	0.028	1.1	1.2E+01	No	No
Diphenylamine	13	12	8%	0.0315	ND - 0.123	0.0315	0.0315	1.7E+00	No	No
Fluoranthene	26	25	4%	0.0430	0.0523 - 0.42	0.043	0.043	1.6E+02	No	No
N-Nitrosodiphenylamine	25	24	4%	0.0368	0.1 - 0.42	0.0368	0.0368	7.5E-02	No	No
Phenyl isocyanate	9	7	22%	0.0820	ND - 0.42	0.064	0.1	NA	No	No
Pyrene	27	25	7%	0.0275	0.0523 - 0.42	0.02	0.035	1.2E+02	No	No
Chlordane-alpha	1	0	100%	0.0011	NA	0.0011	0.0011	NA	No	No
4,4,4-DDT	2	1	50%	0.0022	ND - 0.1	0.0022	0.0022	6.7E-02	No	No
2,4,5-TP (silvex)	1	0	100%	0.0130	NA	0.013	0.013	1.6E-01	No	No
Aluminum	61	0	100%	27221.31	NA	9700	59300	5.5E+04	**Yes**	**Yes**
Antimony	47	37	21%	1.21	1.9 - 32.5	0.3	4.7	6.6E-01	**Yes**	**Yes**
Arsenic	113	3	97%	22.37	1 - 10	0.38	601	1.3E-03	**Yes**	**Yes**
Barium	55	0	100%	133.00	NA	23.2	277	3.0E+02	No	No
Beryllium	31	3	94%	1.72	2.5 - 2.5	0.59	15	5.8E+01	No	No
Boron, Total	15	10	33%	10.48	9.4 - 25	8.3	13.7	2.3E+01	No	No
Cadmium	51	26	49%	0.40	0.47 - 5	0.023	2	1.4E+00	**Yes**	**Yes**
Chromium	33	0	100%	76.06	NA	15.5	177	9.9E+07	No	No

Table F-2
COPCs for Groundwater Protection
4825 Glenbrook Road
Spring Valley, Washington, D.C.

	Site									
Parameter	**Sample Size**	**Number of Non-Detects**	**Frequency of Detection**	**Arithmetic Average of Detected Concentrations**	**Range of Detection Limits**	**Minimum Detect**	**Maximum Detect**	**Groundwater Protection SSL [1]**	**Maximum Detect Greater than Screening Level?**	**COPCs?**
	(-)	(-)	(-)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)		
Cobalt	36	1	97%	20.26	5 - 5	8.35	53.6	4.9E-01	**Yes**	**Yes**
Copper	54	0	100%	54.25	NA	1.3	250	5.1E+01	**Yes**	**Yes**
Lead	56	4	93%	11.15	20.5 - 20.5	3.2	100	1.4E+01	**Yes**	**Yes**
Manganese	58	0	100%	560.43	NA	64.6	2960	5.7E+01	**Yes**	**Yes**
Mercury	54	13	76%	0.12	0.088 - 0.21	0.021	0.52	3.0E-02	**Yes**	**Yes**
Nickel	55	0	100%	48.62	NA	5.81	135	4.8E+01	**Yes**	**Yes**
Selenium	30	22	27%	2.13	1 - 15.3	0.51	3.3	9.5E-01	**Yes**	**Yes**
Silver	31	18	42%	2.48	0.47 - 4	0.031	8.6	1.6E+00	**Yes**	**Yes**
Strontium	22	0	100%	20.52	NA	3.4	70.5	7.7E+02	No	No
Tellurium	22	10	55%	3.03	2.4 - 3	1.7	4.4	NA	No	No
Thallium	55	27	51%	2.97	0.35 - 7.2	0.35	12.1	1.4E-01	**Yes**	**Yes**
Tin	26	15	42%	2.84	4.7 - 12	1	5.5	5.5E+03	No	No
Titanium	22	0	100%	1183.09	NA	307	2140	NA	No	No
Vanadium	61	0	100%	88.59	NA	18.9	264	1.8E+02	**Yes**	**Yes**
Zinc	54	0	100%	75.44	NA	28.5	438	6.8E+02	No	No
Zirconium	22	0	100%	7.52	NA	0.53	27.3	NA	No	No
Cyanide	25	22	12%	0.24	0.15 - 0.5	0.12	0.48	7.4E+00	No	No
Fluoride	23	0	100%	5.43	NA	0.96	17	3.3E+02	No	No
Iodine Pentafluoride	12	2	83%	75.40	ND - 5.6	19	180	NA	No	No
Perchlorate	23	17	26%	0.00	0.0021 - 0.00246	0.00113	0.0027	NA	No	No
Hexavalent Chromium	1	0	100%	2.60	NA	2.6	2.6	8.3E-04	**Yes**	**Yes**

Definitions:

NA - Not Applicable
SSL - Soil Screening Level (source: November 2010 USEPA Regional Screening Levels)

Table 3. Input Parameters of SESOIL

Climatic Data:	WARSAW 2 NW	
Simulation Time:	100	years
Depth to GW:	13.2	ft
Soil Layers:	2	
Soil Layer Depth:	0-13.2	ft
Soil Type:	Silty Clay	
Soil Source Area:	400	ft^2
pH:	7	
Effective Porosity:	0.3	
Hydraulic Conductivity:	1.00E-04	cm/sec
Bulk Density:	1.6	g/cc
Organic carbon:	0.002	

Compounds	**Depth** (ft)	**Highest Concentrations** (mg/kg)	**Location**
Carbon Tetrachloride	6.5'	0.00087	SW-4825GB-FLOOR-[6.5]
Chloroform	2'	0.0013	SW-4825GB-EW01-LE01[2]
Aluminum	2'	59300	SW-4825GB-SW01-LS01[2]
Antimony	2'	4.7	SB-02
Arsenic	6.5'	601	SW-4825GB-FLOOR-[6.5]
Cadmium	3'	2	OU3-SB01
Cobalt	2'	53.6	SW-4825GB-SW01-LS01[2]
Copper	3'	250	SW-4825GB-AA2
Lead	2'	100	052692-1CM
Manganese	2'	2960	SW-4825GB-SW01-LS01[2]
Mercury	2'	0.52	SW-4825GB-GS05
Nickel	2'	135	SW-4825GB-SW01-LS01[2]
Selenium	5'	3.3	SW-BP3-SEW01-5
Silver	0.5'	8.6	SS-10
Thallium	0.5'	12.1	SW-4825GB-(-70,10)SW-E-0.5
Vanadium	3'	264	SW-4825GB-AA2

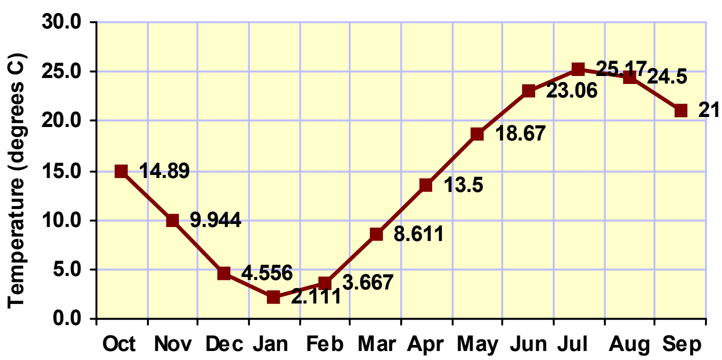
ATTACHMENT A

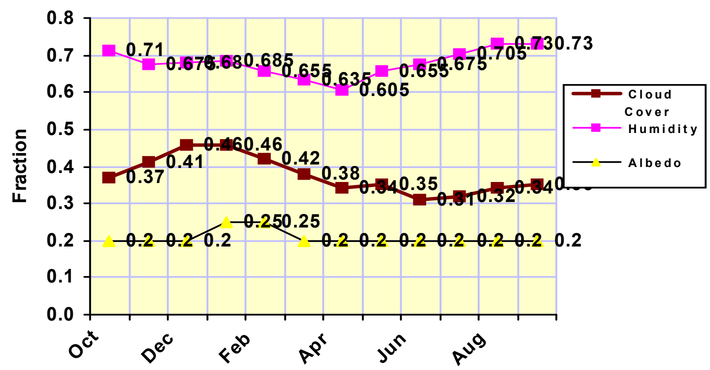
SESOIL MODELS

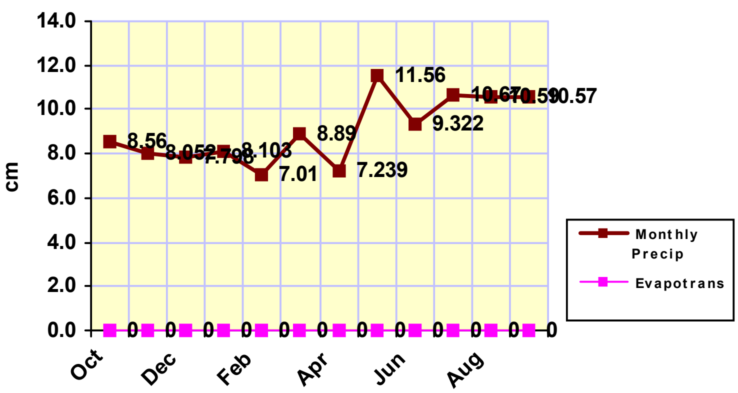
Climate Report

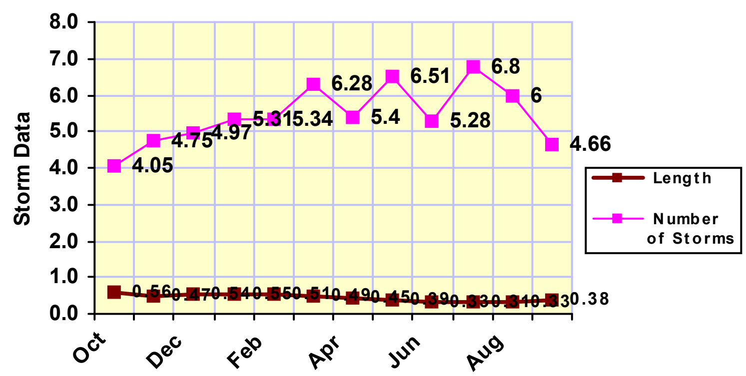
Location Description: WARSAW 2 NW
Climatic Input File: C:\SEVIEW63\WARSAW2N.CLM

Month	Temperature		Precipitation		Evapotranspiration Rate		Storms		Cloud Cover	Albedo	Humidity
Units	°C	°F	cm	Inches	cm	Inches	# per Month	Length Days	Fraction	Fraction	Fraction
October	14.89	58.80	8.560	3.37	0.00	0.00	4.05	0.560	0.370	0.200	0.710
November	9.944	49.90	8.052	3.17	0.00	0.00	4.75	0.470	0.410	0.200	0.675
December	4.556	40.20	7.798	3.07	0.00	0.00	4.97	0.540	0.460	0.200	0.680
January	2.111	35.80	8.103	3.19	0.00	0.00	5.31	0.550	0.460	0.250	0.685
February	3.667	38.60	7.010	2.76	0.00	0.00	5.34	0.510	0.420	0.250	0.655
March	8.611	47.50	8.890	3.50	0.00	0.00	6.28	0.490	0.380	0.200	0.635
April	13.50	56.30	7.239	2.85	0.00	0.00	5.40	0.450	0.340	0.200	0.605
May	18.67	65.61	11.56	4.55	0.00	0.00	6.51	0.390	0.350	0.200	0.655
June	23.06	73.51	9.322	3.67	0.00	0.00	5.28	0.330	0.310	0.200	0.675
July	25.17	77.31	10.67	4.20	0.00	0.00	6.80	0.310	0.320	0.200	0.705
August	24.50	76.10	10.59	4.17	0.00	0.00	6.00	0.330	0.340	0.200	0.730
September	21.00	69.80	10.57	4.16	0.00	0.00	4.66	0.380	0.350	0.200	0.730
Total			108.36	42.66	0.00	0.00					









SESOIL Profile and Load Report

Layer No.	Number of Sub-Layers	Thickness		Intrinsic Permeability	Organic Carbon Content	Adsorption Coefficient	Cation Exchange Capacity	Freundlich Exponent	Solid Phase Degradation Rate	Liquid Phase Degradation Rate	Soil pH
		cm	feet	cm^2	percent	µg/g / µg/mL	mEq / 100 g soil	unitless	1/day	1/day	pH
1	10	198.0	6.50	1.00E-09	0.20	0.00	0.00	1.00	0.00E+00	0.00E+00	7.00
2	10	402.0	13.19	1.00E-09	0.20	0.00	0.00	1.00	0.00E+00	0.00E+00	7.00
3		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00
4		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00

Soil Parameters

Bulk Density (g/cm^3)	1.60
Effective Porosity (fraction)	0.30
Soil Pore Disconnectedness	7.00

Application Parameters

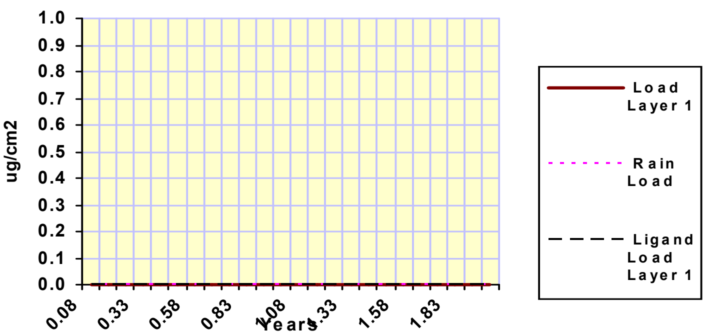
Area	cm^2	3.72E+5
	ft^2	400.42
Latitude	degrees	38.0
Spill Index		1

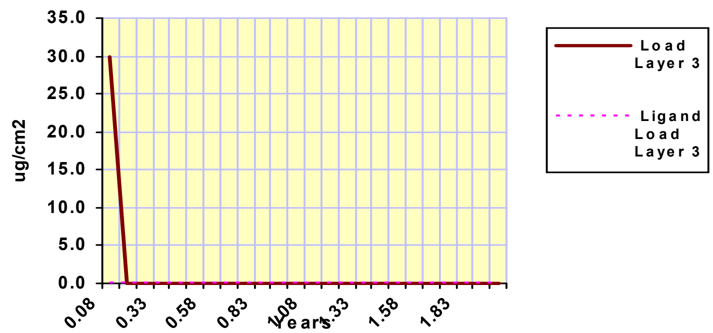
Chemical Parameters

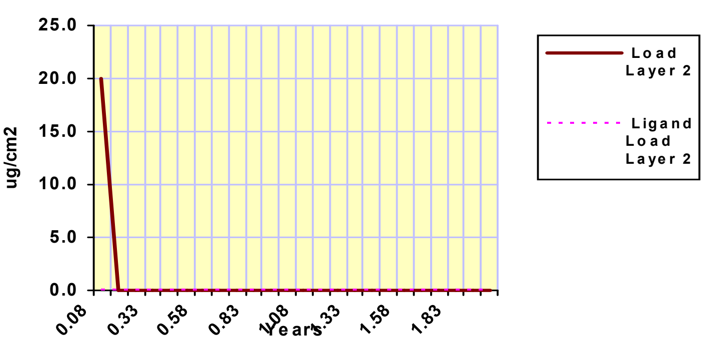
Water Solubility (µg/mL)	790.0	**Moles Ligand / Moles Chemical**	0.00
Henry's Law (M^3atm/mol)	3.00E-2	**Ligand Molecular Weight** (g/mol)	0.00
K_{oc} (µg/g)/(µg/mL)	150.00	**Base Hydrolysis Rate** (L/mol/day)	0.00
Valance (g/mole)	0.00	**Ligand Dissociation Constant**	0.00
Air Diffusion Coefficient (cm^2/sec)	7.80E-2	**Neutral Hydrolysis Rate** (L/mol/day)	0.00
Water Diffusion Coefficient (cm^2/sec)	8.80E-6	**Acid Hydrolysis Rate** (L/mol/day)	0.00
Molecular Weight (g/mol)	154.00		

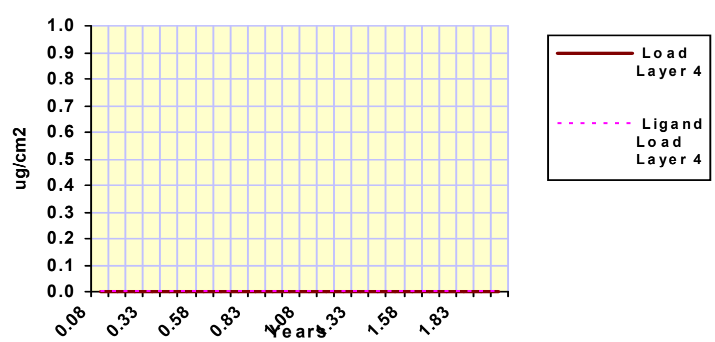
Output File: 4825 GR Carbon Tetrachloride
C:\SEVIEW63\4825CT2.OUT
Chemical File: Carbon Tetrachloride R9
C:\SEVIEW63\CARBONTE.CHM
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI
Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825CT.APL

Sublayer Loads	1	2	3	4	5	6	7	8	9	10
Layer 1 (ug/g)										8.70E-04
Layer 2 (ug/g)										
Layer 3 (ug/g)										
Layer 4 (ug/g)										





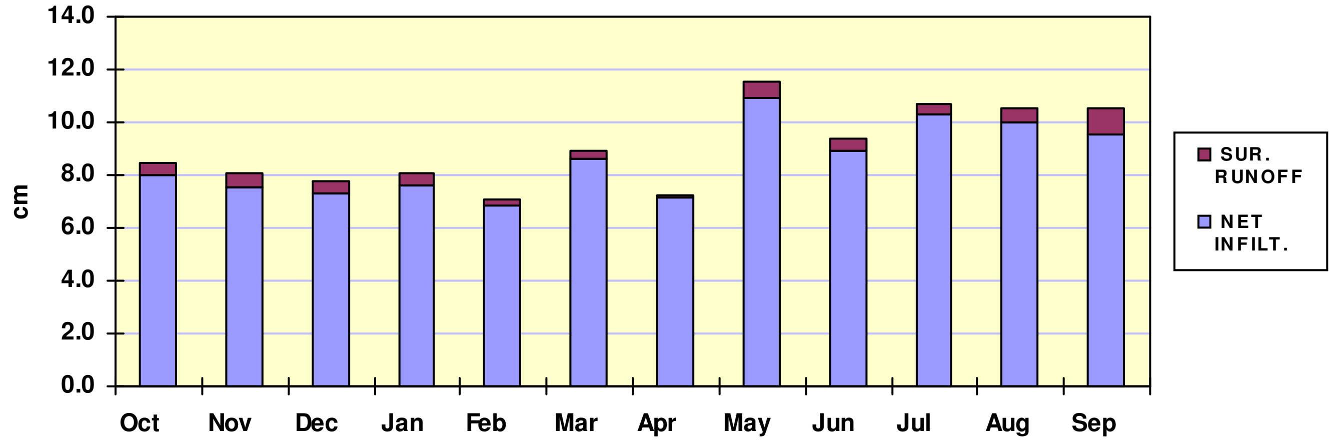


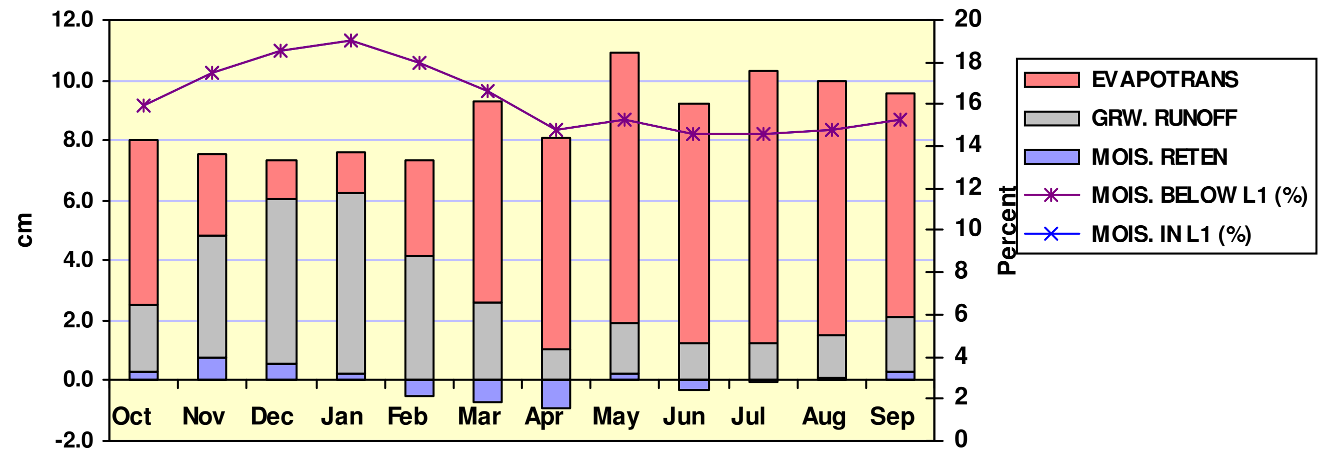


SESOIL Hydrologic Cycle Report

Scenario Description: 4825 GR Carbon Tetrachloride

SESOIL Output File: C:\SEVIEW63\4825CT2.OUT





	Surface Water Runoff		Net Infiltration		Evapotranspiration		Soil Moisture Retention		Groundwater Runoff (Recharge)		Soil Moisture	
											Layer 1	Below Layer 1
Units	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	Percent	Percent
October	0.47	0.19	8.01	3.15	5.48	2.16	0.32	0.13	2.22	0.87	15.94	15.94
November	0.49	0.19	7.56	2.98	2.75	1.08	0.77	0.30	4.04	1.59	17.47	17.47
December	0.44	0.17	7.33	2.89	1.31	0.52	0.56	0.22	5.47	2.15	18.58	18.58
January	0.49	0.19	7.58	2.98	1.35	0.53	0.23	0.09	6.00	2.36	19.03	19.03
February	0.25	0.10	6.82	2.69	3.14	1.24	-0.51	-0.20	4.19	1.65	18.01	18.01
March	0.28	0.11	8.64	3.40	6.71	2.64	-0.69	-0.27	2.62	1.03	16.63	16.63
April	0.14	0.06	7.12	2.80	7.03	2.77	-0.95	-0.37	1.04	0.41	14.74	14.74
May	0.58	0.23	10.94	4.31	9.01	3.55	0.26	0.10	1.67	0.66	15.25	15.25
June	0.49	0.19	8.91	3.51	8.01	3.15	-0.33	-0.13	1.23	0.48	14.59	14.59
July	0.41	0.16	10.30	4.06	9.05	3.56	-0.02	-0.01	1.27	0.50	14.56	14.56
August	0.52	0.20	10.00	3.94	8.50	3.35	0.09	0.04	1.41	0.56	14.74	14.74
September	0.97	0.38	9.53	3.75	7.40	2.91	0.29	0.11	1.85	0.73	15.31	15.31
Total	5.53	2.18	102.74	40.45	69.74	27.46	0.00	0.00	32.99	12.99		

SESOIL Pollutant Cycle Report

Scenario Description: 4825 GR Carbon Tetrachloride

SESOIL Output File: C:\SEVIEW63\4825CT2.OUT

SESOIL Process	Pollutant Mass (µg)	Percent of Total
Volatilized	1.045E+04	101.88
In Soil Air	1.121E+00	0.01
Sur. Runoff	0.000E+00	0.00
In Washld	0.000E+00	0.00
Ads On Soil	2.982E+00	0.03
Hydrol Soil	0.000E+00	0.00
Degrad Soil	0.000E+00	0.00
Pure Phase	0.000E+00	0.00
Complexed	0.000E+00	0.00
Immobile CEC	0.000E+00	0.00
Hydrol CEC	0.000E+00	0.00
In Soil Moi	9.514E-01	0.01
Hydrol Mois	0.000E+00	0.00
Degrad Mois	0.000E+00	0.00
Other Trans	0.000E+00	0.00
Other Sinks	0.000E+00	0.00
Gwr. Runoff	1.022E+02	1.00
Total Output	1.055E+04	102.92
Total Input	1.026E+04	
Input - Output	-2.997E+02	

Maximum leachate concentration: 3.781E-07 **mg/l**

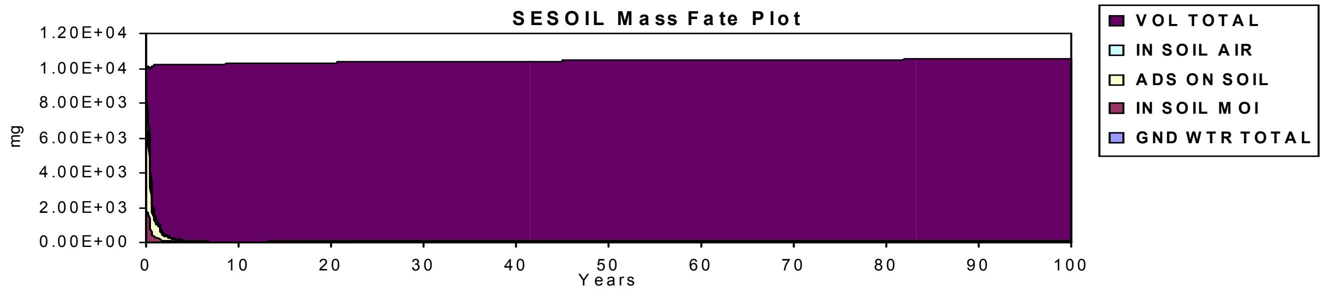
Climate File: WARSAW 2 NW
C:\SEVIEW63\WARSAW2N.CLM

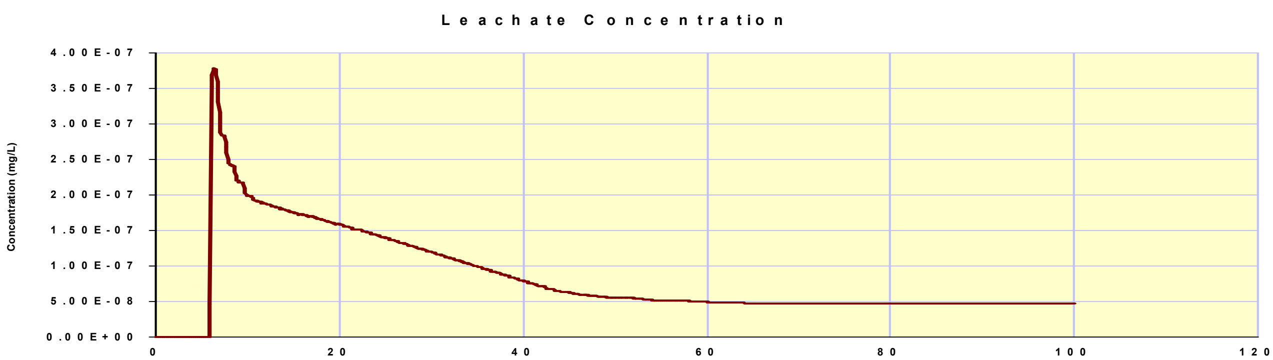
Chemical File: Carbon Tetrachloride R9
C:\SEVIEW63\CARBONTE.CHM

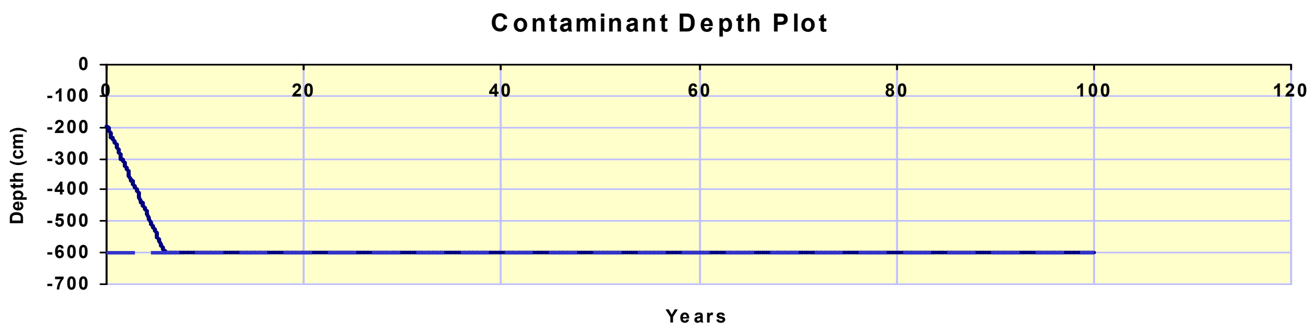
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI

Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825CT.APL

Starting Depth: 196.90 **cm**
Ending Depth: 600.50 **cm**
Total Depth: 600.00 **cm**







SESOIL Profile and Load Report

Layer No.	Number of Sub-Layers	Thickness		Intrinsic Permeability	Organic Carbon Content	Adsorption Coefficient	Cation Exchange Capacity	Freundlich Exponent	Solid Phase Degradation Rate	Liquid Phase Degradation Rate	Soil pH
		cm	feet	cm^2	percent	µg/g / µg/mL	mEq / 100 g soil	unitless	1/day	1/day	pH
1	10	198.0	6.50	1.00E-09	0.20	0.00	0.00	1.00	0.00E+00	0.00E+00	7.00
2	10	402.0	13.19	1.00E-09	0.20	0.00	0.00	1.00	0.00E+00	0.00E+00	7.00
3		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00
4		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00

Soil Parameters

Bulk Density (g/cm^3)	1.60
Effective Porosity (fraction)	0.30
Soil Pore Disconnectedness	7.00

Application Parameters

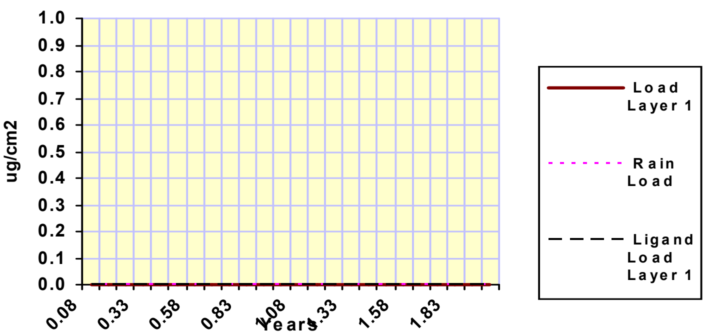
Area	cm^2	3.72E+5
	ft^2	400.42
Latitude	degrees	38.0
Spill Index		1

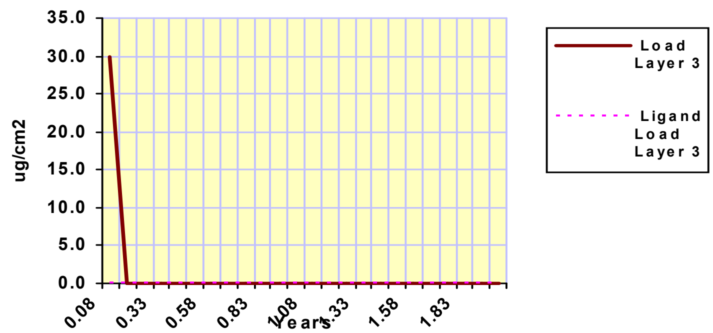
Chemical Parameters

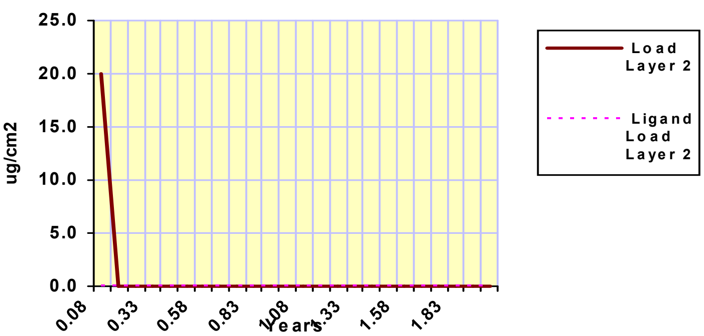
Water Solubility (µg/mL)	7.90E+3	**Moles Ligand / Moles Chemical**	0.00
Henry's Law (M^3atm/mol)	3.70E-3	**Ligand Molecular Weight** (g/mol)	0.00
K_{oc} (µg/g)/(µg/mL)	53.00	**Base Hydrolysis Rate** (L/mol/day)	0.00
Valance (g/mole)	0.00	**Ligand Dissociation Constant**	0.00
Air Diffusion Coefficient (cm^2/sec)	.100	**Neutral Hydrolysis Rate** (L/mol/day)	0.00
Water Diffusion Coefficient (cm^2/sec)	1.00E-5	**Acid Hydrolysis Rate** (L/mol/day)	0.00
Molecular Weight (g/mol)	119.00		

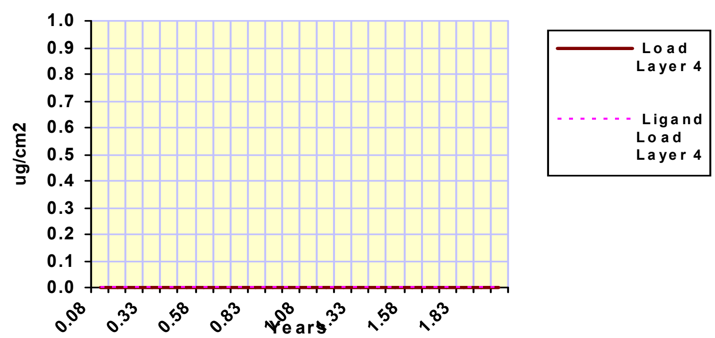
Output File: 4825 GR Chloroform Run 3
C:\SEVIEW63\4825CH3.OUT
Chemical File: Chloroform R9
C:\SEVIEW63\CHLOROFO.CHM
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI
Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825CHLO.APL

Sublayer Loads	1	2	3	4	5	6	7	8	9	10
Layer 1 (ug/g)				1.30E-03						
Layer 2 (ug/g)										
Layer 3 (ug/g)										
Layer 4 (ug/g)										





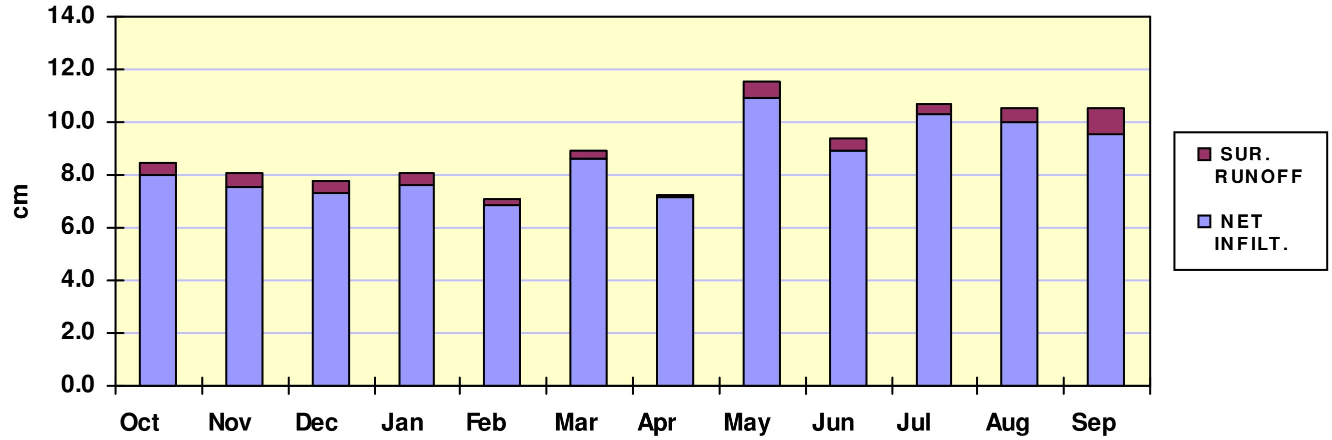


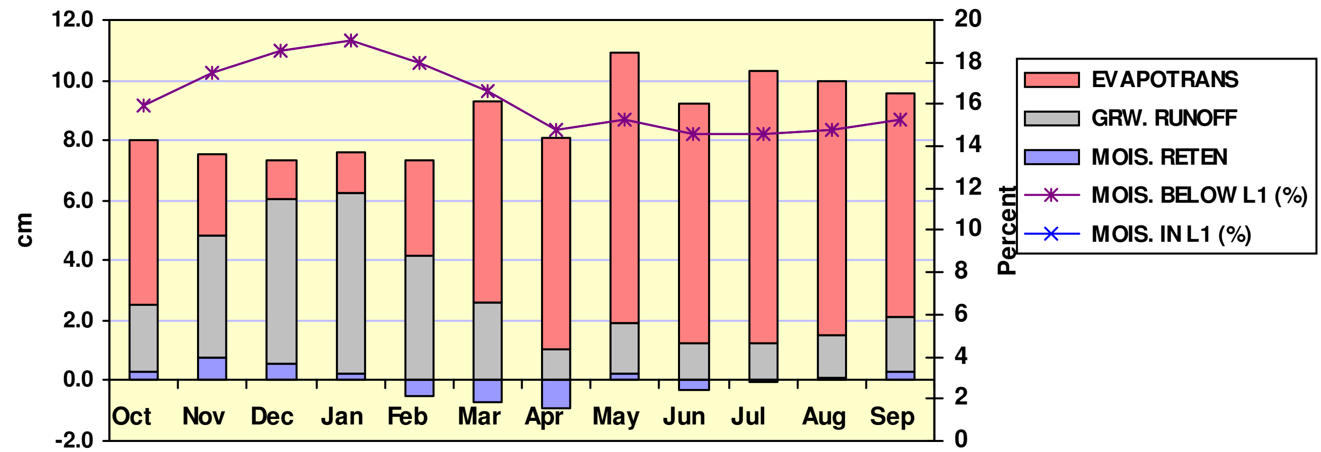


SESOIL Hydrologic Cycle Report

Scenario Description: 4825 GR Chloroform Run 3

SESOIL Output File: C:\SEVIEW63\4825CH3.OUT





	Surface Water Runoff		Net Infiltration		Evapotranspiration		Soil Moisture Retention		Groundwater Runoff (Recharge)		Soil Moisture Layer 1	Soil Moisture Below Layer 1
Units	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	Percent	Percent
October	0.47	0.19	8.01	3.15	5.48	2.16	0.32	0.13	2.22	0.87	15.94	15.94
November	0.49	0.19	7.56	2.98	2.75	1.08	0.77	0.30	4.04	1.59	17.47	17.47
December	0.44	0.17	7.33	2.89	1.31	0.52	0.56	0.22	5.47	2.15	18.58	18.58
January	0.49	0.19	7.58	2.98	1.35	0.53	0.23	0.09	6.00	2.36	19.03	19.03
February	0.25	0.10	6.82	2.69	3.14	1.24	-0.51	-0.20	4.19	1.65	18.01	18.01
March	0.28	0.11	8.64	3.40	6.71	2.64	-0.69	-0.27	2.62	1.03	16.63	16.63
April	0.14	0.06	7.12	2.80	7.03	2.77	-0.95	-0.37	1.04	0.41	14.74	14.74
May	0.58	0.23	10.94	4.31	9.01	3.55	0.26	0.10	1.67	0.66	15.25	15.25
June	0.49	0.19	8.91	3.51	8.01	3.15	-0.33	-0.13	1.23	0.48	14.59	14.59
July	0.41	0.16	10.30	4.06	9.05	3.56	-0.02	-0.01	1.27	0.50	14.56	14.56
August	0.52	0.20	10.00	3.94	8.50	3.35	0.09	0.04	1.41	0.56	14.74	14.74
September	0.97	0.38	9.53	3.75	7.40	2.91	0.29	0.11	1.85	0.73	15.31	15.31
Total	5.53	2.18	102.74	40.45	69.74	27.46	0.00	0.00	32.99	12.99		

SESOIL Pollutant Cycle Report

Scenario Description: 4825 GR Chloroform Run 3

SESOIL Output File: C:\SEVIEW63\4825CH3.OUT

SESOIL Process	Pollutant Mass (µg)	Percent of Total
Volatilized	1.142E+04	74.52
In Soil Air	3.363E-02	0.00
Sur. Runoff	0.000E+00	0.00
In Washld	0.000E+00	0.00
Ads On Soil	2.561E-01	0.00
Hydrol Soil	0.000E+00	0.00
Degrad Soil	0.000E+00	0.00
Pure Phase	0.000E+00	0.00
Complexed	0.000E+00	0.00
Immobile CEC	0.000E+00	0.00
Hydrol CEC	0.000E+00	0.00
In Soil Moi	2.313E-01	0.00
Hydrol Mois	0.000E+00	0.00
Degrad Mois	0.000E+00	0.00
Other Trans	0.000E+00	0.00
Other Sinks	0.000E+00	0.00
Gwr. Runoff	3.977E+03	25.95
Total Output	1.540E+04	100.47
Total Input	1.533E+04	
Input - Output	-7.169E+01	

Maximum leachate concentration: 9.592E-05 **mg/l**

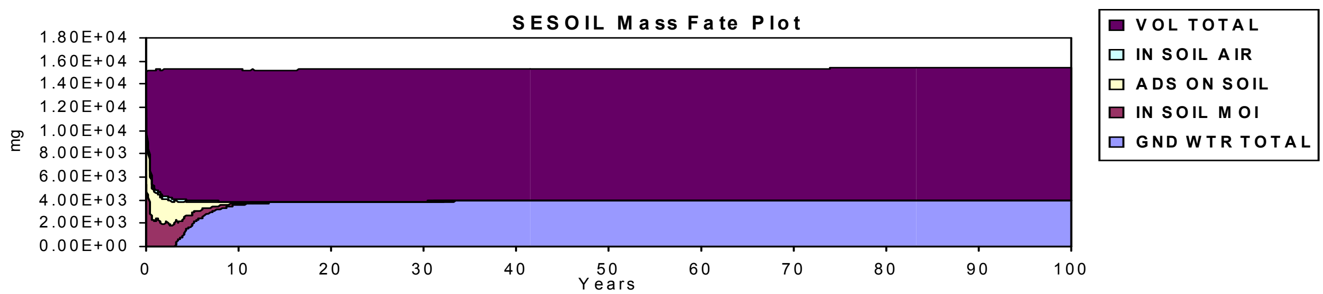
Climate File: WARSAW 2 NW
C:\SEVIEW63\WARSAW2N.CLM

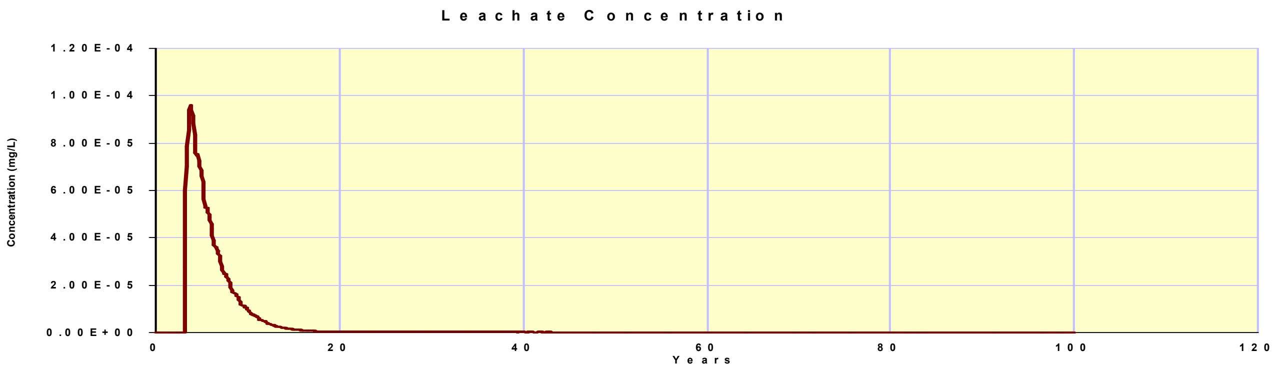
Chemical File: Chloroform R9
C:\SEVIEW63\CHLOROFO.CHM

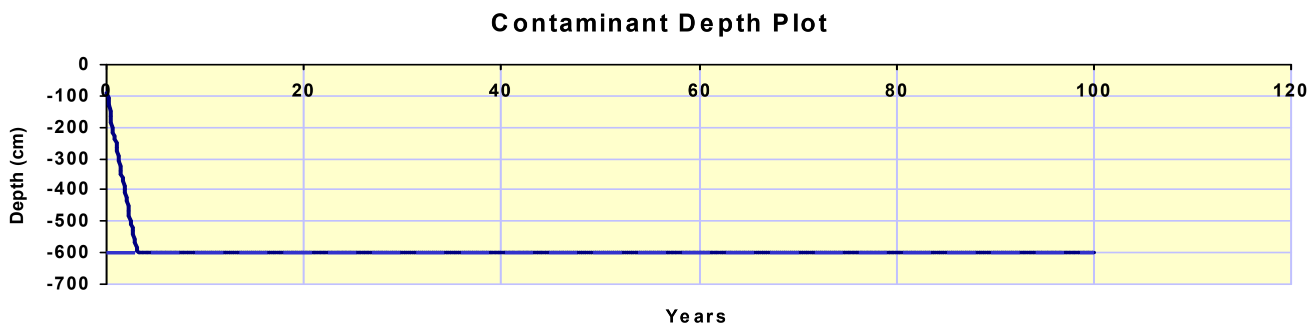
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI

Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825CHLO.APL

Starting Depth: 89.55 **cm**
Ending Depth: 600.50 **cm**
Total Depth: 600.00 **cm**







SESOIL Profile and Load Report

Layer No.	Number of Sub-Layers	Thickness		Intrinsic Permeability	Organic Carbon Content	Adsorption Coefficient	Cation Exchange Capacity	Freundlich Exponent	Solid Phase Degradation Rate	Liquid Phase Degradation Rate	Soil pH
		cm	feet	cm^2	percent	µg/g / µg/mL	mEq / 100 g soil	unitless	1/day	1/day	pH
1	10	198.0	6.50	1.00E-09	0.20	1500.00	0.00	1.00	0.00E+00	0.00E+00	7.00
2	10	402.0	13.19	1.00E-09	0.20	1500.00	0.00	1.00	0.00E+00	0.00E+00	7.00
3		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00
4		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00

Soil Parameters

Bulk Density (g/cm^3)	1.60
Effective Porosity (fraction)	0.30
Soil Pore Disconnectedness	7.00

Application Parameters

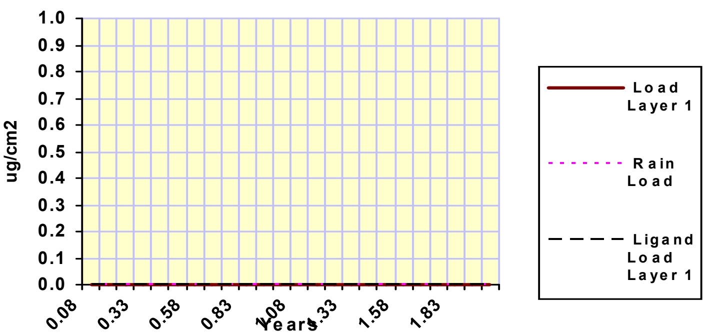
Area	cm^2	3.72E+5
	ft^2	400.42
Latitude	degrees	38.0
Spill Index		1

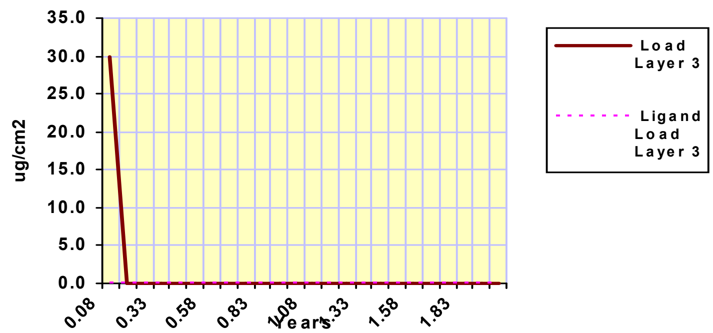
Chemical Parameters

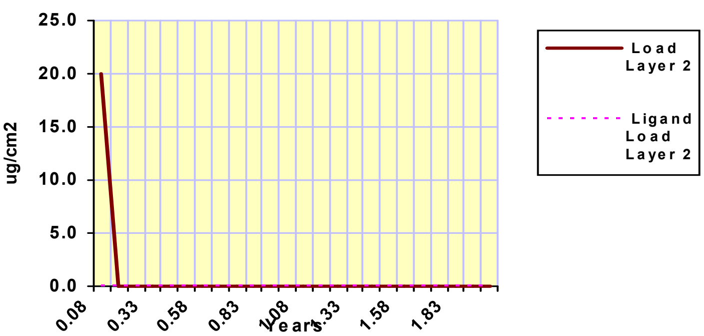
Water Solubility (µg/mL)	5.94E+4	**Moles Ligand / Moles Chemical**	0.00
Henry's Law (M^3atm/mol)	2.44E-2	**Ligand Molecular Weight** (g/mol)	0.00
K_{oc} (µg/g)/(µg/mL)	0.00	**Base Hydrolysis Rate** (L/mol/day)	0.00
Valance (g/mole)	0.00	**Ligand Dissociation Constant**	0.00
Air Diffusion Coefficient (cm^2/sec)	.000	**Neutral Hydrolysis Rate** (L/mol/day)	0.00
Water Diffusion Coefficient (cm^2/sec)	.000	**Acid Hydrolysis Rate** (L/mol/day)	0.00
Molecular Weight (g/mol)	30.00		

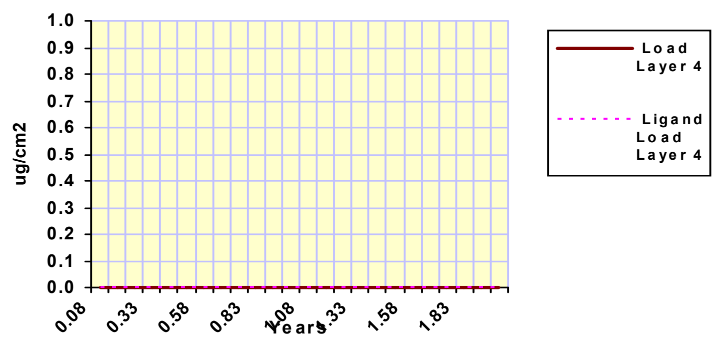
Output File: 4825 GR Aluminum
C:\SEVIEW63\4825AL1.OUT
Chemical File: Aluminum (Kd)
C:\SEVIEW63\ALUMINUM.CHM
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI
Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825AL.APL

Sublayer Loads	1	2	3	4	5	6	7	8	9	10
Layer 1 (ug/g)				5.90E+04						
Layer 2 (ug/g)										
Layer 3 (ug/g)										
Layer 4 (ug/g)										





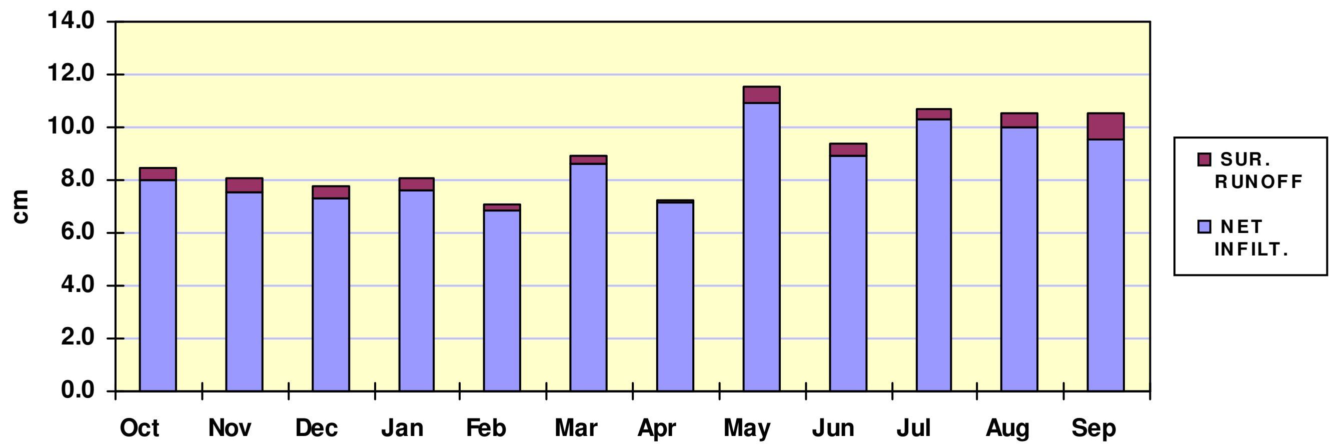


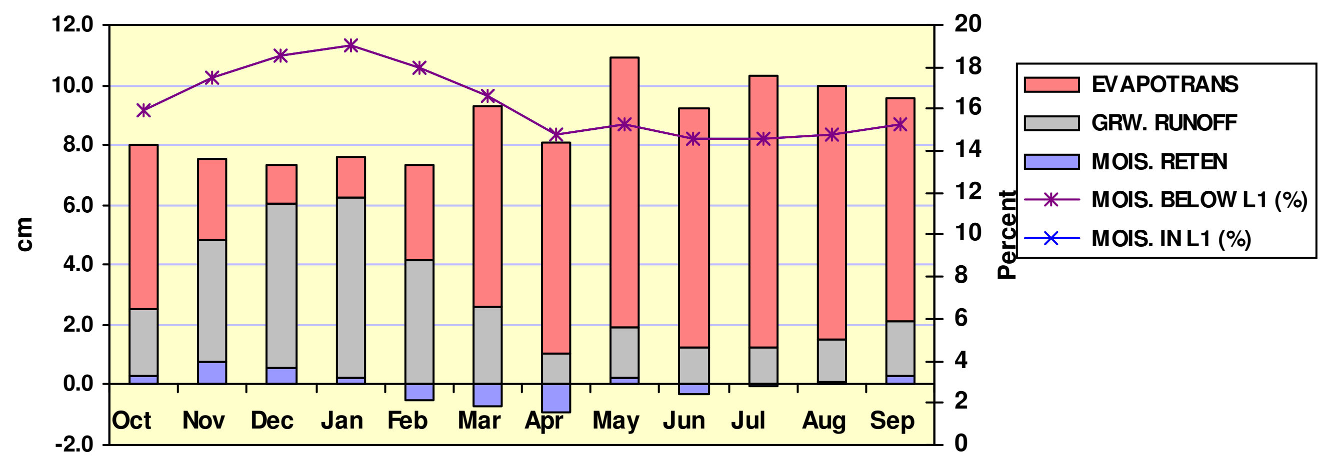


SESOIL Hydrologic Cycle Report

Scenario Description: 4825 GR Aluminum

SESOIL Output File: C:\SEVIEW63\4825AL1.OUT





	Surface Water Runoff		Net Infiltration		Evapotranspiration		Soil Moisture Retention		Groundwater Runoff (Recharge)		Soil Moisture	
											Layer 1	Below Layer 1
Units	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	Percent	Percent
October	0.47	0.19	8.01	3.15	5.48	2.16	0.32	0.13	2.22	0.87	15.94	15.94
November	0.49	0.19	7.56	2.98	2.75	1.08	0.77	0.30	4.04	1.59	17.47	17.47
December	0.44	0.17	7.33	2.89	1.31	0.52	0.56	0.22	5.47	2.15	18.58	18.58
January	0.49	0.19	7.58	2.98	1.35	0.53	0.23	0.09	6.00	2.36	19.03	19.03
February	0.25	0.10	6.82	2.69	3.14	1.24	-0.51	-0.20	4.19	1.65	18.01	18.01
March	0.28	0.11	8.64	3.40	6.71	2.64	-0.69	-0.27	2.62	1.03	16.63	16.63
April	0.14	0.06	7.12	2.80	7.03	2.77	-0.95	-0.37	1.04	0.41	14.74	14.74
May	0.58	0.23	10.94	4.31	9.01	3.55	0.26	0.10	1.67	0.66	15.25	15.25
June	0.49	0.19	8.91	3.51	8.01	3.15	-0.33	-0.13	1.23	0.48	14.59	14.59
July	0.41	0.16	10.30	4.06	9.05	3.56	-0.02	-0.01	1.27	0.50	14.56	14.56
August	0.52	0.20	10.00	3.94	8.50	3.35	0.09	0.04	1.41	0.56	14.74	14.74
September	0.97	0.38	9.53	3.75	7.40	2.91	0.29	0.11	1.85	0.73	15.31	15.31
Total	5.53	2.18	102.74	40.45	69.74	27.46	0.00	0.00	32.99	12.99		

SESOIL Pollutant Cycle Report

Scenario Description: 4825 GR Aluminum

SESOIL Output File: C:\SEVIEW63\4825AL1.OUT

SESOIL Process	Pollutant Mass (µg)	Percent of Total
Volatilized	0.000E+00	0.00
In Soil Air	4.256E+07	0.01
Sur. Runoff	0.000E+00	0.00
In Washld	0.000E+00	0.00
Ads On Soil	6.954E+11	99.96
Hydrol Soil	0.000E+00	0.00
Degrad Soil	0.000E+00	0.00
Pure Phase	0.000E+00	0.00
Complexed	0.000E+00	0.00
Immobile CEC	0.000E+00	0.00
Hydrol CEC	0.000E+00	0.00
In Soil Moi	4.437E+07	0.01
Hydrol Mois	0.000E+00	0.00
Degrad Mois	0.000E+00	0.00
Other Trans	0.000E+00	0.00
Other Sinks	0.000E+00	0.00
Gwr. Runoff	0.000E+00	0.00
Total Output	6.954E+11	99.97
Total Input	6.957E+11	
Input - Output	2.130E+08	

Maximum leachate concentration: 0.000E+00 **mg/l**

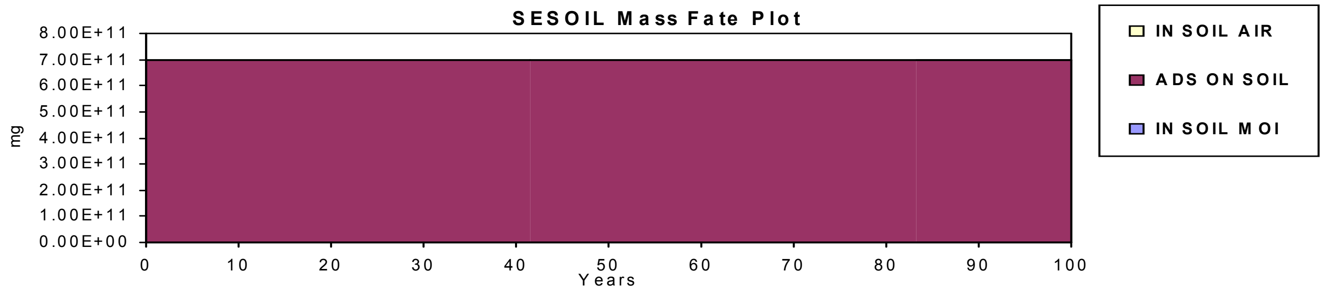
Climate File: WARSAW 2 NW
C:\SEVIEW63\WARSAW2N.CLM

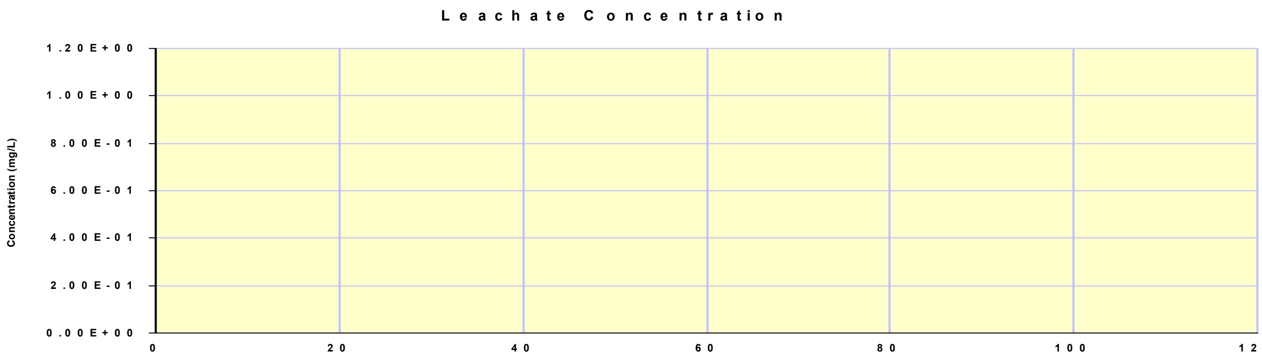
Chemical File: Aluminum (Kd)
C:\SEVIEW63\ALUMINUM.CHM

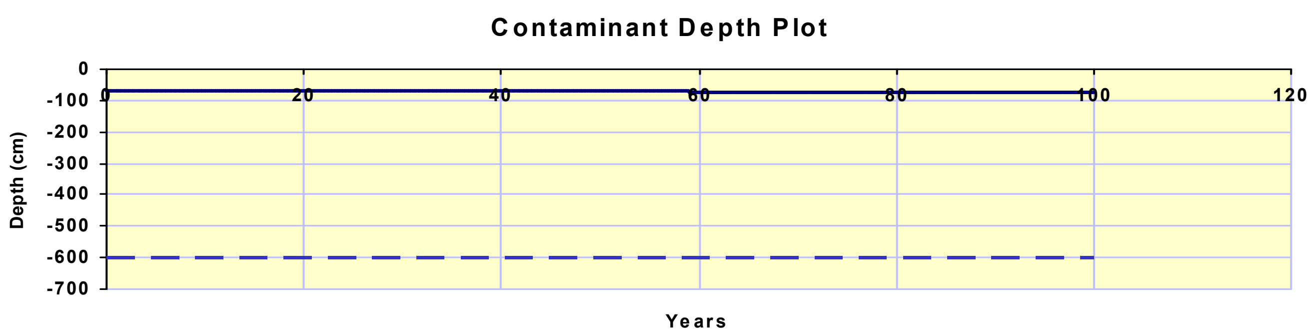
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI

Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825AL.APL

Starting Depth:	69.34	**cm**
Ending Depth:	73.16	**cm**
Total Depth:	600.00	**cm**







SESOIL Profile and Load Report

Layer No.	Number of Sub-Layers	Thickness cm	Thickness feet	Intrinsic Permeability cm 2	Organic Carbon Content percent	Adsorption Coefficient µg/g / µg/mL	Cation Exchange Capacity mEq / 100 g soil	Freundlich Exponent unitless	Solid Phase Degradation Rate 1/day	Liquid Phase Degradation Rate 1/day	Soil pH pH
1	10	198.0	6.50	1.00E-09	0.20	45.00	0.00	1.00	0.00E+00	0.00E+00	7.00
2	10	402.0	13.19	1.00E-09	0.20	45.00	0.00	1.00	0.00E+00	0.00E+00	7.00
3		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00
4		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00

Soil Parameters

Bulk Density (g/cm^3)	1.60
Effective Porosity (fraction)	0.30
Soil Pore Disconnectedness	7.00

Application Parameters

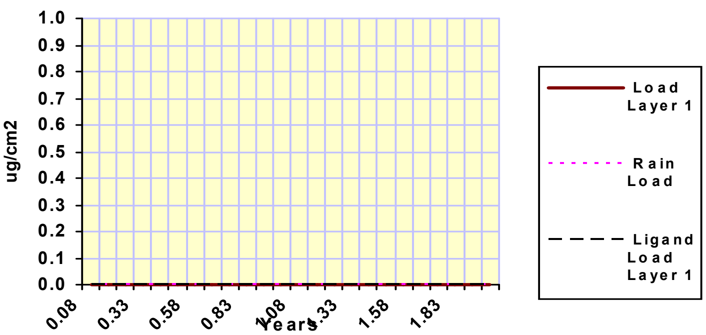
Area	cm ^{2}	3.72E+5
	ft ^{2}	400.42
Latitude	degrees	38.0
Spill Index		1

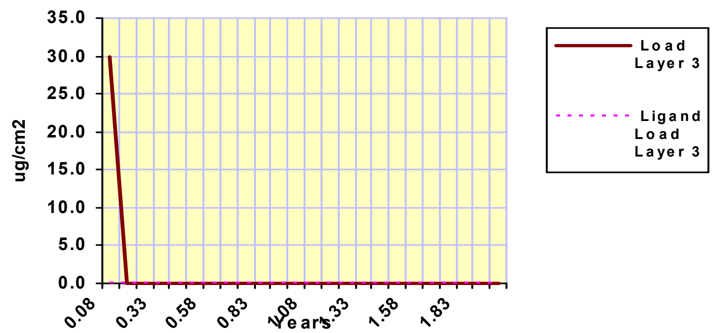
Chemical Parameters

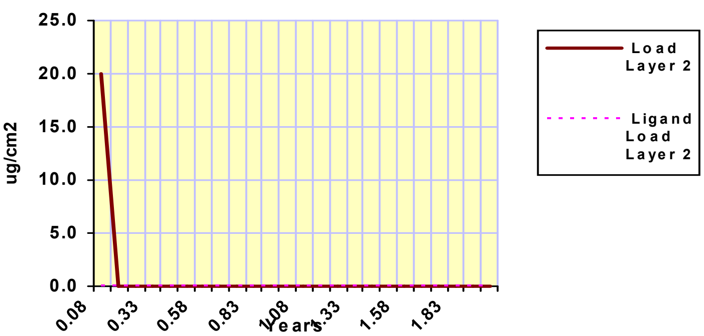
Water Solubility (µg/mL)	2.30E+4	**Moles Ligand / Moles Chemical**	0.00
Henry's Law (M^{3}atm/mol)	2.44E-2	**Ligand Molecular Weight** (g/mol)	0.00
K$_{oc}$ (µg/g)/(µg/mL)	0.00	**Base Hydrolysis Rate** (L/mol/day)	0.00
Valance (g/mole)	0.00	**Ligand Dissociation Constant**	0.00
Air Diffusion Coefficient (cm^2/sec)	.000	**Neutral Hydrolysis Rate** (L/mol/day)	0.00
Water Diffusion Coefficient (cm^2/sec)	.000	**Acid Hydrolysis Rate** (L/mol/day)	0.00
Molecular Weight (g/mol)	125.00		

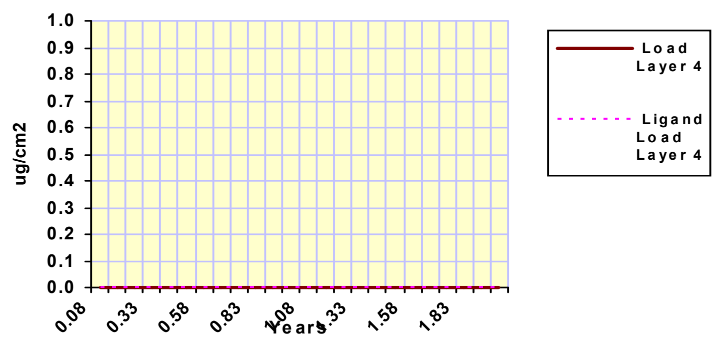
Output File: 4825 GR Antimony
C:\SEVIEW63\4825AN.OUT
Chemical File: Antimony (metallic) (Kd)
C:\SEVIEW63\ANTIMONY.CHM
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI
Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825AN.APL

Sublayer Loads	1	2	3	4	5	6	7	8	9	10
Layer 1 (ug/g)				4.70E+00						
Layer 2 (ug/g)										
Layer 3 (ug/g)										
Layer 4 (ug/g)										





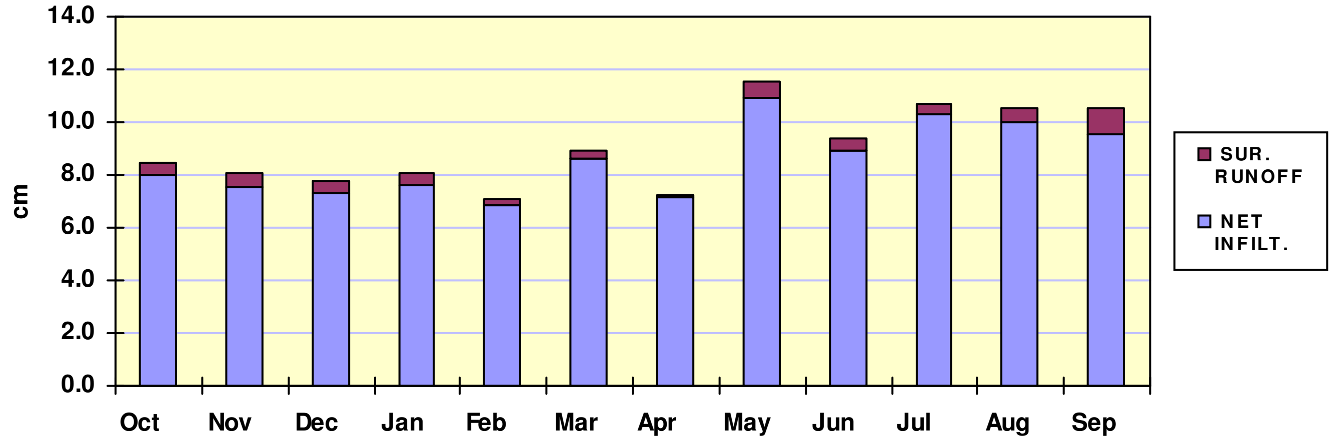


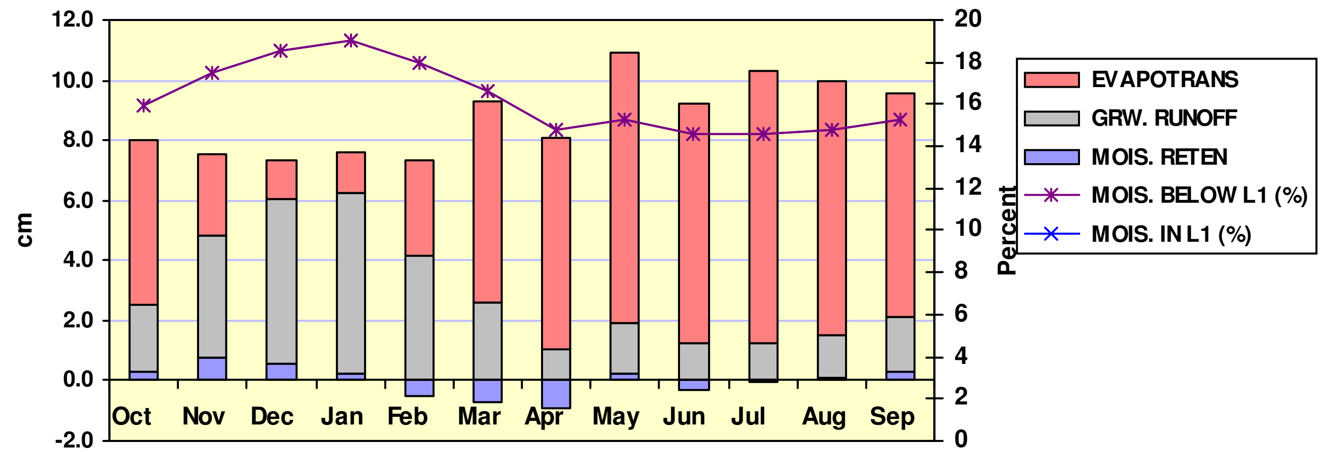


SESOIL Hydrologic Cycle Report

Scenario Description: 4825 GR Antimony

SESOIL Output File: C:\SEVIEW63\4825AN.OUT





	Surface Water Runoff		Net Infiltration		Evapotranspiration		Soil Moisture Retention		Groundwater Runoff (Recharge)		Soil Moisture Layer 1	Soil Moisture Below Layer 1
Units	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	Percent	Percent
October	0.47	0.19	8.01	3.15	5.48	2.16	0.32	0.13	2.22	0.87	15.94	15.94
November	0.49	0.19	7.56	2.98	2.75	1.08	0.77	0.30	4.04	1.59	17.47	17.47
December	0.44	0.17	7.33	2.89	1.31	0.52	0.56	0.22	5.47	2.15	18.58	18.58
January	0.49	0.19	7.58	2.98	1.35	0.53	0.23	0.09	6.00	2.36	19.03	19.03
February	0.25	0.10	6.82	2.69	3.14	1.24	-0.51	-0.20	4.19	1.65	18.01	18.01
March	0.28	0.11	8.64	3.40	6.71	2.64	-0.69	-0.27	2.62	1.03	16.63	16.63
April	0.14	0.06	7.12	2.80	7.03	2.77	-0.95	-0.37	1.04	0.41	14.74	14.74
May	0.58	0.23	10.94	4.31	9.01	3.55	0.26	0.10	1.67	0.66	15.25	15.25
June	0.49	0.19	8.91	3.51	8.01	3.15	-0.33	-0.13	1.23	0.48	14.59	14.59
July	0.41	0.16	10.30	4.06	9.05	3.56	-0.02	-0.01	1.27	0.50	14.56	14.56
August	0.52	0.20	10.00	3.94	8.50	3.35	0.09	0.04	1.41	0.56	14.74	14.74
September	0.97	0.38	9.53	3.75	7.40	2.91	0.29	0.11	1.85	0.73	15.31	15.31
Total	5.53	2.18	102.74	40.45	69.74	27.46	0.00	0.00	32.99	12.99		

SESOIL Pollutant Cycle Report

Scenario Description: 4825 GR Antimony

SESOIL Output File: C:\SEVIEW63\4825AN.OUT

SESOIL Process	Pollutant Mass (µg)	Percent of Total
Volatilized	0.000E+00	0.00
In Soil Air	1.119E+05	0.20
Sur. Runoff	0.000E+00	0.00
In Washld	0.000E+00	0.00
Ads On Soil	5.489E+07	99.06
Hydrol Soil	0.000E+00	0.00
Degrad Soil	0.000E+00	0.00
Pure Phase	0.000E+00	0.00
Complexed	0.000E+00	0.00
Immobile CEC	0.000E+00	0.00
Hydrol CEC	0.000E+00	0.00
In Soil Moi	1.167E+05	0.21
Hydrol Mois	0.000E+00	0.00
Degrad Mois	0.000E+00	0.00
Other Trans	0.000E+00	0.00
Other Sinks	0.000E+00	0.00
Gwr. Runoff	0.000E+00	0.00
Total Output	5.512E+07	99.47
Total Input	5.542E+07	
Input - Output	2.934E+05	

Maximum leachate concentration: 0.000E+00 **mg/l**

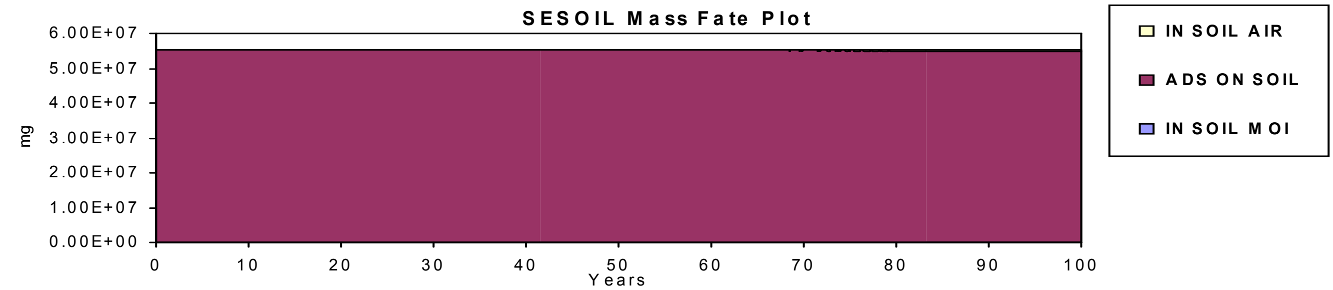
Climate File: WARSAW 2 NW
C:\SEVIEW63\WARSAW2N.CLM

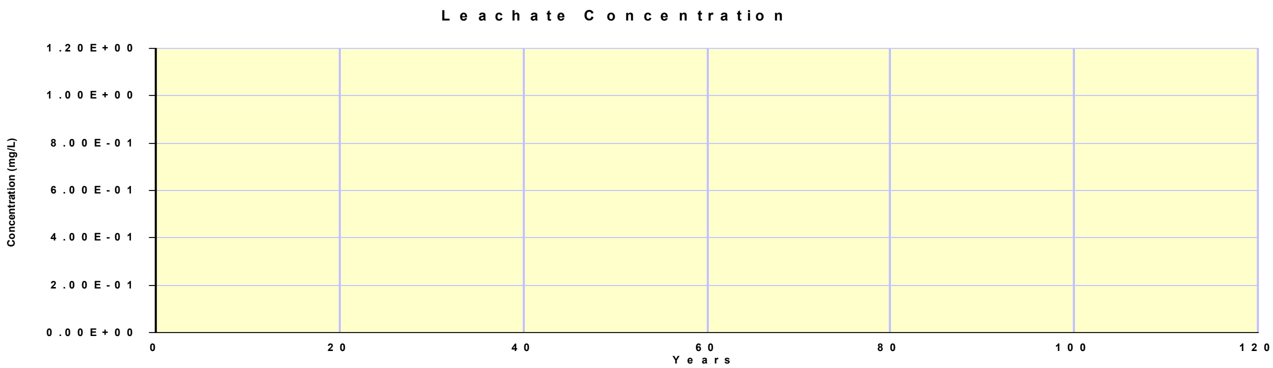
Chemical File: Antimony (metallic) (Kd)
C:\SEVIEW63\ANTIMONY.CHM

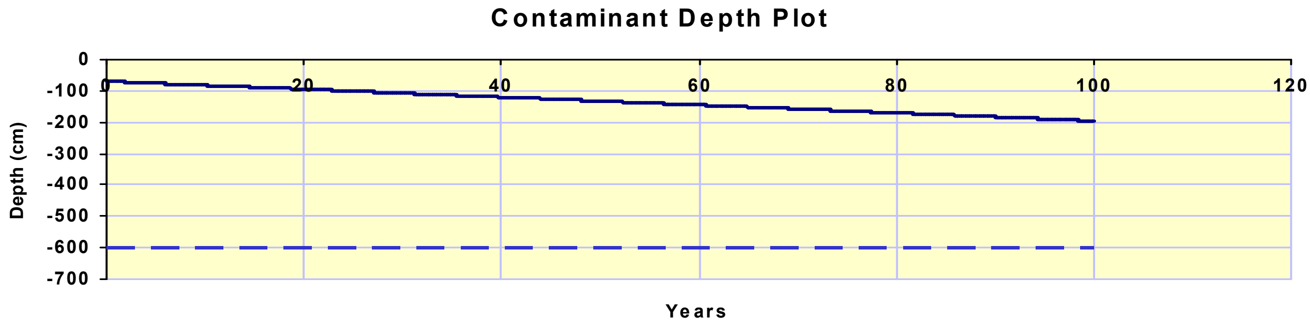
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI

Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825AN.APL

Starting Depth: 69.44 **cm**
Ending Depth: 195.50 **cm**
Total Depth: 600.00 **cm**







SESOIL Profile and Load Report

Layer No.	Number of Sub-Layers	Thickness		Intrinsic Permeability	Organic Carbon Content	Adsorption Coefficient	Cation Exchange Capacity	Freundlich Exponent	Solid Phase Degradation Rate	Liquid Phase Degradation Rate	Soil pH
		cm	feet	cm^2	percent	µg/g / µg/mL	mEq / 100 g soil	unitless	1/day	1/day	pH
1	10	198.0	6.50	1.00E-09	0.20	29.00	0.00	1.00	0.00E+00	0.00E+00	7.00
2	10	402.0	13.19	1.00E-09	0.20	29.00	0.00	1.00	0.00E+00	0.00E+00	7.00
3		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00
4		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00

Soil Parameters

Bulk Density (g/cm^3)	1.60
Effective Porosity (fraction)	0.30
Soil Pore Disconnectedness	7.00

Application Parameters

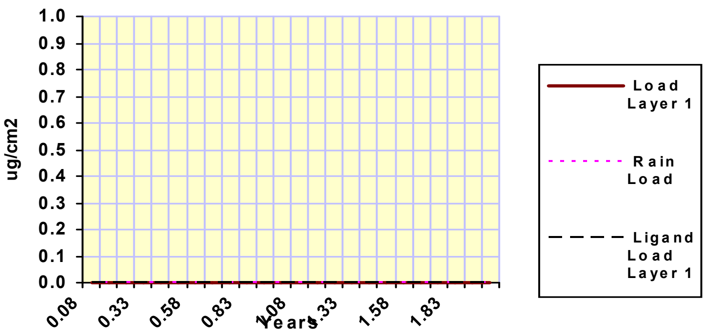
Area	cm^2	3.72E+5
	ft^2	400.42
Latitude	degrees	38.0
Spill Index		1

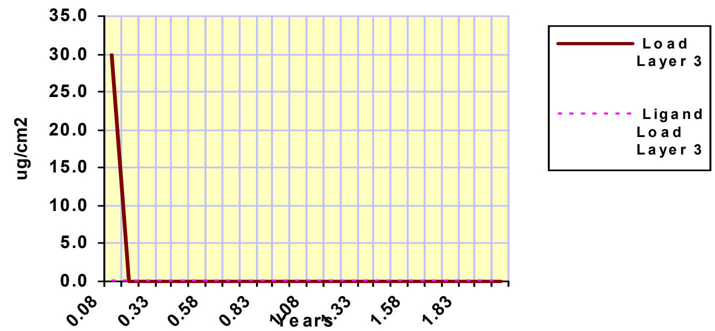
Chemical Parameters

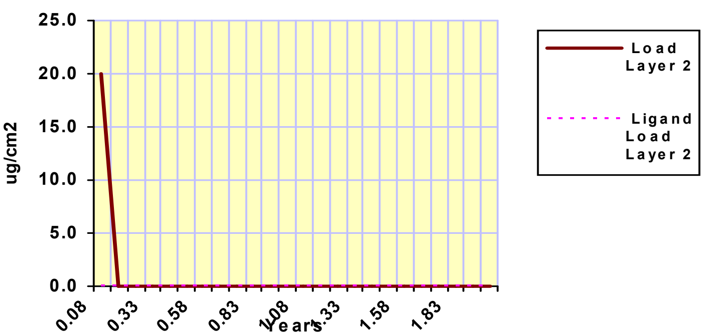
Water Solubility (µg/mL)	3.47E+4	**Moles Ligand / Moles Chemical**	0.00
Henry's Law (M^3atm/mol)	.772	**Ligand Molecular Weight** (g/mol)	0.00
K_{oc} (µg/g)/(µg/mL)	0.00	**Base Hydrolysis Rate** (L/mol/day)	0.00
Valance (g/mole)	0.00	**Ligand Dissociation Constant**	0.00
Air Diffusion Coefficient (cm^2/sec)	.000	**Neutral Hydrolysis Rate** (L/mol/day)	0.00
Water Diffusion Coefficient (cm^2/sec)	.000	**Acid Hydrolysis Rate** (L/mol/day)	0.00
Molecular Weight (g/mol)	77.90		

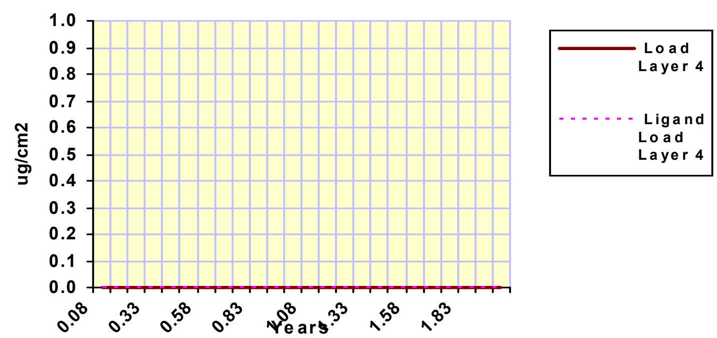
Output File: 4825 GR Arsenic run 4
C:\SEVIEW63\4825AS4.OUT
Chemical File: Arsenic (Kd)
C:\SEVIEW63\ARSENICI.CHM
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI
Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825AS2.APL

Sublayer Loads	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Layer 1 (ug/g)										6.01E+02
Layer 2 (ug/g)										
Layer 3 (ug/g)										
Layer 4 (ug/g)										





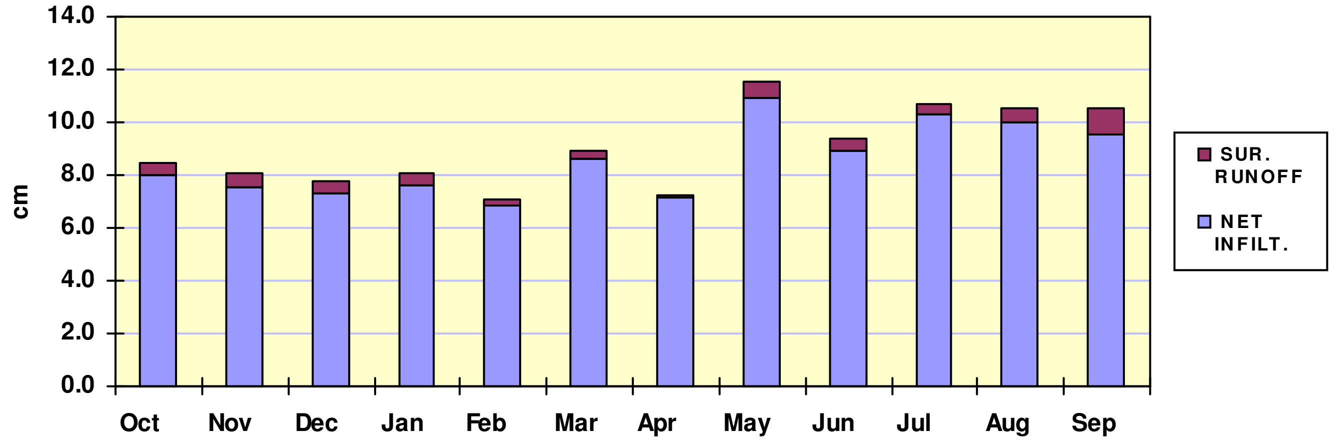


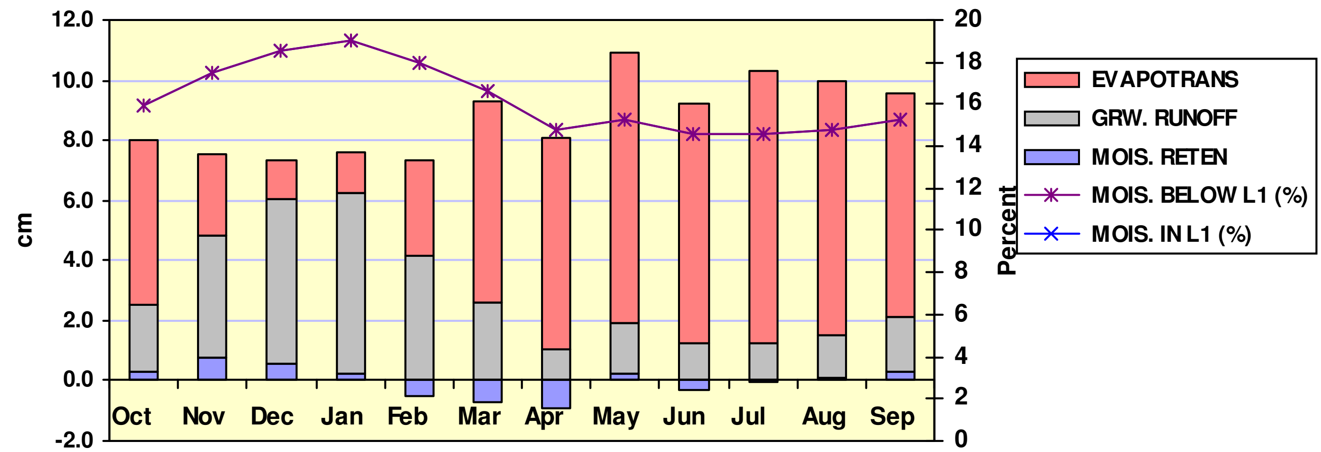


SESOIL Hydrologic Cycle Report

Scenario Description: 4825 GR Arsenic run 4

SESOIL Output File: C:\SEVIEW63\4825AS4.OUT





	Surface Water Runoff		Net Infiltration		Evapotranspiration		Soil Moisture Retention		Groundwater Runoff (Recharge)		Soil Moisture	
											Layer 1	Below Layer 1
Units	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	Percent	Percent
October	0.47	0.19	8.01	3.15	5.48	2.16	0.32	0.13	2.22	0.87	15.94	15.94
November	0.49	0.19	7.56	2.98	2.75	1.08	0.77	0.30	4.04	1.59	17.47	17.47
December	0.44	0.17	7.33	2.89	1.31	0.52	0.56	0.22	5.47	2.15	18.58	18.58
January	0.49	0.19	7.58	2.98	1.35	0.53	0.23	0.09	6.00	2.36	19.03	19.03
February	0.25	0.10	6.82	2.69	3.14	1.24	-0.51	-0.20	4.19	1.65	18.01	18.01
March	0.28	0.11	8.64	3.40	6.71	2.64	-0.69	-0.27	2.62	1.03	16.63	16.63
April	0.14	0.06	7.12	2.80	7.03	2.77	-0.95	-0.37	1.04	0.41	14.74	14.74
May	0.58	0.23	10.94	4.31	9.01	3.55	0.26	0.10	1.67	0.66	15.25	15.25
June	0.49	0.19	8.91	3.51	8.01	3.15	-0.33	-0.13	1.23	0.48	14.59	14.59
July	0.41	0.16	10.30	4.06	9.05	3.56	-0.02	-0.01	1.27	0.50	14.56	14.56
August	0.52	0.20	10.00	3.94	8.50	3.35	0.09	0.04	1.41	0.56	14.74	14.74
September	0.97	0.38	9.53	3.75	7.40	2.91	0.29	0.11	1.85	0.73	15.31	15.31
Total	5.53	2.18	102.74	40.45	69.74	27.46	0.00	0.00	32.99	12.99		

SESOIL Pollutant Cycle Report

Scenario Description: 4825 GR Arsenic run 4

SESOIL Output File: C:\SEVIEW63\4825AS4.OUT

SESOIL Process	Pollutant Mass (µg)	Percent of Total
Volatilized	0.000E+00	0.00
In Soil Air	6.406E+08	9.04
Sur. Runoff	0.000E+00	0.00
In Washld	0.000E+00	0.00
Ads On Soil	6.396E+09	90.26
Hydrol Soil	0.000E+00	0.00
Degrad Soil	0.000E+00	0.00
Pure Phase	0.000E+00	0.00
Complexed	0.000E+00	0.00
Immobile CEC	0.000E+00	0.00
Hydrol CEC	0.000E+00	0.00
In Soil Moi	2.110E+07	0.30
Hydrol Mois	0.000E+00	0.00
Degrad Mois	0.000E+00	0.00
Other Trans	0.000E+00	0.00
Other Sinks	0.000E+00	0.00
Gwr. Runoff	0.000E+00	0.00
Total Output	7.058E+09	99.60
Total Input	7.087E+09	
Input - Output	2.846E+07	

Maximum leachate concentration: 0.000E+00 **mg/l**

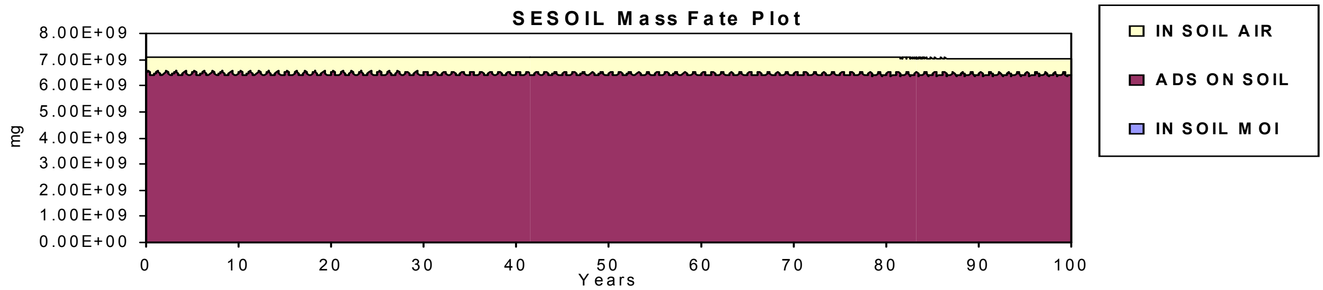
Climate File: WARSAW 2 NW
C:\SEVIEW63\WARSAW2N.CLM

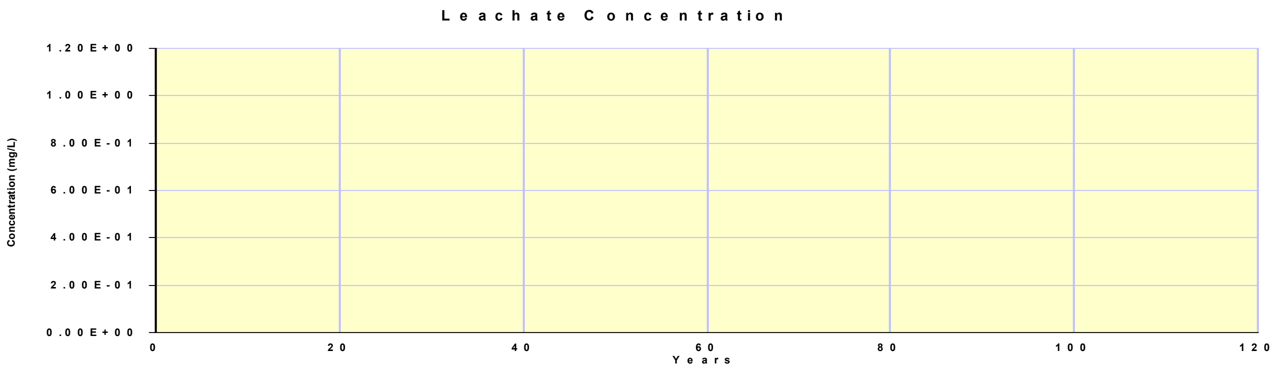
Chemical File: Arsenic (Kd)
C:\SEVIEW63\ARSENICI.CHM

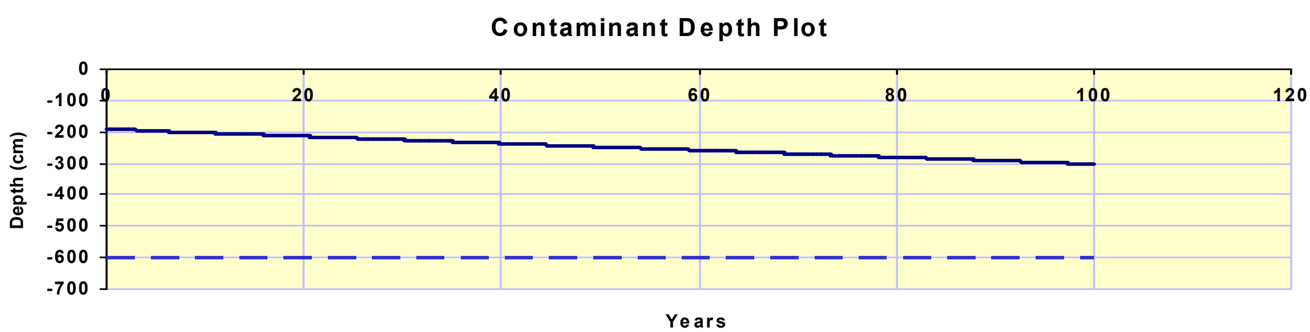
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI

Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825AS2.APL

Starting Depth: 188.40 **cm**
Ending Depth: 302.50 **cm**
Total Depth: 600.00 **cm**







SESOIL Profile and Load Report

Layer No.	Number of Sub-Layers	Thickness		Intrinsic Permeability	Organic Carbon Content	Adsorption Coefficient	Cation Exchange Capacity	Freundlich Exponent	Solid Phase Degradation Rate	Liquid Phase Degradation Rate	Soil pH
		cm	feet	cm^2	percent	µg/g / µg/mL	mEq / 100 g soil	unitless	1/day	1/day	pH
1	10	198.0	6.50	1.00E-09	0.20	75.00	0.00	1.00	0.00E+00	0.00E+00	7.00
2	10	402.0	13.19	1.00E-09	0.20	75.00	0.00	1.00	0.00E+00	0.00E+00	7.00
3		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00
4		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00

Soil Parameters

Bulk Density (g/cm^3)	1.60
Effective Porosity (fraction)	0.30
Soil Pore Disconnectedness	7.00

Application Parameters

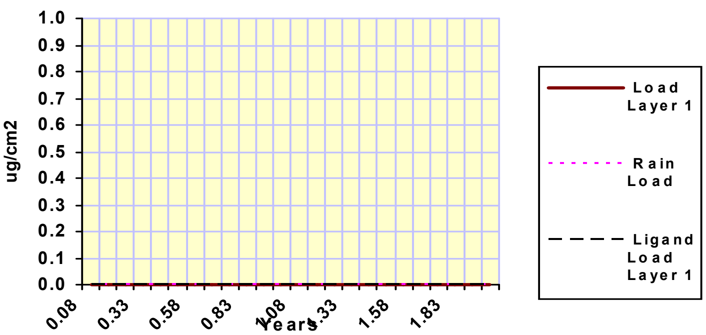
Area	cm^2	3.72E+5
	ft^2	400.42
Latitude	degrees	38.0
Spill Index		1

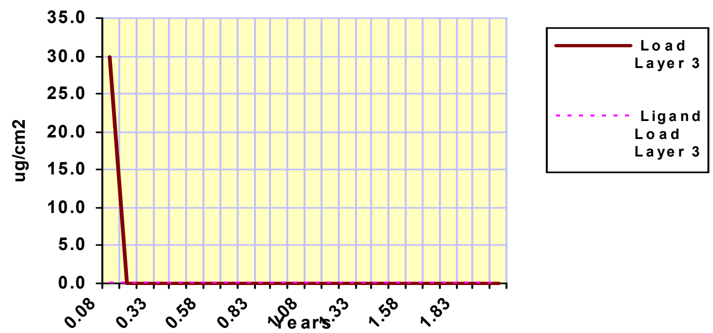
Chemical Parameters

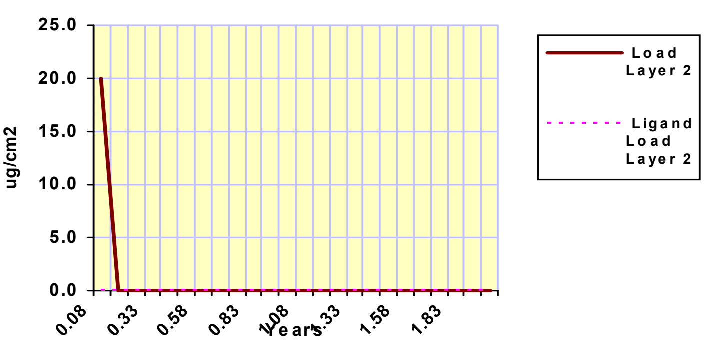
Water Solubility (µg/mL)	1.23E+5	**Moles Ligand / Moles Chemical**	0.00
Henry's Law (M^3atm/mol)	2.44E-2	**Ligand Molecular Weight** (g/mol)	0.00
K_{oc} (µg/g)/(µg/mL)	0.00	**Base Hydrolysis Rate** (L/mol/day)	0.00
Valance (g/mole)	0.00	**Ligand Dissociation Constant**	0.00
Air Diffusion Coefficient (cm^2/sec)	.000	**Neutral Hydrolysis Rate** (L/mol/day)	0.00
Water Diffusion Coefficient (cm^2/sec)	.000	**Acid Hydrolysis Rate** (L/mol/day)	0.00
Molecular Weight (g/mol)	112.00		

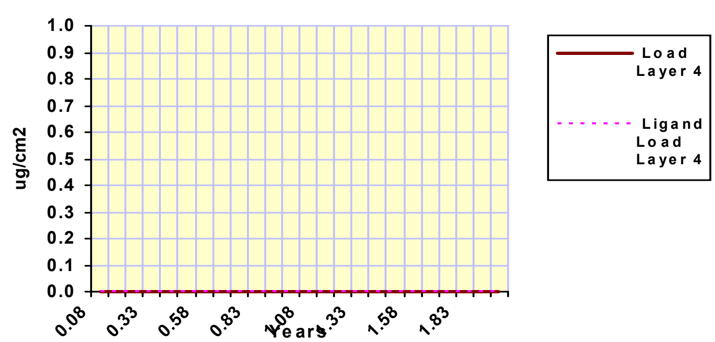
Output File: 4825 GR Cadmium
C:\SEVIEW63\4825CD.OUT
Chemical File: Cadmium (Diet) (Kd)
C:\SEVIEW63\CADMIUMD.CHM
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI
Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825CD.APL

Sublayer Loads	1	2	3	4	5	6	7	8	9	10
Layer 1 (ug/g)					2.00E+00					
Layer 2 (ug/g)										
Layer 3 (ug/g)										
Layer 4 (ug/g)										





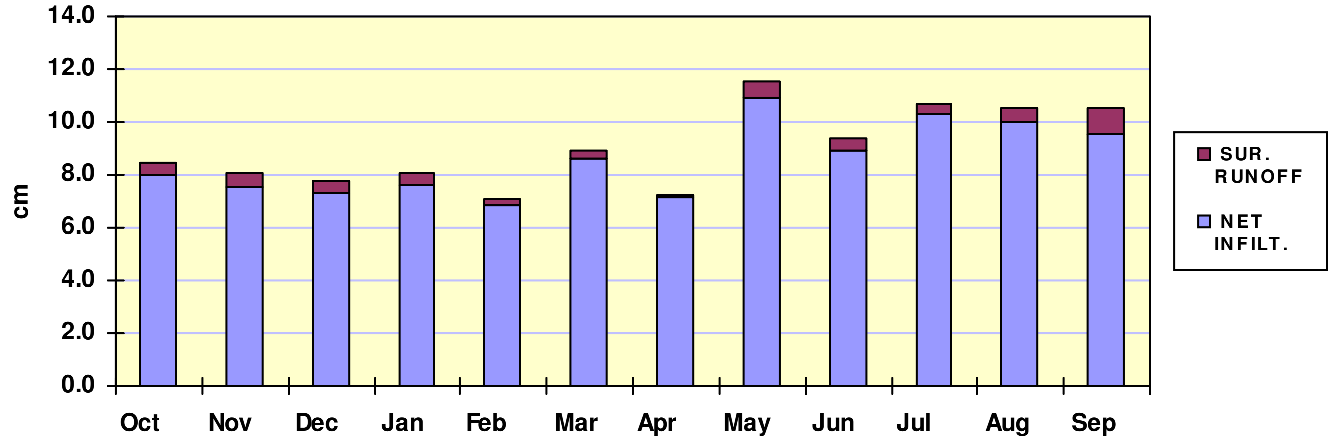


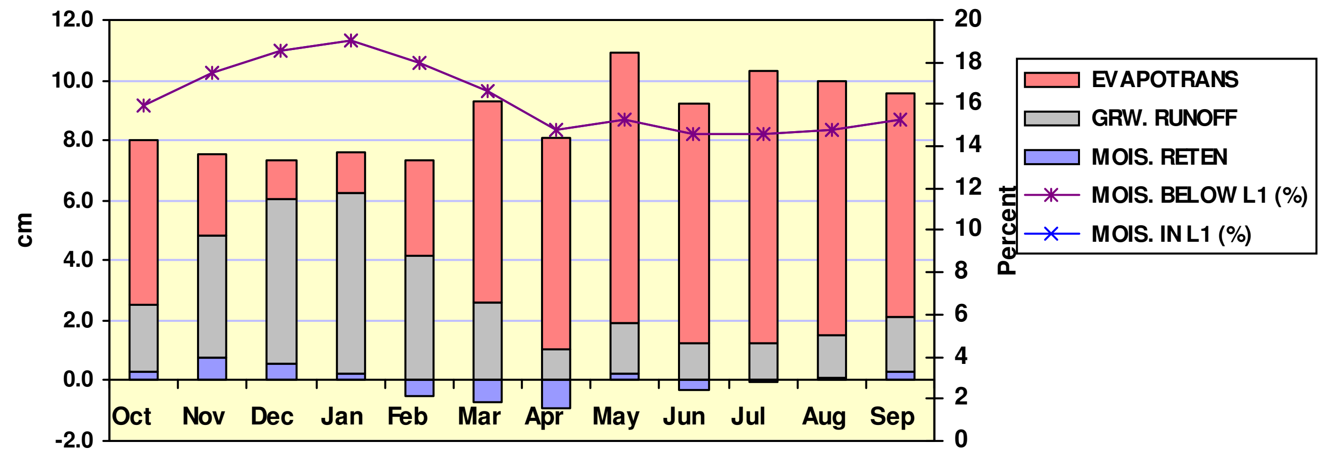


SESOIL Hydrologic Cycle Report

Scenario Description: 4825 GR Cadmium

SESOIL Output File: C:\SEVIEW63\4825CD.OUT





	Surface Water Runoff		Net Infiltration		Evapotranspiration		Soil Moisture Retention		Groundwater Runoff (Recharge)		Soil Moisture	
											Layer 1	Below Layer 1
Units	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	Percent	Percent
October	0.47	0.19	8.01	3.15	5.48	2.16	0.32	0.13	2.22	0.87	15.94	15.94
November	0.49	0.19	7.56	2.98	2.75	1.08	0.77	0.30	4.04	1.59	17.47	17.47
December	0.44	0.17	7.33	2.89	1.31	0.52	0.56	0.22	5.47	2.15	18.58	18.58
January	0.49	0.19	7.58	2.98	1.35	0.53	0.23	0.09	6.00	2.36	19.03	19.03
February	0.25	0.10	6.82	2.69	3.14	1.24	-0.51	-0.20	4.19	1.65	18.01	18.01
March	0.28	0.11	8.64	3.40	6.71	2.64	-0.69	-0.27	2.62	1.03	16.63	16.63
April	0.14	0.06	7.12	2.80	7.03	2.77	-0.95	-0.37	1.04	0.41	14.74	14.74
May	0.58	0.23	10.94	4.31	9.01	3.55	0.26	0.10	1.67	0.66	15.25	15.25
June	0.49	0.19	8.91	3.51	8.01	3.15	-0.33	-0.13	1.23	0.48	14.59	14.59
July	0.41	0.16	10.30	4.06	9.05	3.56	-0.02	-0.01	1.27	0.50	14.56	14.56
August	0.52	0.20	10.00	3.94	8.50	3.35	0.09	0.04	1.41	0.56	14.74	14.74
September	0.97	0.38	9.53	3.75	7.40	2.91	0.29	0.11	1.85	0.73	15.31	15.31
Total	5.53	2.18	102.74	40.45	69.74	27.46	0.00	0.00	32.99	12.99		

SESOIL Pollutant Cycle Report

Scenario Description: 4825 GR Cadmium

SESOIL Output File: C:\SEVIEW63\4825CD.OUT

SESOIL Process	Pollutant Mass (µg)	Percent of Total
Volatilized	0.000E+00	0.00
In Soil Air	2.855E+04	0.12
Sur. Runoff	0.000E+00	0.00
In Washld	0.000E+00	0.00
Ads On Soil	2.333E+07	98.95
Hydrol Soil	0.000E+00	0.00
Degrad Soil	0.000E+00	0.00
Pure Phase	0.000E+00	0.00
Complexed	0.000E+00	0.00
Immobile CEC	0.000E+00	0.00
Hydrol CEC	0.000E+00	0.00
In Soil Moi	2.977E+04	0.13
Hydrol Mois	0.000E+00	0.00
Degrad Mois	0.000E+00	0.00
Other Trans	0.000E+00	0.00
Other Sinks	0.000E+00	0.00
Gwr. Runoff	0.000E+00	0.00
Total Output	2.339E+07	99.20
Total Input	2.358E+07	
Input - Output	1.884E+05	

Maximum leachate concentration: 0.000E+00 **mg/l**

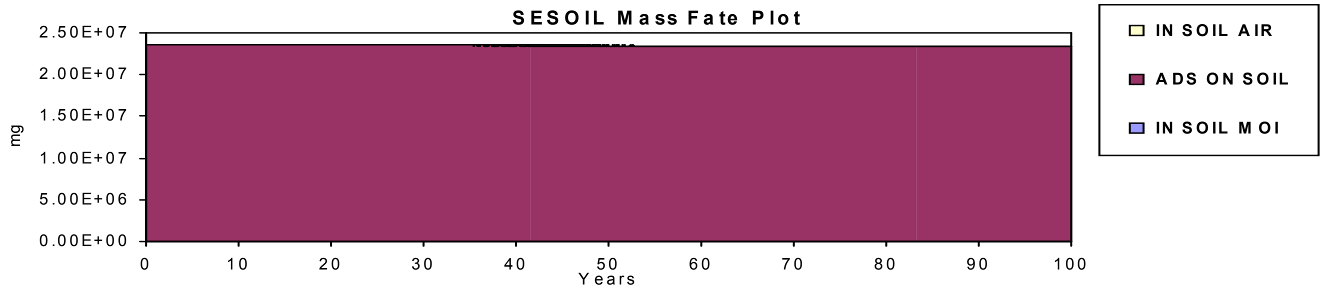
Climate File: WARSAW 2 NW
C:\SEVIEW63\WARSAW2N.CLM

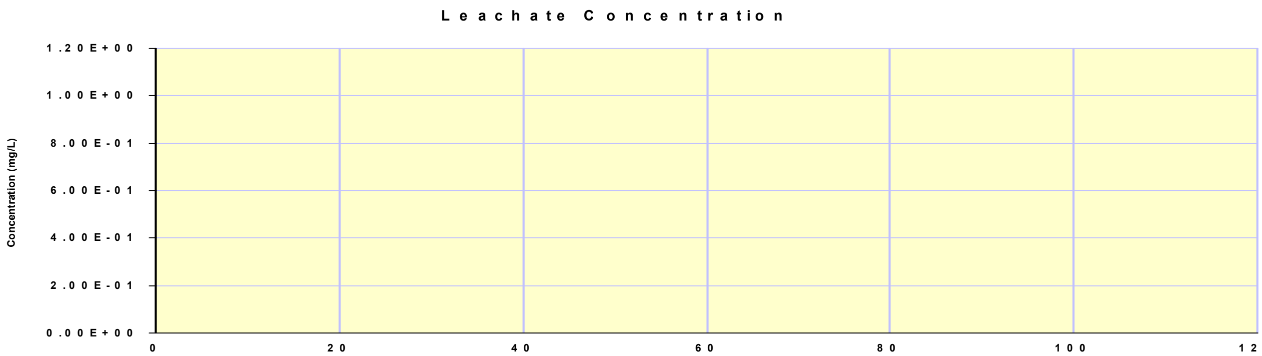
Chemical File: Cadmium (Diet) (Kd)
C:\SEVIEW63\CADMIUMD.CHM

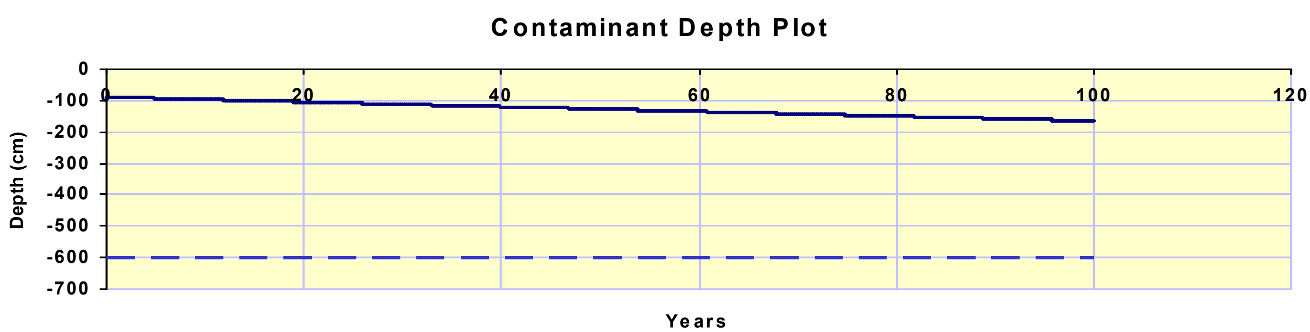
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI

Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825CD.APL

Starting Depth: 89.21 **cm**
Ending Depth: 165.00 **cm**
Total Depth: 600.00 **cm**







SESOIL Profile and Load Report

Layer No.	Number of Sub-Layers	Thickness		Intrinsic Permeability	Organic Carbon Content	Adsorption Coefficient	Cation Exchange Capacity	Freundlich Exponent	Solid Phase Degradation Rate	Liquid Phase Degradation Rate	Soil pH
		cm	feet	cm^2	percent	µg/g / µg/mL	mEq / 100 g soil	unitless	1/day	1/day	pH
1	10	198.0	6.50	1.00E-09	0.20	45.00	0.00	1.00	0.00E+00	0.00E+00	7.00
2	10	402.0	13.19	1.00E-09	0.20	45.00	0.00	1.00	0.00E+00	0.00E+00	7.00
3		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00
4		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00

Soil Parameters

Bulk Density (g/cm^3)	1.60
Effective Porosity (fraction)	0.30
Soil Pore Disconnectedness	7.00

Application Parameters

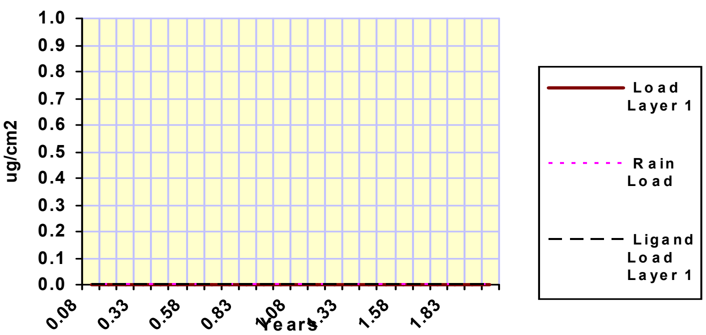
Area cm^2	3.72E+5
ft^2	400.42
Latitude degrees	38.0
Spill Index	1

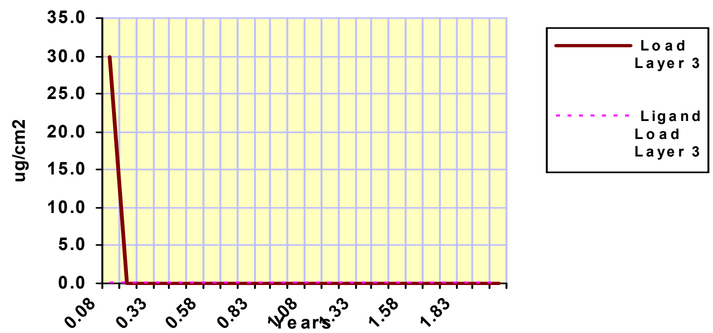
Chemical Parameters

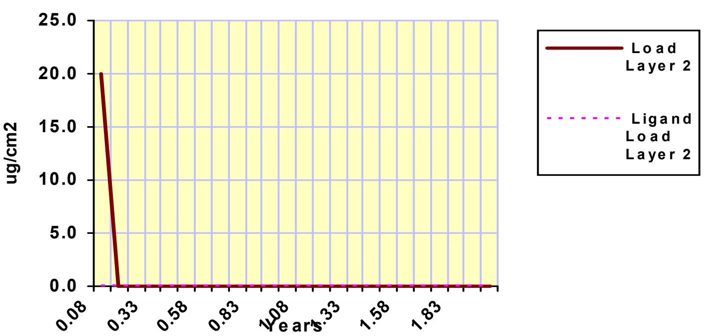
Water Solubility (µg/mL)	8.75E+4	**Moles Ligand / Moles Chemical**	0.00
Henry's Law (M^3atm/mol)	2.44E-2	**Ligand Molecular Weight** (g/mol)	0.00
K_{oc} (µg/g)/(µg/mL)	0.00	**Base Hydrolysis Rate** (L/mol/day)	0.00
Valance (g/mole)	0.00	**Ligand Dissociation Constant**	0.00
Air Diffusion Coefficient (cm^2/sec)	.000	**Neutral Hydrolysis Rate** (L/mol/day)	0.00
Water Diffusion Coefficient (cm^2/sec)	.000	**Acid Hydrolysis Rate** (L/mol/day)	0.00
Molecular Weight (g/mol)	58.90		

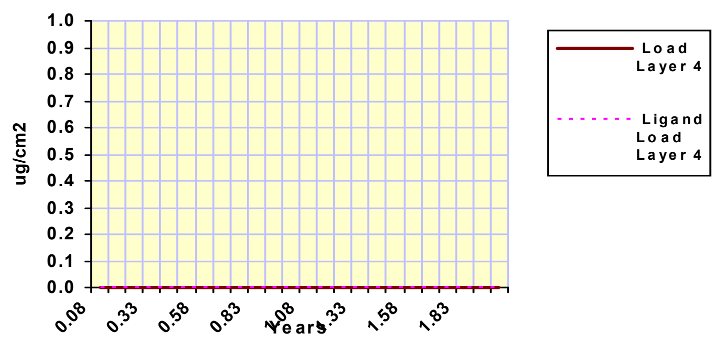
Output File: 4825 GR Cobalt
C:\SEVIEW63\4825CO2.OUT
Chemical File: Cobalt (Kd)
C:\SEVIEW63\COBALTKD.CHM
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI
Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825CO.APL

Sublayer Loads	1	2	3	4	5	6	7	8	9	10
Layer 1 (ug/g)				5.36E+01						
Layer 2 (ug/g)										
Layer 3 (ug/g)										
Layer 4 (ug/g)										





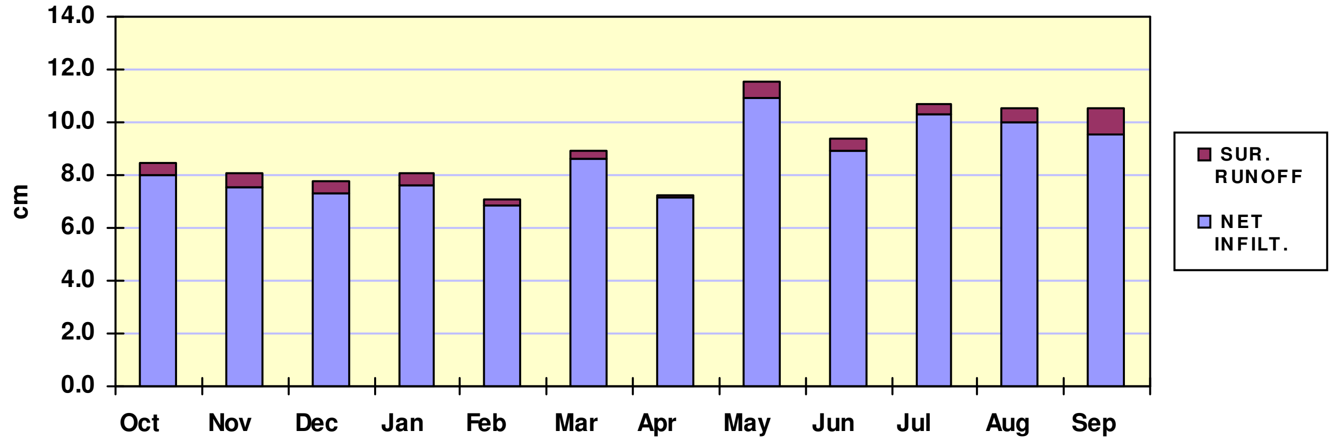


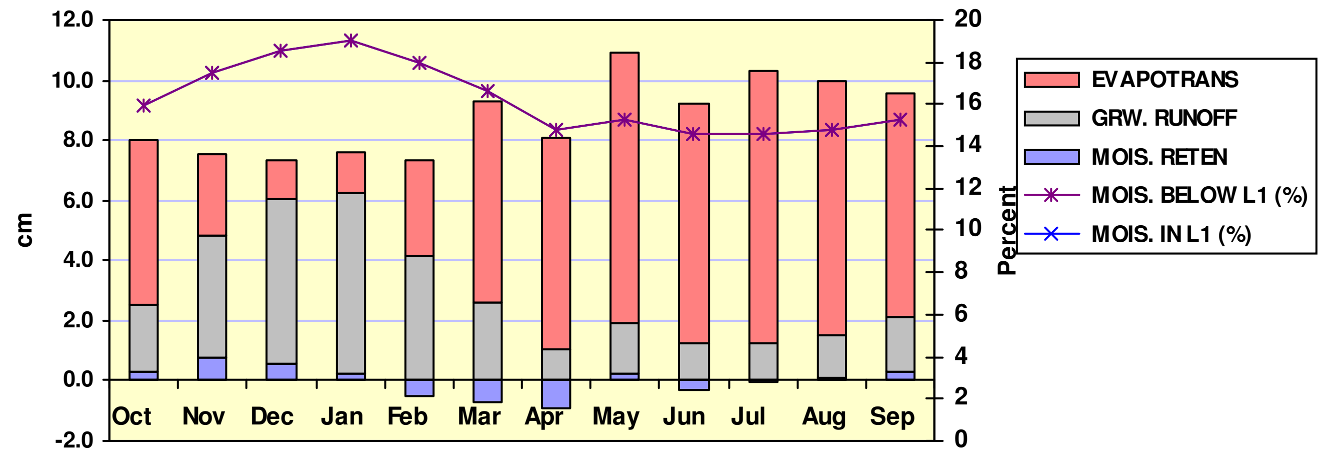


SESOIL Hydrologic Cycle Report

Scenario Description: 4825 GR Cobalt

SESOIL Output File: C:\SEVIEW63\4825CO2.OUT





	Surface Water Runoff		Net Infiltration		Evapotranspiration		Soil Moisture Retention		Groundwater Runoff (Recharge)		Soil Moisture Layer 1	Soil Moisture Below Layer 1
Units	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	Percent	Percent
October	0.47	0.19	8.01	3.15	5.48	2.16	0.32	0.13	2.22	0.87	15.94	15.94
November	0.49	0.19	7.56	2.98	2.75	1.08	0.77	0.30	4.04	1.59	17.47	17.47
December	0.44	0.17	7.33	2.89	1.31	0.52	0.56	0.22	5.47	2.15	18.58	18.58
January	0.49	0.19	7.58	2.98	1.35	0.53	0.23	0.09	6.00	2.36	19.03	19.03
February	0.25	0.10	6.82	2.69	3.14	1.24	-0.51	-0.20	4.19	1.65	18.01	18.01
March	0.28	0.11	8.64	3.40	6.71	2.64	-0.69	-0.27	2.62	1.03	16.63	16.63
April	0.14	0.06	7.12	2.80	7.03	2.77	-0.95	-0.37	1.04	0.41	14.74	14.74
May	0.58	0.23	10.94	4.31	9.01	3.55	0.26	0.10	1.67	0.66	15.25	15.25
June	0.49	0.19	8.91	3.51	8.01	3.15	-0.33	-0.13	1.23	0.48	14.59	14.59
July	0.41	0.16	10.30	4.06	9.05	3.56	-0.02	-0.01	1.27	0.50	14.56	14.56
August	0.52	0.20	10.00	3.94	8.50	3.35	0.09	0.04	1.41	0.56	14.74	14.74
September	0.97	0.38	9.53	3.75	7.40	2.91	0.29	0.11	1.85	0.73	15.31	15.31
Total	5.53	2.18	102.74	40.45	69.74	27.46	0.00	0.00	32.99	12.99		

SESOIL Pollutant Cycle Report

Scenario Description: 4825 GR Cobalt

SESOIL Output File: C:\SEVIEW63\4825CO2.OUT

SESOIL Process	Pollutant Mass (µg)	Percent of Total
Volatilized	0.000E+00	0.00
In Soil Air	1.277E+06	0.20
Sur. Runoff	0.000E+00	0.00
In Washld	0.000E+00	0.00
Ads On Soil	6.262E+08	99.08
Hydrol Soil	0.000E+00	0.00
Degrad Soil	0.000E+00	0.00
Pure Phase	0.000E+00	0.00
Complexed	0.000E+00	0.00
Immobile CEC	0.000E+00	0.00
Hydrol CEC	0.000E+00	0.00
In Soil Moi	1.331E+06	0.21
Hydrol Mois	0.000E+00	0.00
Degrad Mois	0.000E+00	0.00
Other Trans	0.000E+00	0.00
Other Sinks	0.000E+00	0.00
Gwr. Runoff	0.000E+00	0.00
Total Output	6.288E+08	99.49
Total Input	6.321E+08	
Input - Output	3.224E+06	

Maximum leachate concentration: 0.000E+00 **mg/l**

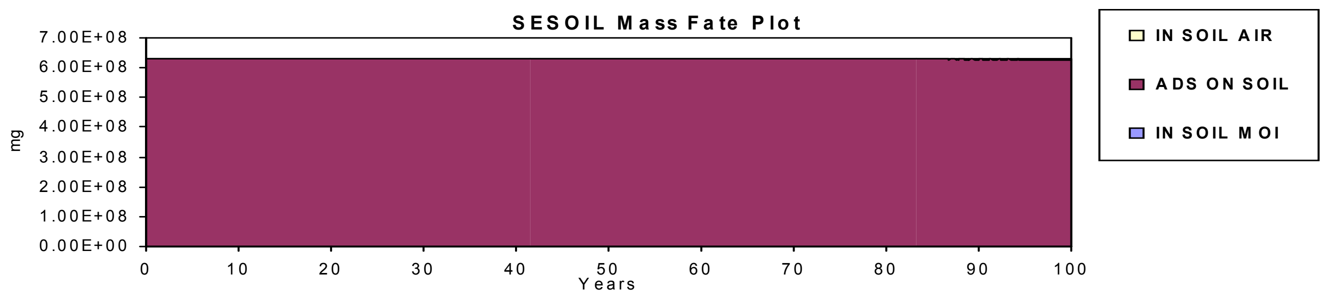
Climate File: WARSAW 2 NW
C:\SEVIEW63\WARSAW2N.CLM

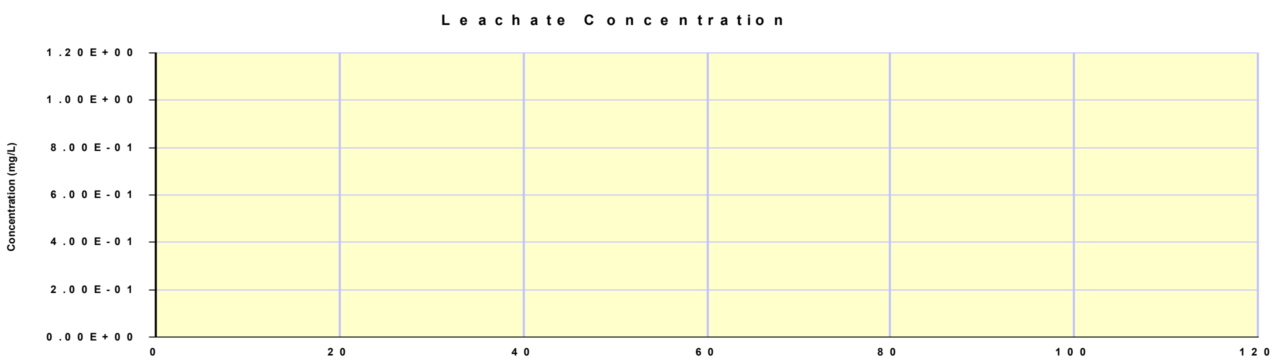
Chemical File: Cobalt (Kd)
C:\SEVIEW63\COBALTKD.CHM

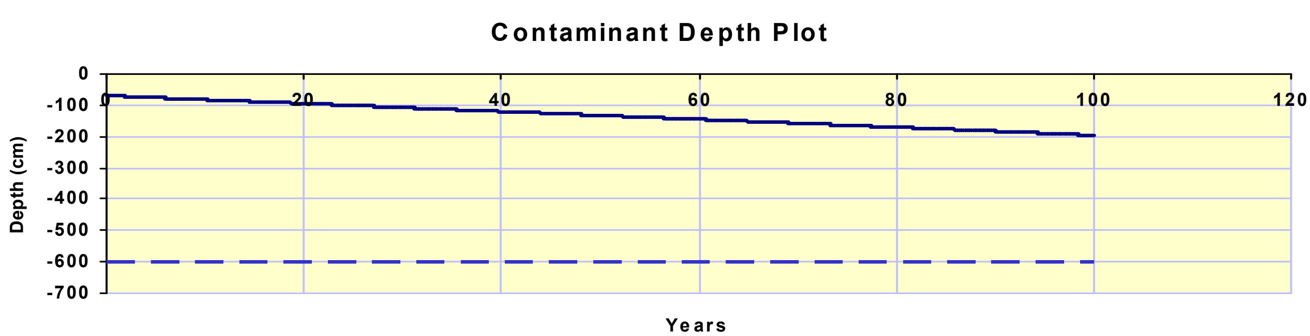
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI

Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825CO.APL

Starting Depth:	69.44	**cm**
Ending Depth:	195.50	**cm**
Total Depth:	600.00	**cm**







SESOIL Profile and Load Report

Layer No.	Number of Sub-Layers	Thickness		Intrinsic Permeability	Organic Carbon Content	Adsorption Coefficient	Cation Exchange Capacity	Freundlich Exponent	Solid Phase Degradation Rate	Liquid Phase Degradation Rate	Soil pH
		cm	feet	cm^2	percent	µg/g / µg/mL	mEq / 100 g soil	unitless	1/day	1/day	pH
1	10	198.0	6.50	1.00E-09	0.20	35.00	0.00	1.00	0.00E+00	0.00E+00	7.00
2	10	402.0	13.19	1.00E-09	0.20	35.00	0.00	1.00	0.00E+00	0.00E+00	7.00
3		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00
4		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00

Soil Parameters

Bulk Density (g/cm^3)	1.60
Effective Porosity (fraction)	0.30
Soil Pore Disconnectedness	7.00

Application Parameters

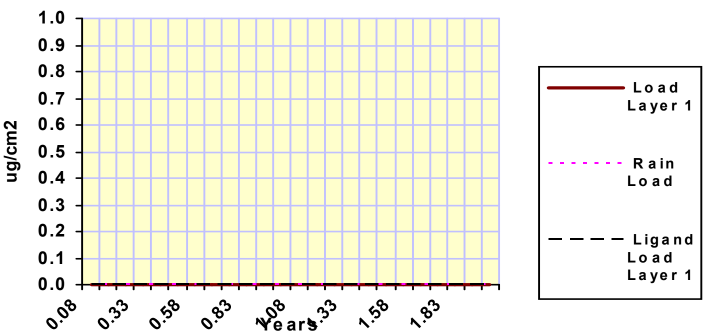
Area	cm^2	3.72E+5
	ft^2	400.42
Latitude	degrees	38.0
Spill Index		1

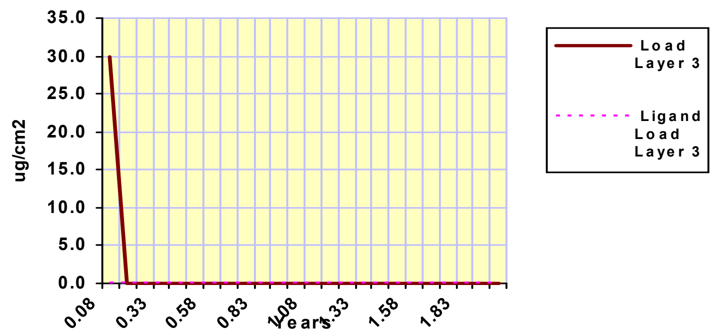
Chemical Parameters

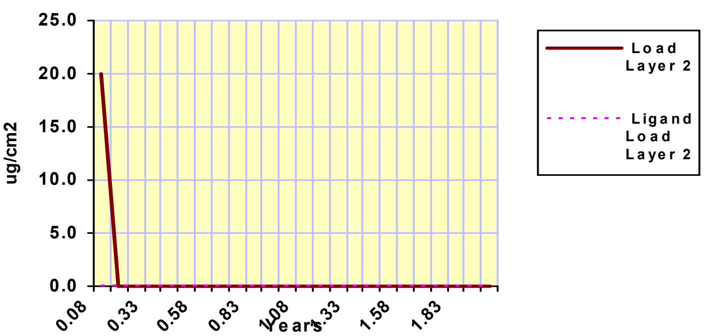
Water Solubility (µg/mL)	4.21E+5	**Moles Ligand / Moles Chemical**	0.00
Henry's Law (M^3atm/mol)	2.44E-2	**Ligand Molecular Weight** (g/mol)	0.00
K_{oc} (µg/g)/(µg/mL)	0.00	**Base Hydrolysis Rate** (L/mol/day)	0.00
Valance (g/mole)	0.00	**Ligand Dissociation Constant**	0.00
Air Diffusion Coefficient (cm^2/sec)	.000	**Neutral Hydrolysis Rate** (L/mol/day)	0.00
Water Diffusion Coefficient (cm^2/sec)	.000	**Acid Hydrolysis Rate** (L/mol/day)	0.00
Molecular Weight (g/mol)	63.50		

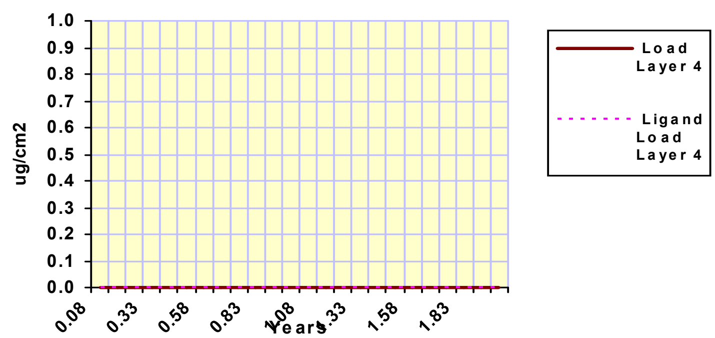
Output File: 4825 GR Copper
C:\SEVIEW63\4825CU.OUT
Chemical File: Copper (Kd)
C:\SEVIEW63\COPPERKD.CHM
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI
Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825CU.APL

Sublayer Loads	1	2	3	4	5	6	7	8	9	10
Layer 1 (ug/g)					2.50E+02					
Layer 2 (ug/g)										
Layer 3 (ug/g)										
Layer 4 (ug/g)										





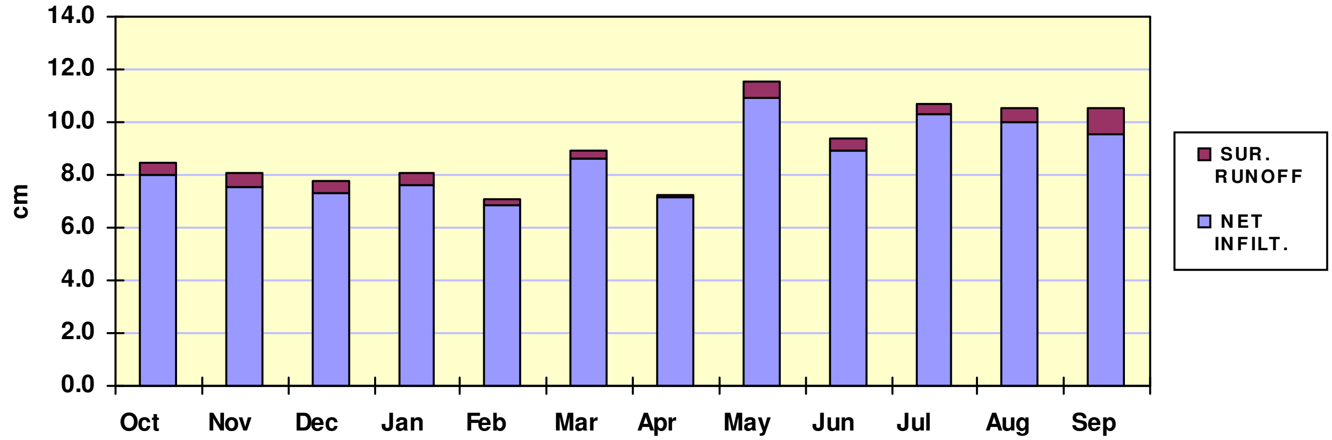


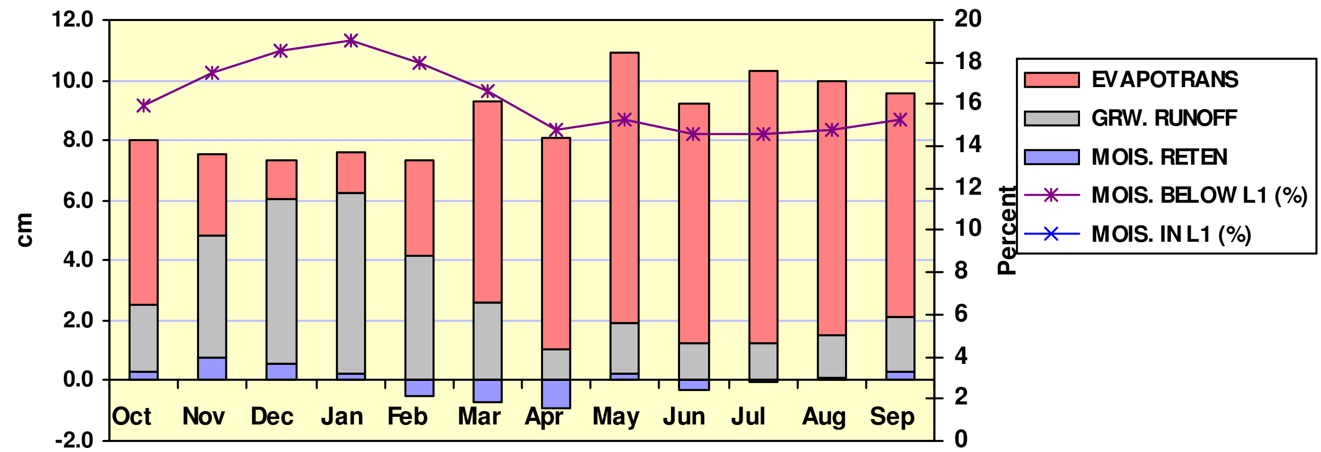


SESOIL Hydrologic Cycle Report

Scenario Description: 4825 GR Copper

SESOIL Output File: C:\SEVIEW63\4825CU.OUT





	Surface Water Runoff		Net Infiltration		Evapotranspiration		Soil Moisture Retention		Groundwater Runoff (Recharge)		Soil Moisture	
											Layer 1	Below Layer 1
Units	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	Percent	Percent
October	0.47	0.19	8.01	3.15	5.48	2.16	0.32	0.13	2.22	0.87	15.94	15.94
November	0.49	0.19	7.56	2.98	2.75	1.08	0.77	0.30	4.04	1.59	17.47	17.47
December	0.44	0.17	7.33	2.89	1.31	0.52	0.56	0.22	5.47	2.15	18.58	18.58
January	0.49	0.19	7.58	2.98	1.35	0.53	0.23	0.09	6.00	2.36	19.03	19.03
February	0.25	0.10	6.82	2.69	3.14	1.24	-0.51	-0.20	4.19	1.65	18.01	18.01
March	0.28	0.11	8.64	3.40	6.71	2.64	-0.69	-0.27	2.62	1.03	16.63	16.63
April	0.14	0.06	7.12	2.80	7.03	2.77	-0.95	-0.37	1.04	0.41	14.74	14.74
May	0.58	0.23	10.94	4.31	9.01	3.55	0.26	0.10	1.67	0.66	15.25	15.25
June	0.49	0.19	8.91	3.51	8.01	3.15	-0.33	-0.13	1.23	0.48	14.59	14.59
July	0.41	0.16	10.30	4.06	9.05	3.56	-0.02	-0.01	1.27	0.50	14.56	14.56
August	0.52	0.20	10.00	3.94	8.50	3.35	0.09	0.04	1.41	0.56	14.74	14.74
September	0.97	0.38	9.53	3.75	7.40	2.91	0.29	0.11	1.85	0.73	15.31	15.31
Total	5.53	2.18	102.74	40.45	69.74	27.46	0.00	0.00	32.99	12.99		

SESOIL Pollutant Cycle Report

Scenario Description: 4825 GR Copper

SESOIL Output File: C:\SEVIEW63\4825CU.OUT

SESOIL Process	Pollutant Mass (µg)	Percent of Total
Volatilized	0.000E+00	0.00
In Soil Air	7.635E+06	0.26
Sur. Runoff	0.000E+00	0.00
In Washld	0.000E+00	0.00
Ads On Soil	2.911E+09	98.77
Hydrol Soil	0.000E+00	0.00
Degrad Soil	0.000E+00	0.00
Pure Phase	0.000E+00	0.00
Complexed	0.000E+00	0.00
Immobile CEC	0.000E+00	0.00
Hydrol CEC	0.000E+00	0.00
In Soil Moi	7.960E+06	0.27
Hydrol Mois	0.000E+00	0.00
Degrad Mois	0.000E+00	0.00
Other Trans	0.000E+00	0.00
Other Sinks	0.000E+00	0.00
Gwr. Runoff	0.000E+00	0.00
Total Output	2.927E+09	99.30
Total Input	2.948E+09	
Input - Output	2.058E+07	

Maximum leachate concentration: 0.000E+00 **mg/l**

Climate File: WARSAW 2 NW

C:\SEVIEW63\WARSAW2N.CLM

Chemical File: Copper (Kd)

C:\SEVIEW63\COPPERKD.CHM

Soil File: Silty Clay

C:\SEVIEW63\4825.SOI

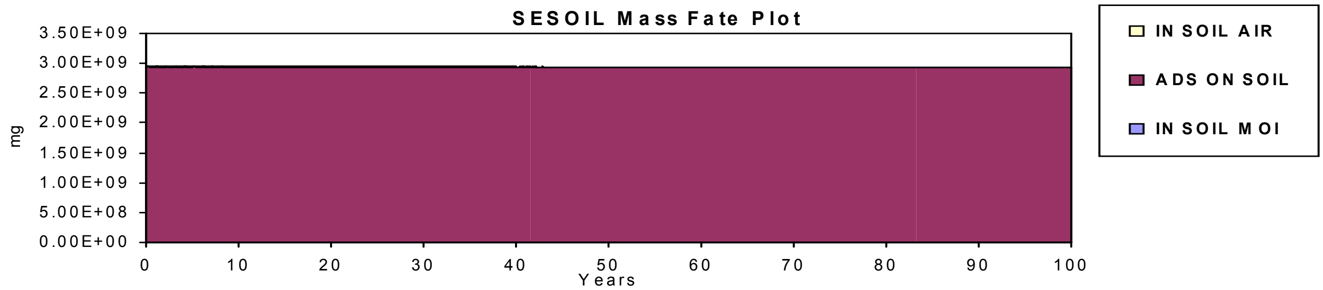
Application File: 4825 Glenbrook Road

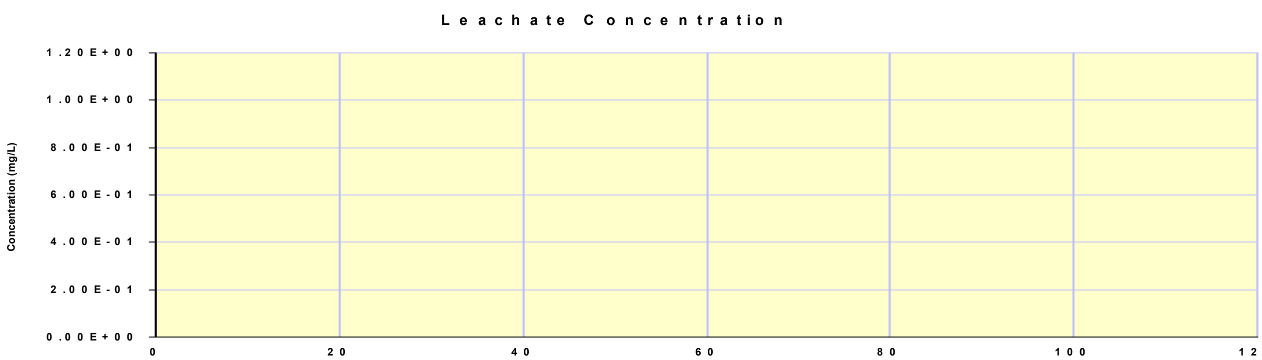
C:\SEVIEW63\4825CU.APL

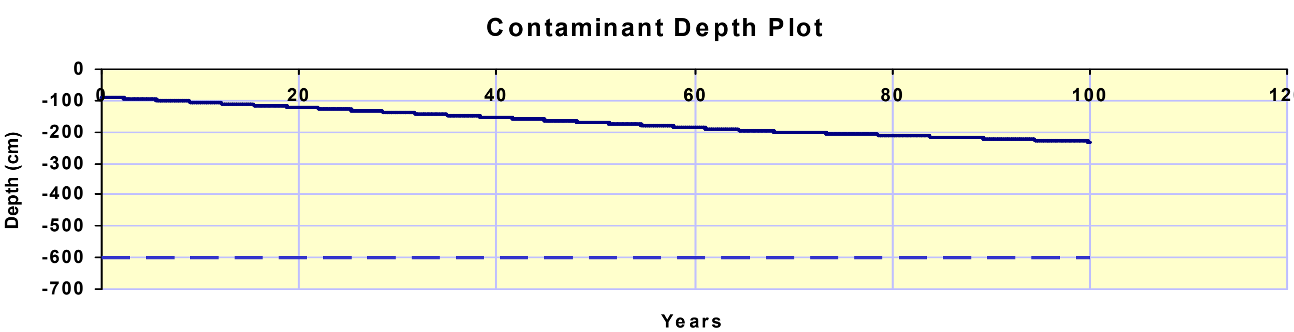
Starting Depth: 89.28 **cm**

Ending Depth: 230.80 **cm**

Total Depth: 600.00 **cm**







SESOIL Profile and Load Report

Layer No.	Number of Sub-Layers	Thickness		Intrinsic Permeability	Organic Carbon Content	Adsorption Coefficient	Cation Exchange Capacity	Freundlich Exponent	Solid Phase Degradation Rate	Liquid Phase Degradation Rate	Soil pH
		cm	feet	cm ^{2}	percent	$\frac{\mu g/g}{\mu g/mL}$	$\frac{mEq}{100\ g\ soil}$	unitless	1/day	1/day	pH
1	10	183.0	6.00	1.00E-09	0.20	900.00	0.00	1.00	0.00E+00	0.00E+00	7.00
2	10	402.0	13.19	1.00E-09	0.20	900.00	0.00	1.00	0.00E+00	0.00E+00	7.00
3		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00
4		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00

Soil Parameters

Bulk Density (g/cm^3)	1.60
Effective Porosity (fraction)	0.30
Soil Pore Disconnectedness	7.00

Application Parameters

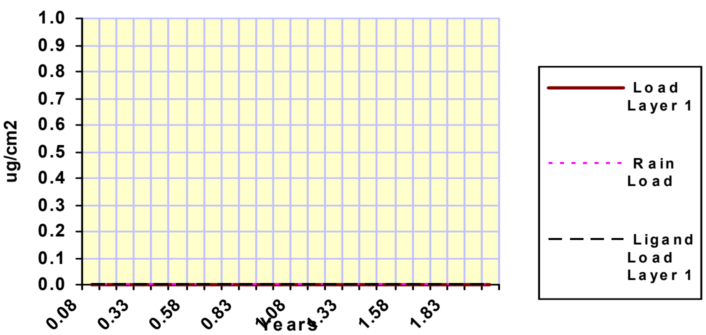
Area	cm ^{2}	3.72E+5
	ft ^{2}	400.42
Latitude	degrees	38.0
Spill Index		1

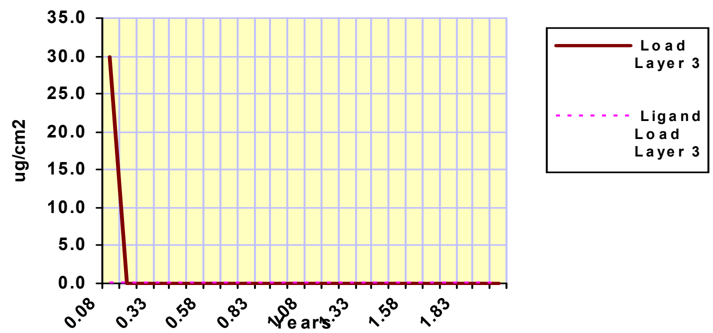
Chemical Parameters

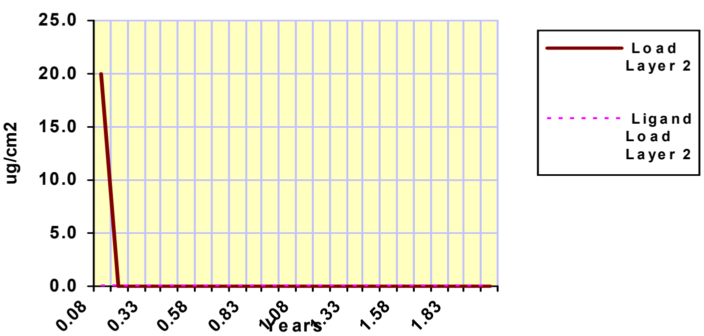
Water Solubility (µg/mL)	9.58E+3	**Moles Ligand / Moles Chemical**	0.00
Henry's Law (M^{3}atm/mol)	2.44E-2	**Ligand Molecular Weight** (g/mol)	0.00
K_{oc} (µg/g)/(µg/mL)	0.00	**Base Hydrolysis Rate** (L/mol/day)	0.00
Valance (g/mole)	0.00	**Ligand Dissociation Constant**	0.00
Air Diffusion Coefficient (cm^2/sec)	.000	**Neutral Hydrolysis Rate** (L/mol/day)	0.00
Water Diffusion Coefficient (cm^2/sec)	.000	**Acid Hydrolysis Rate** (L/mol/day)	0.00
Molecular Weight (g/mol)	207.00		

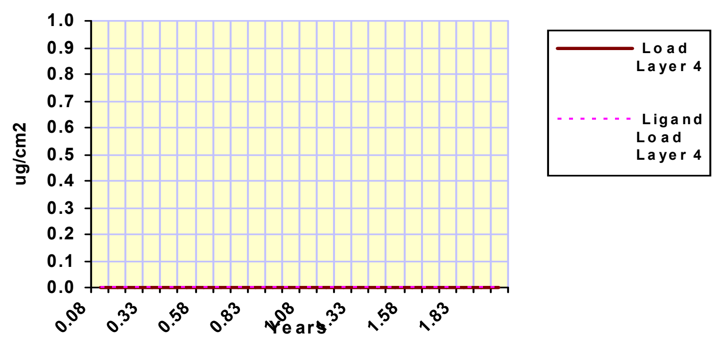
Output File: 4825 GR Lead
C:\SEVIEW63\4825PB1.OUT
Chemical File: Lead And Compounds (Kd)
C:\SEVIEW63\LEADANDC.CHM
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI
Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825PB.APL

Sublayer Loads	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Layer 1 (ug/g)				1.00E+02						
Layer 2 (ug/g)										
Layer 3 (ug/g)										
Layer 4 (ug/g)										





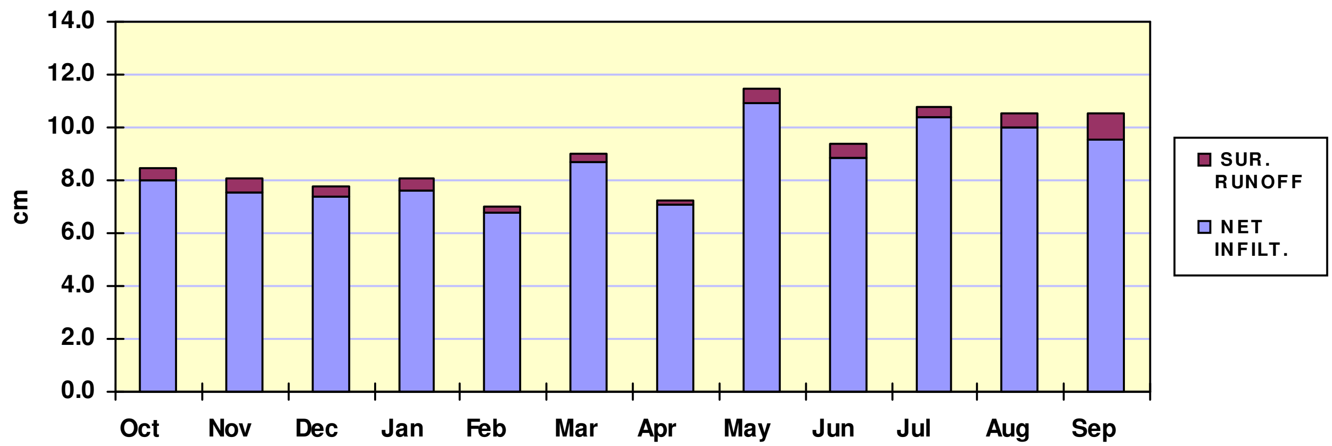


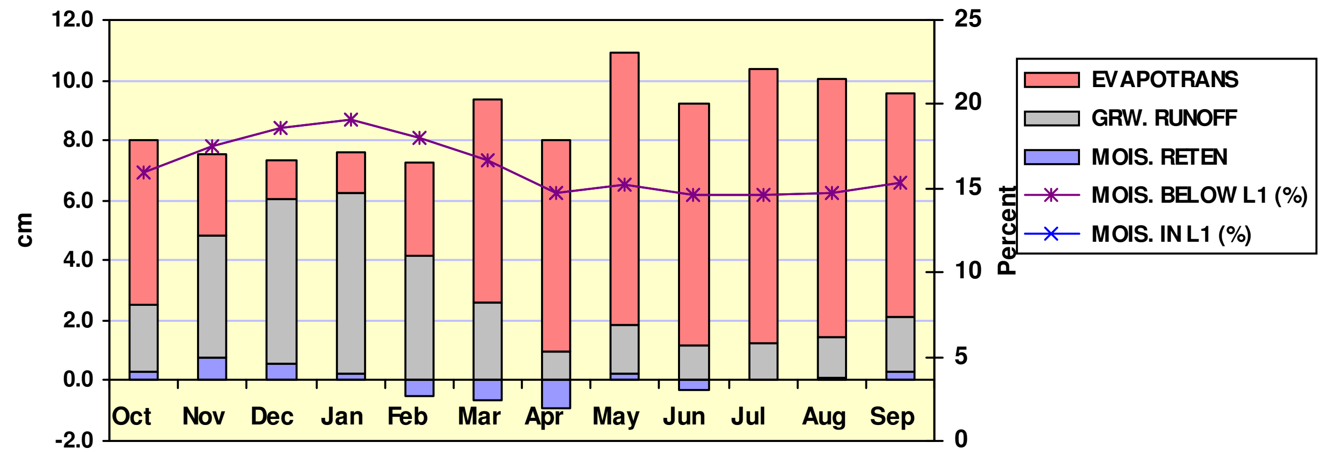


SESOIL Hydrologic Cycle Report

Scenario Description: 4825 GR Lead

SESOIL Output File: C:\SEVIEW63\4825PB1.OUT





	Surface Water Runoff		Net Infiltration		Evapotranspiration		Soil Moisture Retention		Groundwater Runoff (Recharge)		Soil Moisture	
											Layer 1	Below Layer 1
Units	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	Percent	Percent
October	0.47	0.19	8.02	3.16	5.50	2.17	0.31	0.12	2.21	0.87	15.97	15.97
November	0.49	0.19	7.55	2.97	2.75	1.08	0.75	0.30	4.05	1.59	17.50	17.50
December	0.44	0.17	7.35	2.89	1.31	0.52	0.54	0.21	5.50	2.17	18.61	18.61
January	0.50	0.20	7.61	3.00	1.35	0.53	0.22	0.09	6.04	2.38	19.06	19.06
February	0.25	0.10	6.78	2.67	3.14	1.24	-0.51	-0.20	4.15	1.63	18.01	18.01
March	0.28	0.11	8.68	3.42	6.72	2.65	-0.66	-0.26	2.62	1.03	16.66	16.66
April	0.14	0.06	7.11	2.80	7.05	2.78	-0.94	-0.37	1.00	0.39	14.74	14.74
May	0.58	0.23	10.91	4.30	9.03	3.56	0.25	0.10	1.63	0.64	15.25	15.25
June	0.49	0.19	8.88	3.50	8.03	3.16	-0.32	-0.13	1.18	0.46	14.59	14.59
July	0.42	0.17	10.36	4.08	9.12	3.59	0.00	0.00	1.24	0.49	14.59	14.59
August	0.53	0.21	10.03	3.95	8.56	3.37	0.09	0.04	1.38	0.54	14.77	14.77
September	0.98	0.39	9.56	3.76	7.45	2.93	0.28	0.11	1.83	0.72	15.34	15.34
Total	5.55	2.19	102.85	40.49	70.02	27.57	0.00	0.00	32.83	12.92		

SESOIL Pollutant Cycle Report

Scenario Description: 4825 GR Lead

SESOIL Output File: C:\SEVIEW63\4825PB1.OUT

SESOIL Process	Pollutant Mass (µg)	Percent of Total
Volatilized	0.000E+00	0.00
In Soil Air	1.107E+05	0.01
Sur. Runoff	0.000E+00	0.00
In Washld	0.000E+00	0.00
Ads On Soil	1.087E+09	99.82
Hydrol Soil	0.000E+00	0.00
Degrad Soil	0.000E+00	0.00
Pure Phase	0.000E+00	0.00
Complexed	0.000E+00	0.00
Immobile CEC	0.000E+00	0.00
Hydrol CEC	0.000E+00	0.00
In Soil Moi	1.158E+05	0.01
Hydrol Mois	0.000E+00	0.00
Degrad Mois	0.000E+00	0.00
Other Trans	0.000E+00	0.00
Other Sinks	0.000E+00	0.00
Gwr. Runoff	0.000E+00	0.00
Total Output	1.087E+09	99.84
Total Input	1.089E+09	
Input - Output	1.773E+06	

Maximum leachate concentration: 0.000E+00 **mg/l**

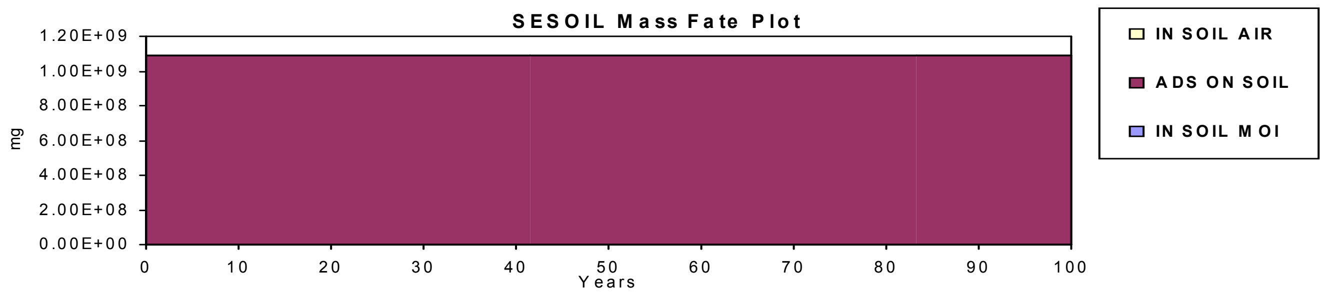
Climate File: WARSAW 2 NW
C:\SEVIEW63\WARSAW2N.CLM

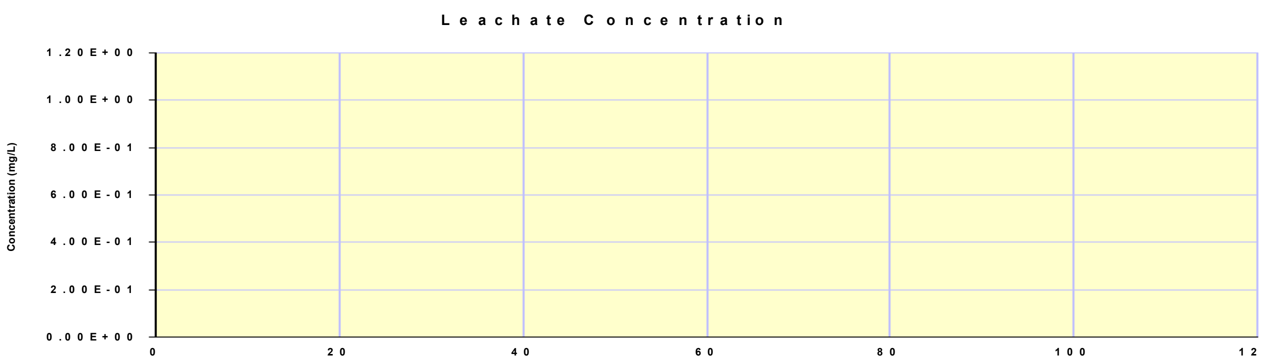
Chemical File: Lead And Compounds (Kd)
C:\SEVIEW63\LEADANDC.CHM

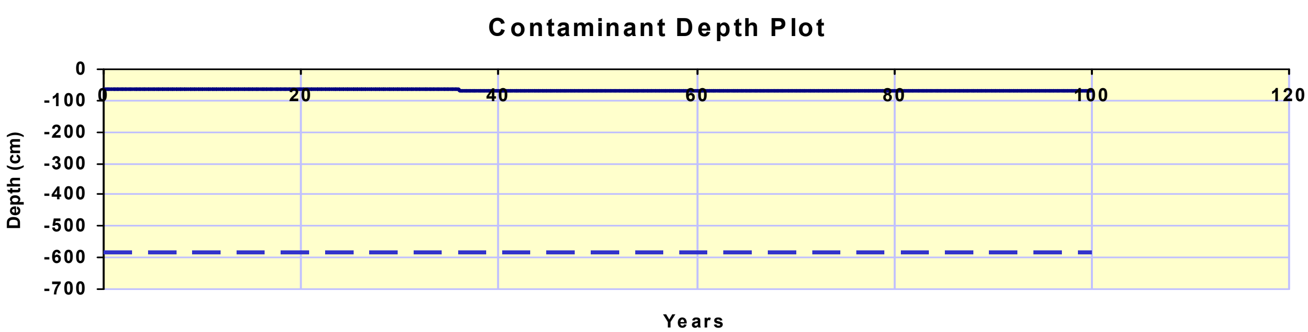
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI

Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825PB.APL

Starting Depth: 64.01 **cm**
Ending Depth: 70.35 **cm**
Total Depth: 585.00 **cm**







SESOIL Profile and Load Report

Layer No.	Number of Sub-Layers	Thickness		Intrinsic Permeability	Organic Carbon Content	Adsorption Coefficient	Cation Exchange Capacity	Freundlich Exponent	Solid Phase Degradation Rate	Liquid Phase Degradation Rate	Soil pH
		cm	feet	cm^2	percent	μg/g / μg/mL	mEq / 100 g soil	unitless	1/day	1/day	pH
1	10	198.0	6.50	1.00E-09	0.20	65.00	0.00	1.00	0.00E+00	0.00E+00	7.00
2	10	402.0	13.19	1.00E-09	0.20	65.00	0.00	1.00	0.00E+00	0.00E+00	7.00
3		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00
4		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00

Soil Parameters

Bulk Density (g/cm^3)	1.60
Effective Porosity (fraction)	0.30
Soil Pore Disconnectedness	7.00

Application Parameters

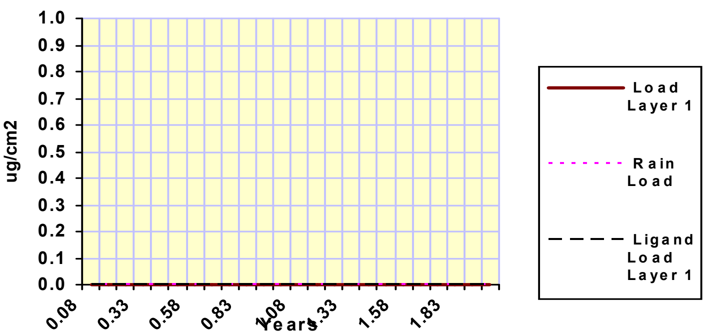
Area cm^2	3.72E+5
ft^2	400.42
Latitude degrees	38.0
Spill Index	1

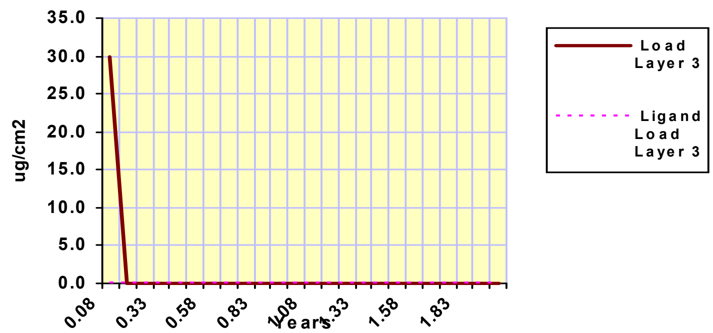
Chemical Parameters

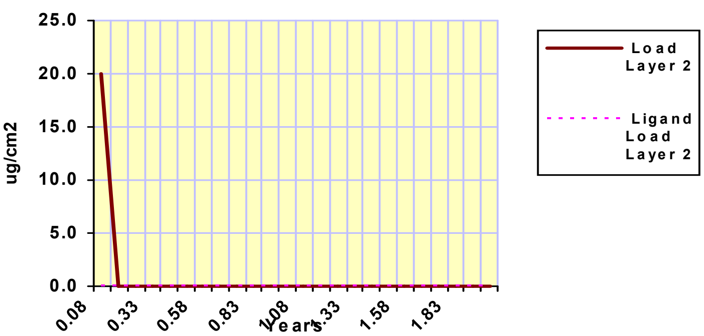
Water Solubility (μg/mL)	8.72E+4	**Moles Ligand / Moles Chemical**	0.00
Henry's Law (M^3atm/mol)	2.44E-2	**Ligand Molecular Weight** (g/mol)	0.00
K_{oc} (μg/g)/(μg/mL)	0.00	**Base Hydrolysis Rate** (L/mol/day)	0.00
Valance (g/mole)	0.00	**Ligand Dissociation Constant**	0.00
Air Diffusion Coefficient (cm^2/sec)	.000	**Neutral Hydrolysis Rate** (L/mol/day)	0.00
Water Diffusion Coefficient (cm^2/sec)	.000	**Acid Hydrolysis Rate** (L/mol/day)	0.00
Molecular Weight (g/mol)	54.90		

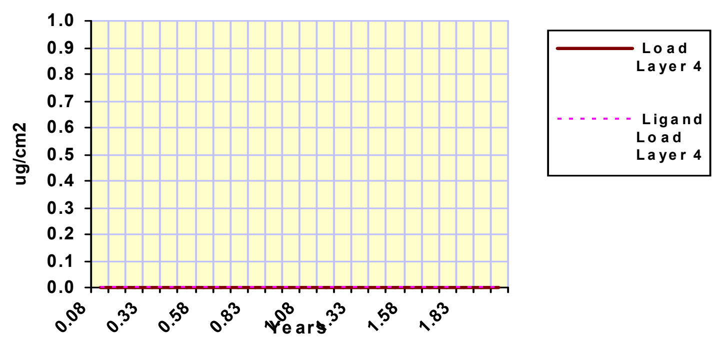
Output File: 4825 GR Manganese
C:\SEVIEW63\4825MN1.OUT
Chemical File: Manganese (Diet) (Kd)
C:\SEVIEW63\MANGANES.CHM
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI
Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825MN.APL

Sublayer Loads	1	2	3	4	5	6	7	8	9	10
Layer 1 (ug/g)				2.90E+03						
Layer 2 (ug/g)										
Layer 3 (ug/g)										
Layer 4 (ug/g)										





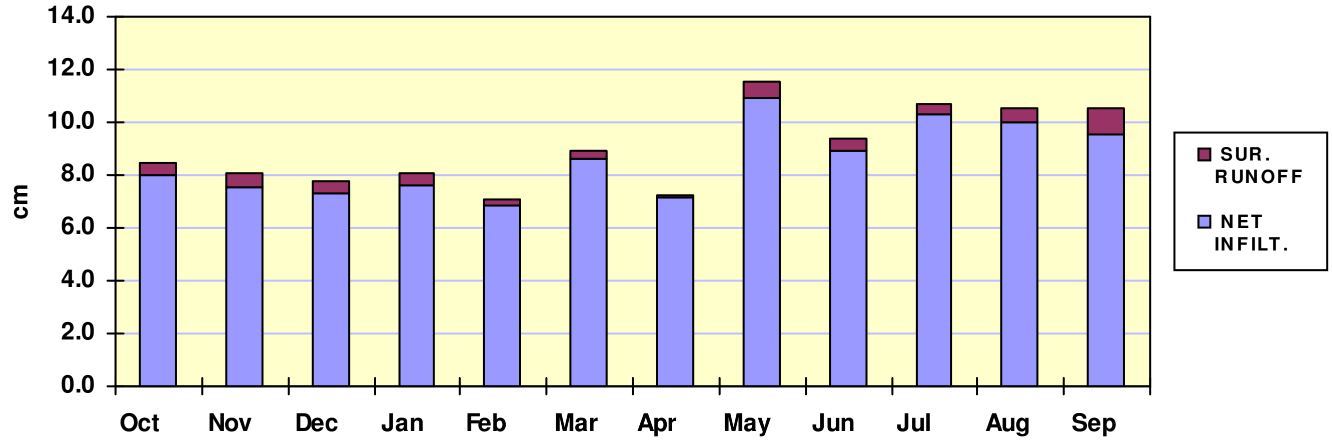


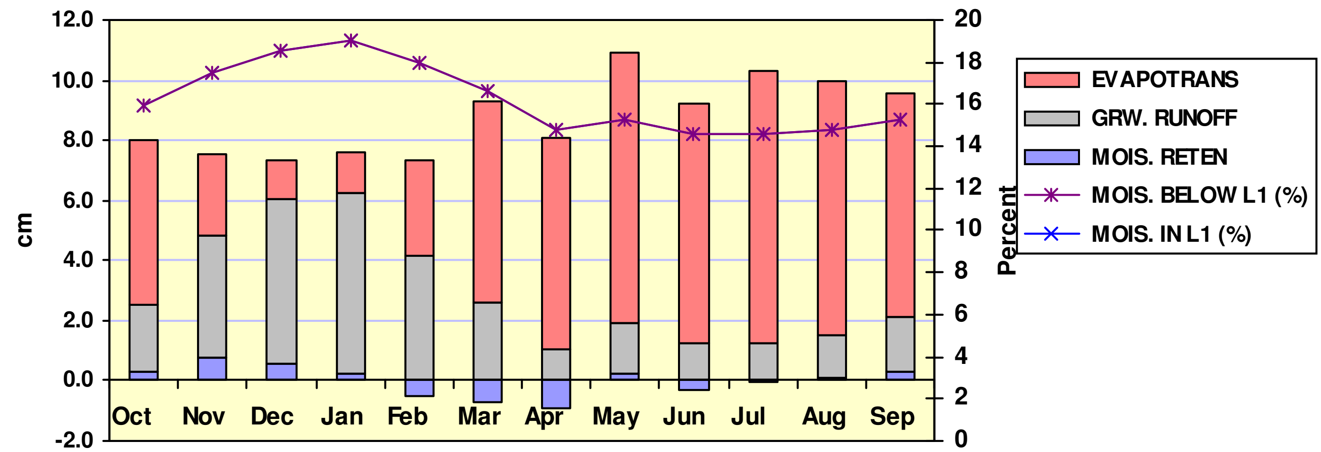


SESOIL Hydrologic Cycle Report

Scenario Description: 4825 GR Manganese

SESOIL Output File: C:\SEVIEW63\4825MN1.OUT





	Surface Water Runoff		Net Infiltration		Evapotranspiration		Soil Moisture Retention		Groundwater Runoff (Recharge)		Soil Moisture	
											Layer 1	Below Layer 1
Units	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	Percent	Percent
October	0.47	0.19	8.01	3.15	5.48	2.16	0.32	0.13	2.22	0.87	15.94	15.94
November	0.49	0.19	7.56	2.98	2.75	1.08	0.77	0.30	4.04	1.59	17.47	17.47
December	0.44	0.17	7.33	2.89	1.31	0.52	0.56	0.22	5.47	2.15	18.58	18.58
January	0.49	0.19	7.58	2.98	1.35	0.53	0.23	0.09	6.00	2.36	19.03	19.03
February	0.25	0.10	6.82	2.69	3.14	1.24	-0.51	-0.20	4.19	1.65	18.01	18.01
March	0.28	0.11	8.64	3.40	6.71	2.64	-0.69	-0.27	2.62	1.03	16.63	16.63
April	0.14	0.06	7.12	2.80	7.03	2.77	-0.95	-0.37	1.04	0.41	14.74	14.74
May	0.58	0.23	10.94	4.31	9.01	3.55	0.26	0.10	1.67	0.66	15.25	15.25
June	0.49	0.19	8.91	3.51	8.01	3.15	-0.33	-0.13	1.23	0.48	14.59	14.59
July	0.41	0.16	10.30	4.06	9.05	3.56	-0.02	-0.01	1.27	0.50	14.56	14.56
August	0.52	0.20	10.00	3.94	8.50	3.35	0.09	0.04	1.41	0.56	14.74	14.74
September	0.97	0.38	9.53	3.75	7.40	2.91	0.29	0.11	1.85	0.73	15.31	15.31
Total	5.53	2.18	102.74	40.45	69.74	27.46	0.00	0.00	32.99	12.99		

SESOIL Pollutant Cycle Report

Scenario Description: 4825 GR Manganese

SESOIL Output File: C:\SEVIEW63\4825MN1.OUT

SESOIL Process	Pollutant Mass (µg)	Percent of Total
Volatilized	0.000E+00	0.00
In Soil Air	4.779E+07	0.14
Sur. Runoff	0.000E+00	0.00
In Washld	0.000E+00	0.00
Ads On Soil	3.385E+10	98.98
Hydrol Soil	0.000E+00	0.00
Degrad Soil	0.000E+00	0.00
Pure Phase	0.000E+00	0.00
Complexed	0.000E+00	0.00
Immobile CEC	0.000E+00	0.00
Hydrol CEC	0.000E+00	0.00
In Soil Moi	4.982E+07	0.15
Hydrol Mois	0.000E+00	0.00
Degrad Mois	0.000E+00	0.00
Other Trans	0.000E+00	0.00
Other Sinks	0.000E+00	0.00
Gwr. Runoff	0.000E+00	0.00
Total Output	3.394E+10	99.27
Total Input	3.420E+10	
Input - Output	2.510E+08	

Maximum leachate concentration: 0.000E+00 **mg/l**

Climate File: WARSAW 2 NW
C:\SEVIEW63\WARSAW2N.CLM

Chemical File: Manganese (Diet) (Kd)
C:\SEVIEW63\MANGANES.CHM

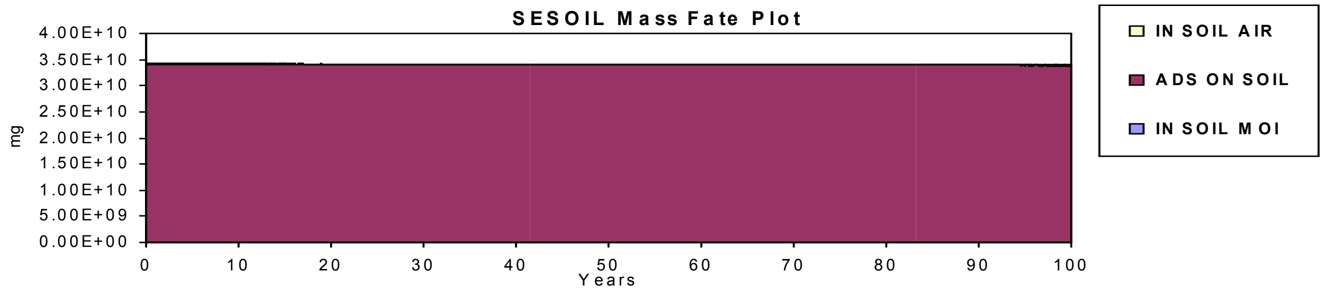
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI

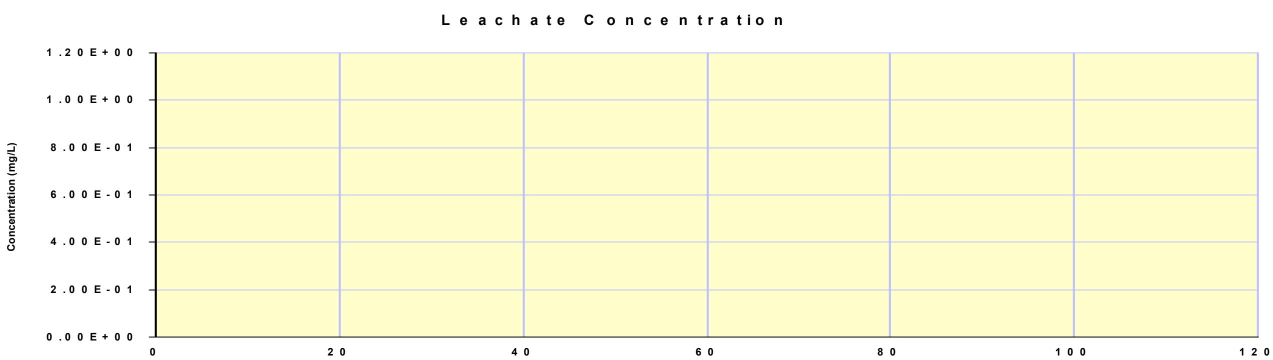
Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825MN.APL

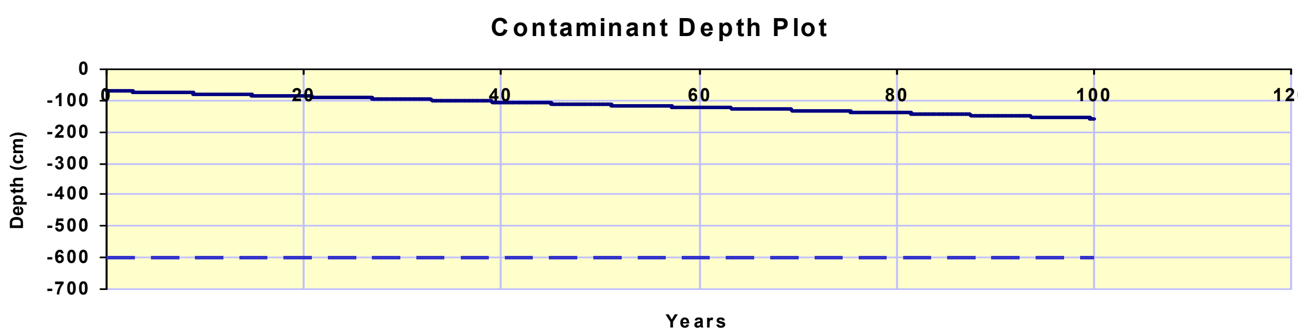
Starting Depth: 69.41 **cm**

Ending Depth: 156.80 **cm**

Total Depth: 600.00 **cm**







SESOIL Profile and Load Report

Layer No.	Number of Sub-Layers	Thickness (cm)	Thickness (feet)	Intrinsic Permeability (cm 2)	Organic Carbon Content (percent)	Adsorption Coefficient (µg/g / µg/mL)	Cation Exchange Capacity (mEq / 100 g soil)	Freundlich Exponent (unitless)	Solid Phase Degradation Rate (1/day)	Liquid Phase Degradation Rate (1/day)	Soil pH (pH)
1	10	198.0	6.50	1.00E-09	0.20	52.00	0.00	1.00	0.00E+00	0.00E+00	7.00
2	10	402.0	13.19	1.00E-09	0.20	52.00	0.00	1.00	0.00E+00	0.00E+00	7.00
3		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00
4		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00

Soil Parameters

Bulk Density (g/cm3)	1.60
Effective Porosity (fraction)	0.30
Soil Pore Disconnectedness	7.00

Application Parameters

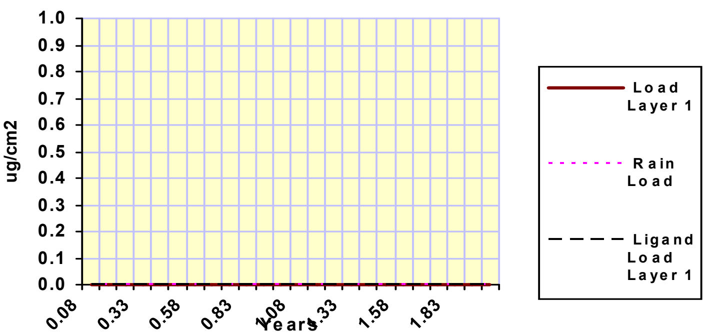
Area	cm 2	3.72E+5
	ft 2	400.42
Latitude	degrees	38.0
Spill Index		1

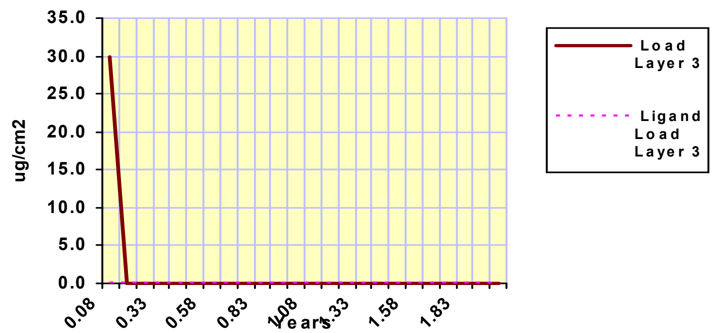
Chemical Parameters

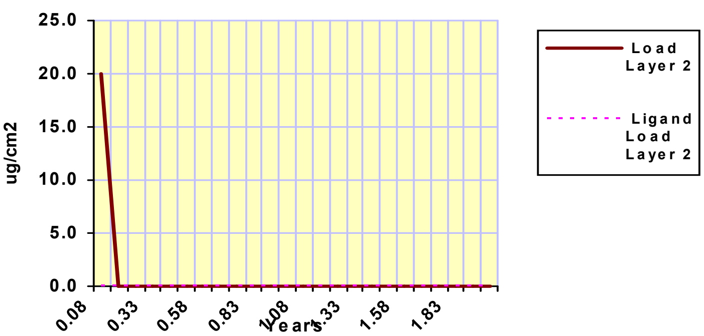
Water Solubility (µg/mL)	6.00E-2	**Moles Ligand / Moles Chemical**	0.00
Henry's Law (M^3atm/mol)	2.44E-2	**Ligand Molecular Weight** (g/mol)	0.00
K_{oc} (µg/g)/(µg/mL)	0.00	**Base Hydrolysis Rate** (L/mol/day)	0.00
Valance (g/mole)	0.00	**Ligand Dissociation Constant**	0.00
Air Diffusion Coefficient (cm^2/sec)	3.07E-2	**Neutral Hydrolysis Rate** (L/mol/day)	0.00
Water Diffusion Coefficient (cm^2/sec)	6.30E-6	**Acid Hydrolysis Rate** (L/mol/day)	0.00
Molecular Weight (g/mol)	201.00		

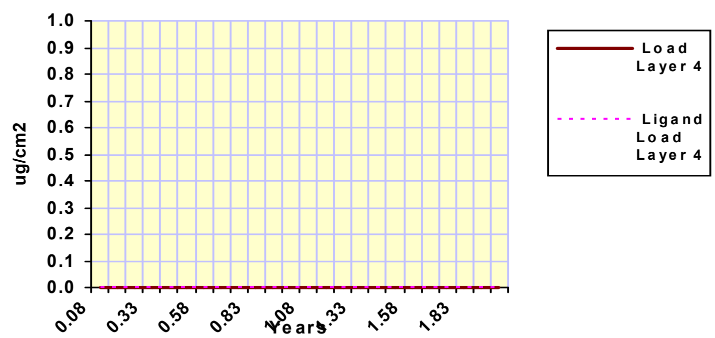
Output File: 4825 GR Mercury
C:\SEVIEW63\4825HG.OUT
Chemical File: Mercury, Inorganic Salts (Kd)
C:\SEVIEW63\MERCURYI.CHM
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI
Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825HG.APL

Sublayer Loads	1	2	3	4	5	6	7	8	9	10
Layer 1 (ug/g)			5.20E-01							
Layer 2 (ug/g)										
Layer 3 (ug/g)										
Layer 4 (ug/g)										





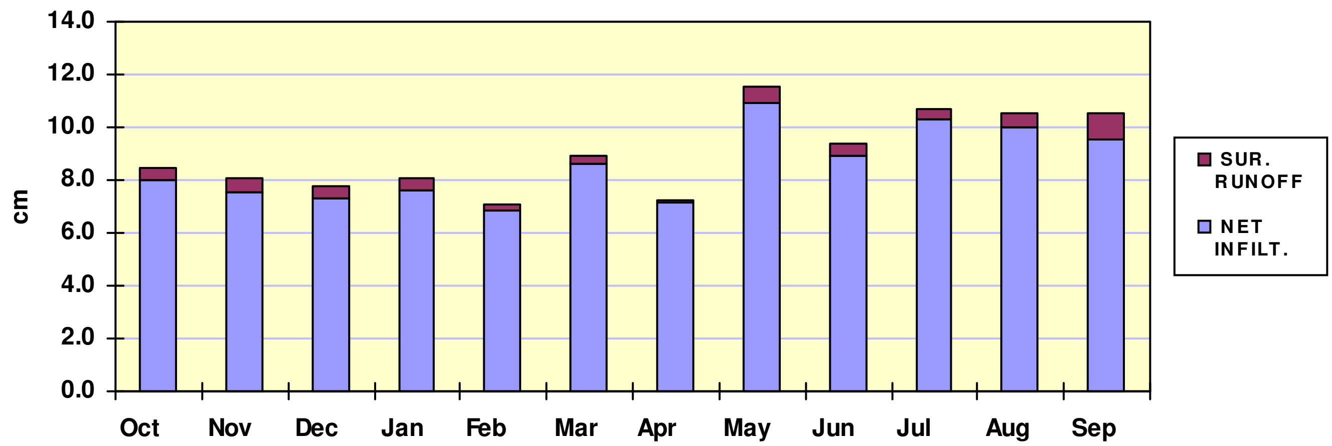


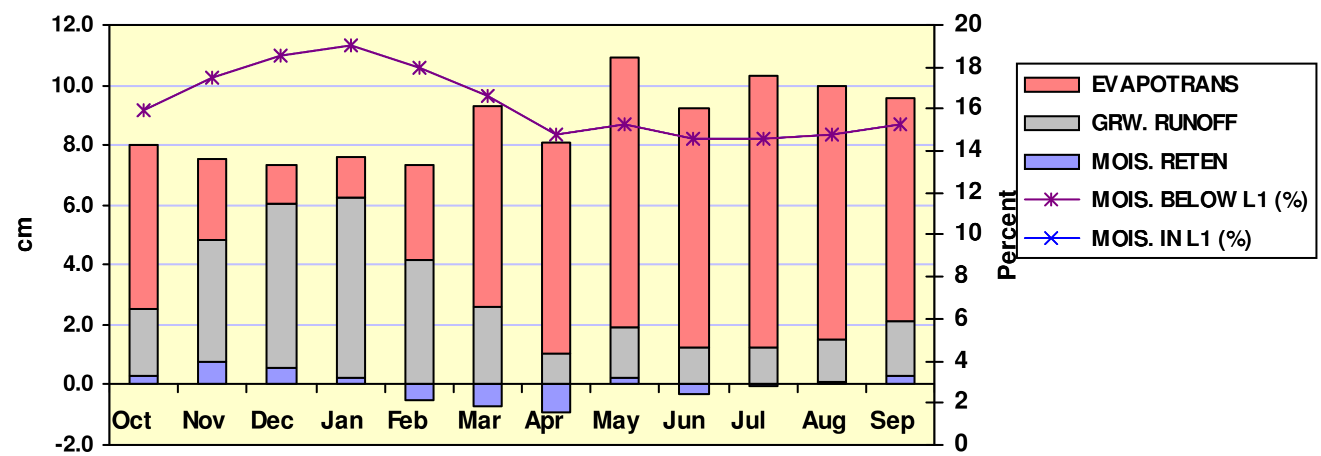


SESOIL Hydrologic Cycle Report

Scenario Description: 4825 GR Mercury

SESOIL Output File: C:\SEVIEW63\4825HG.OUT





	Surface Water Runoff		Net Infiltration		Evapotranspiration		Soil Moisture Retention		Groundwater Runoff (Recharge)		Soil Moisture	
											Layer 1	Below Layer 1
Units	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	Percent	Percent
October	0.47	0.19	8.01	3.15	5.48	2.16	0.32	0.13	2.22	0.87	15.94	15.94
November	0.49	0.19	7.56	2.98	2.75	1.08	0.77	0.30	4.04	1.59	17.47	17.47
December	0.44	0.17	7.33	2.89	1.31	0.52	0.56	0.22	5.47	2.15	18.58	18.58
January	0.49	0.19	7.58	2.98	1.35	0.53	0.23	0.09	6.00	2.36	19.03	19.03
February	0.25	0.10	6.82	2.69	3.14	1.24	-0.51	-0.20	4.19	1.65	18.01	18.01
March	0.28	0.11	8.64	3.40	6.71	2.64	-0.69	-0.27	2.62	1.03	16.63	16.63
April	0.14	0.06	7.12	2.80	7.03	2.77	-0.95	-0.37	1.04	0.41	14.74	14.74
May	0.58	0.23	10.94	4.31	9.01	3.55	0.26	0.10	1.67	0.66	15.25	15.25
June	0.49	0.19	8.91	3.51	8.01	3.15	-0.33	-0.13	1.23	0.48	14.59	14.59
July	0.41	0.16	10.30	4.06	9.05	3.56	-0.02	-0.01	1.27	0.50	14.56	14.56
August	0.52	0.20	10.00	3.94	8.50	3.35	0.09	0.04	1.41	0.56	14.74	14.74
September	0.97	0.38	9.53	3.75	7.40	2.91	0.29	0.11	1.85	0.73	15.31	15.31
Total	5.53	2.18	102.74	40.45	69.74	27.46	0.00	0.00	32.99	12.99		

SESOIL Pollutant Cycle Report

Scenario Description: 4825 GR Mercury

SESOIL Output File: C:\SEVIEW63\4825HG.OUT

SESOIL Process	Pollutant Mass (µg)	Percent of Total
Volatilized	5.963E+06	97.25
In Soil Air	2.856E+02	0.00
Sur. Runoff	0.000E+00	0.00
In Washld	0.000E+00	0.00
Ads On Soil	1.618E+05	2.64
Hydrol Soil	0.000E+00	0.00
Degrad Soil	0.000E+00	0.00
Pure Phase	0.000E+00	0.00
Complexed	0.000E+00	0.00
Immobile CEC	0.000E+00	0.00
Hydrol CEC	0.000E+00	0.00
In Soil Moi	2.978E+02	0.00
Hydrol Mois	0.000E+00	0.00
Degrad Mois	0.000E+00	0.00
Other Trans	0.000E+00	0.00
Other Sinks	0.000E+00	0.00
Gwr. Runoff	0.000E+00	0.00
Total Output	6.125E+06	99.89
Total Input	6.132E+06	
Input - Output	6.490E+03	

Maximum leachate concentration: 0.000E+00 **mg/l**

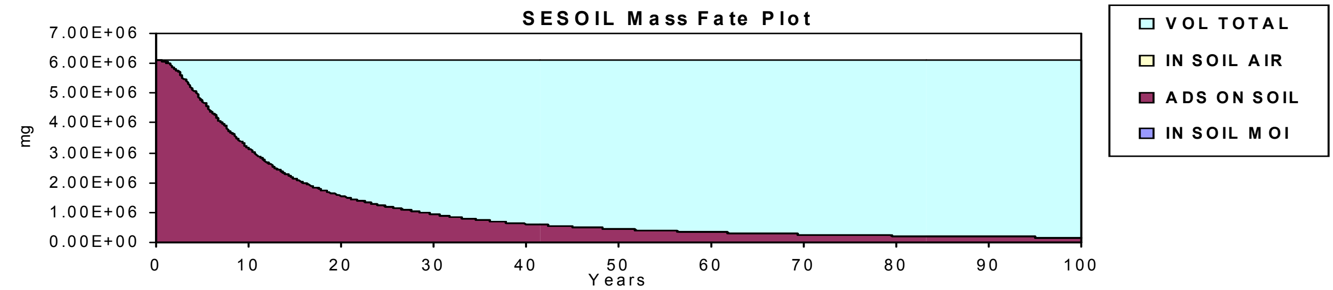
Climate File: WARSAW 2 NW
C:\SEVIEW63\WARSAW2N.CLM

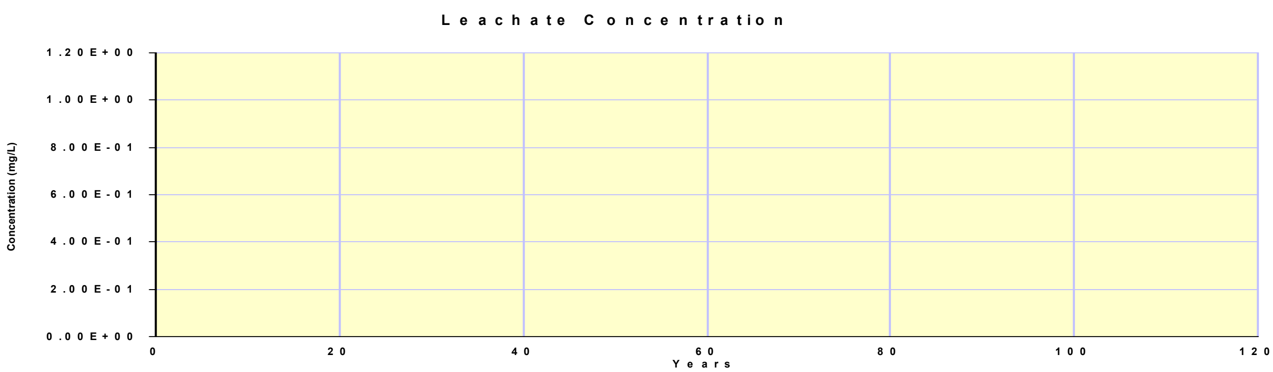
Chemical File: Mercury, Inorganic Salts (Kd)
C:\SEVIEW63\MERCURYI.CHM

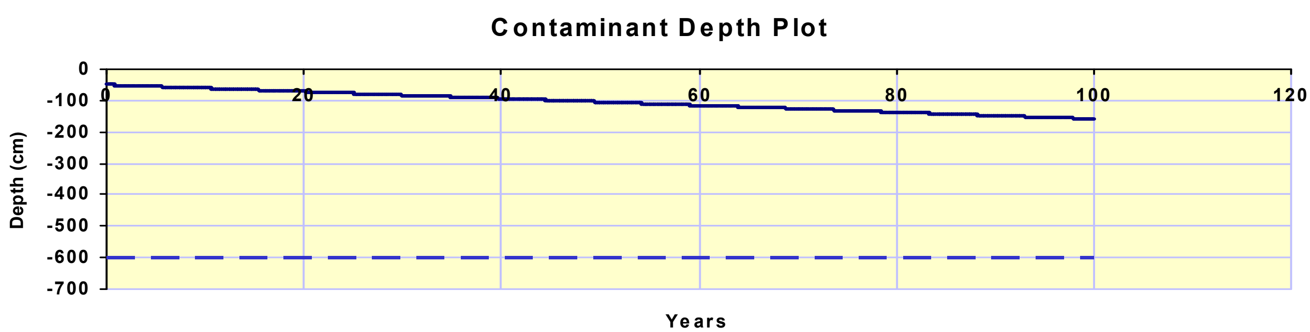
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI

Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825HG.APL

Starting Depth: 49.62 **cm**
Ending Depth: 158.80 **cm**
Total Depth: 600.00 **cm**







SESOIL Profile and Load Report

Layer No.	Number of Sub-Layers	Thickness		Intrinsic Permeability	Organic Carbon Content	Adsorption Coefficient	Cation Exchange Capacity	Freundlich Exponent	Solid Phase Degradation Rate	Liquid Phase Degradation Rate	Soil pH
		cm	feet	cm^2	percent	µg/g / µg/mL	mEq / 100 g soil	unitless	1/day	1/day	pH
1	10	198.0	6.50	1.00E-09	0.20	65.00	0.00	1.00	0.00E+00	0.00E+00	7.00
2	10	402.0	13.19	1.00E-09	0.20	65.00	0.00	1.00	0.00E+00	0.00E+00	7.00
3		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00
4		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00

Soil Parameters

Bulk Density (g/cm^3)	1.60
Effective Porosity (fraction)	0.30
Soil Pore Disconnectedness	7.00

Application Parameters

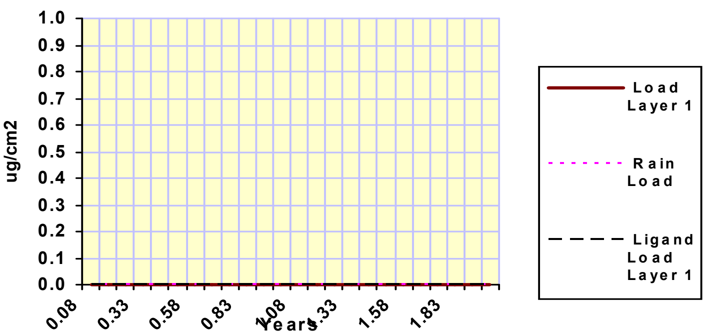
Area	cm^2	3.72E+5
	ft^2	400.42
Latitude	degrees	38.0
Spill Index		1

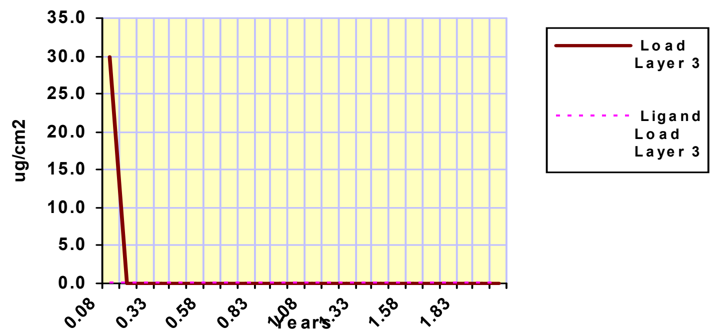
Chemical Parameters

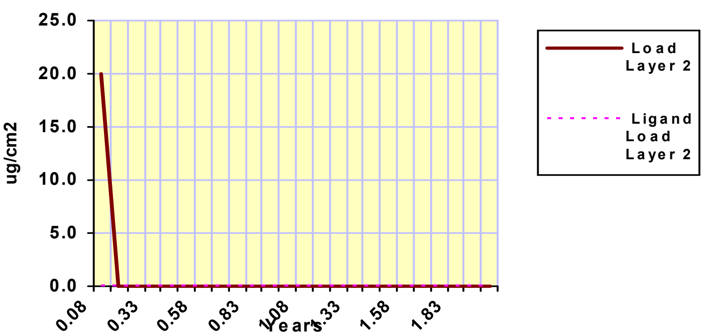
Water Solubility (µg/mL)	4.22E+5	**Moles Ligand / Moles Chemical**	0.00
Henry's Law (M^3atm/mol)	2.44E-2	**Ligand Molecular Weight** (g/mol)	0.00
K_{oc} (µg/g)/(µg/mL)	0.00	**Base Hydrolysis Rate** (L/mol/day)	0.00
Valance (g/mole)	0.00	**Ligand Dissociation Constant**	0.00
Air Diffusion Coefficient (cm^2/sec)	.000	**Neutral Hydrolysis Rate** (L/mol/day)	0.00
Water Diffusion Coefficient (cm^2/sec)	.000	**Acid Hydrolysis Rate** (L/mol/day)	0.00
Molecular Weight (g/mol)	58.70		

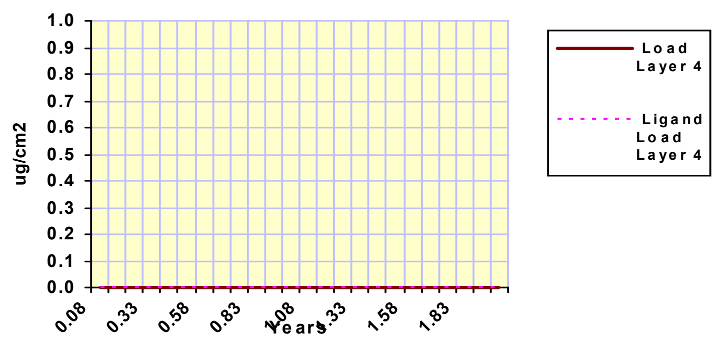
Output File: 4825 GR Nickel
C:\SEVIEW63\4825NI1.OUT
Chemical File: Nickel Soluble Salts (Kd)
C:\SEVIEW63\NICKEL.CHM
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI
Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825NI.APL

Sublayer Loads	1	2	3	4	5	6	7	8	9	10
Layer 1 (ug/g)				1.35E+02						
Layer 2 (ug/g)										
Layer 3 (ug/g)										
Layer 4 (ug/g)										





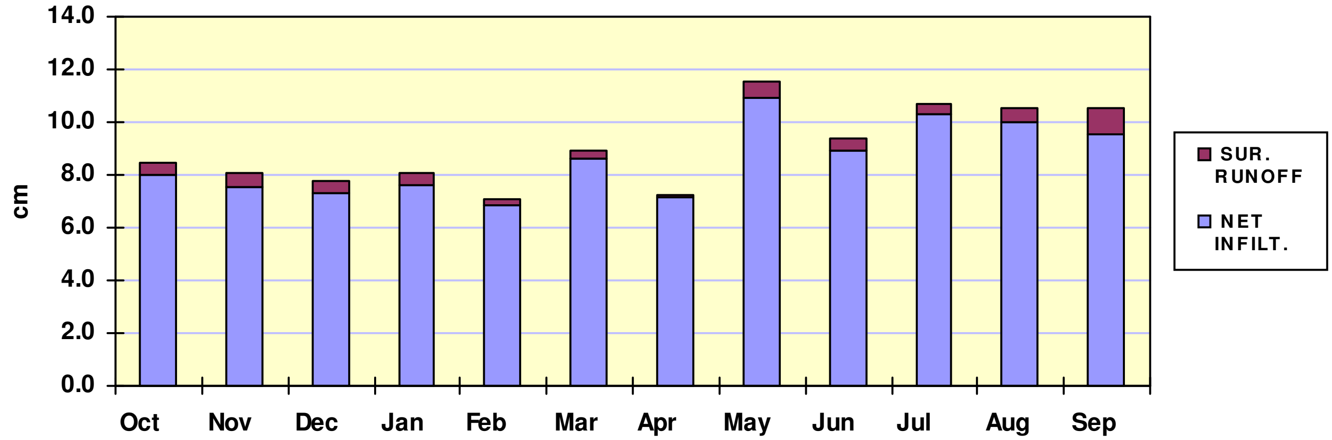


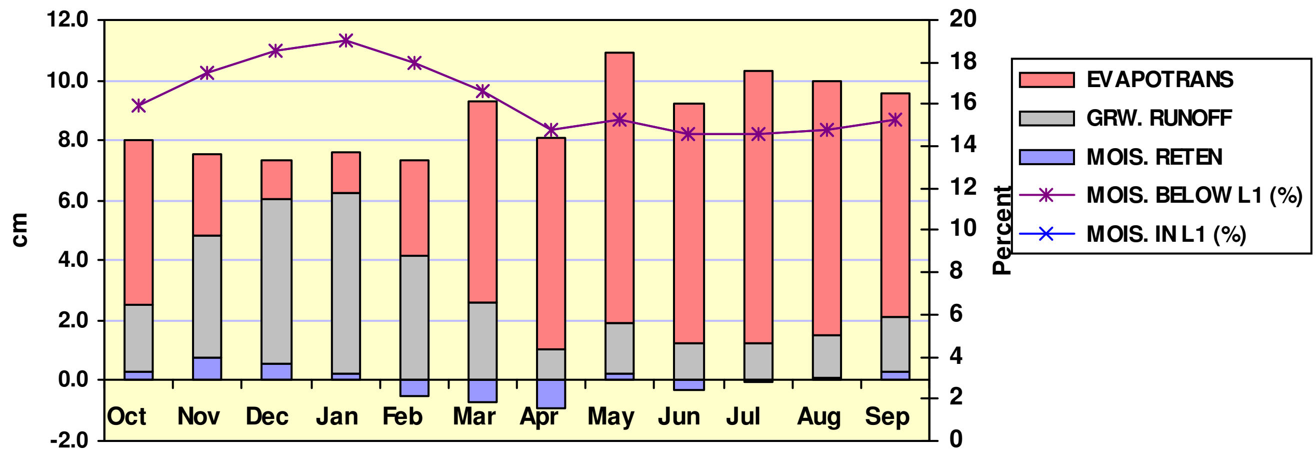


SESOIL Hydrologic Cycle Report

Scenario Description: 4825 GR Nickel

SESOIL Output File: C:\SEVIEW63\4825NI1.OUT





	Surface Water Runoff		Net Infiltration		Evapotranspiration		Soil Moisture Retention		Groundwater Runoff (Recharge)		Soil Moisture	
											Layer 1	Below Layer 1
Units	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	Percent	Percent
October	0.47	0.19	8.01	3.15	5.48	2.16	0.32	0.13	2.22	0.87	15.94	15.94
November	0.49	0.19	7.56	2.98	2.75	1.08	0.77	0.30	4.04	1.59	17.47	17.47
December	0.44	0.17	7.33	2.89	1.31	0.52	0.56	0.22	5.47	2.15	18.58	18.58
January	0.49	0.19	7.58	2.98	1.35	0.53	0.23	0.09	6.00	2.36	19.03	19.03
February	0.25	0.10	6.82	2.69	3.14	1.24	-0.51	-0.20	4.19	1.65	18.01	18.01
March	0.28	0.11	8.64	3.40	6.71	2.64	-0.69	-0.27	2.62	1.03	16.63	16.63
April	0.14	0.06	7.12	2.80	7.03	2.77	-0.95	-0.37	1.04	0.41	14.74	14.74
May	0.58	0.23	10.94	4.31	9.01	3.55	0.26	0.10	1.67	0.66	15.25	15.25
June	0.49	0.19	8.91	3.51	8.01	3.15	-0.33	-0.13	1.23	0.48	14.59	14.59
July	0.41	0.16	10.30	4.06	9.05	3.56	-0.02	-0.01	1.27	0.50	14.56	14.56
August	0.52	0.20	10.00	3.94	8.50	3.35	0.09	0.04	1.41	0.56	14.74	14.74
September	0.97	0.38	9.53	3.75	7.40	2.91	0.29	0.11	1.85	0.73	15.31	15.31
Total	5.53	2.18	102.74	40.45	69.74	27.46	0.00	0.00	32.99	12.99		

SESOIL Pollutant Cycle Report

Scenario Description: 4825 GR Nickel

SESOIL Output File: C:\SEVIEW63\4825NI1.OUT

SESOIL Process	Pollutant Mass (µg)	Percent of Total
Volatilized	0.000E+00	0.00
In Soil Air	2.229E+06	0.14
Sur. Runoff	0.000E+00	0.00
In Washld	0.000E+00	0.00
Ads On Soil	1.578E+09	99.15
Hydrol Soil	0.000E+00	0.00
Degrad Soil	0.000E+00	0.00
Pure Phase	0.000E+00	0.00
Complexed	0.000E+00	0.00
Immobile CEC	0.000E+00	0.00
Hydrol CEC	0.000E+00	0.00
In Soil Moi	2.324E+06	0.15
Hydrol Mois	0.000E+00	0.00
Degrad Mois	0.000E+00	0.00
Other Trans	0.000E+00	0.00
Other Sinks	0.000E+00	0.00
Gwr. Runoff	0.000E+00	0.00
Total Output	1.583E+09	99.44
Total Input	1.592E+09	
Input - Output	8.936E+06	

Maximum leachate concentration: 0.000E+00 **mg/l**

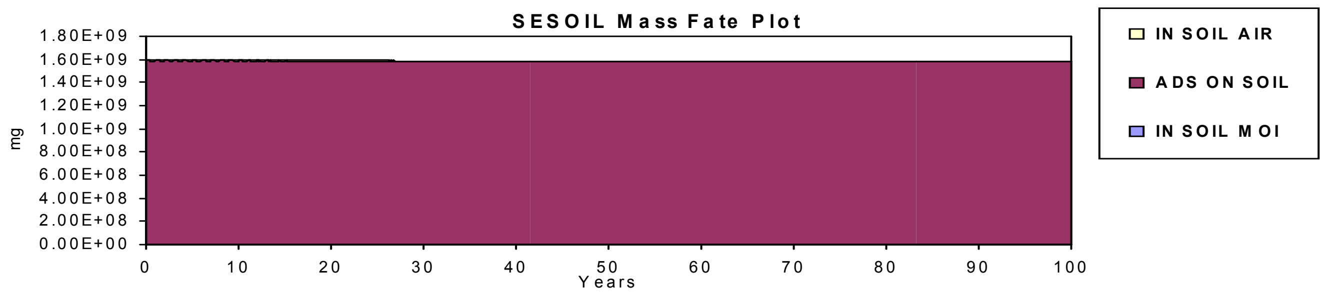
Climate File: WARSAW 2 NW
C:\SEVIEW63\WARSAW2N.CLM

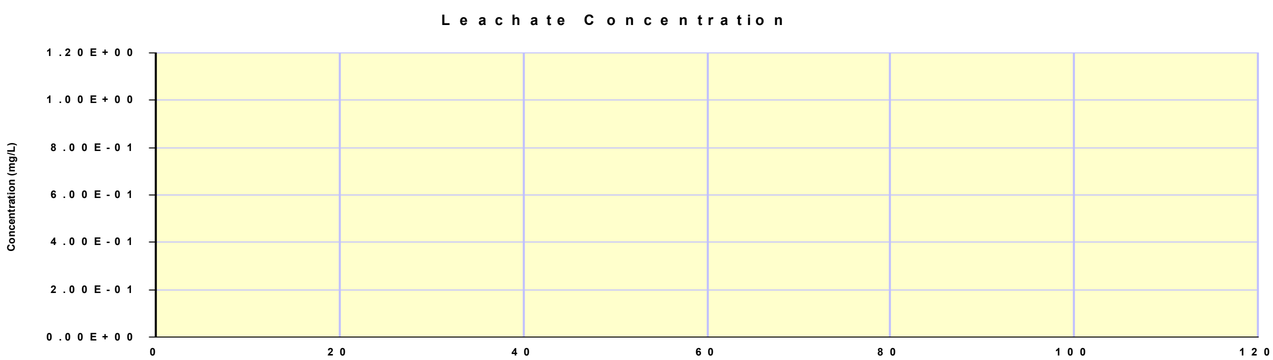
Chemical File: Nickel Soluble Salts (Kd)
C:\SEVIEW63\NICKEL.CHM

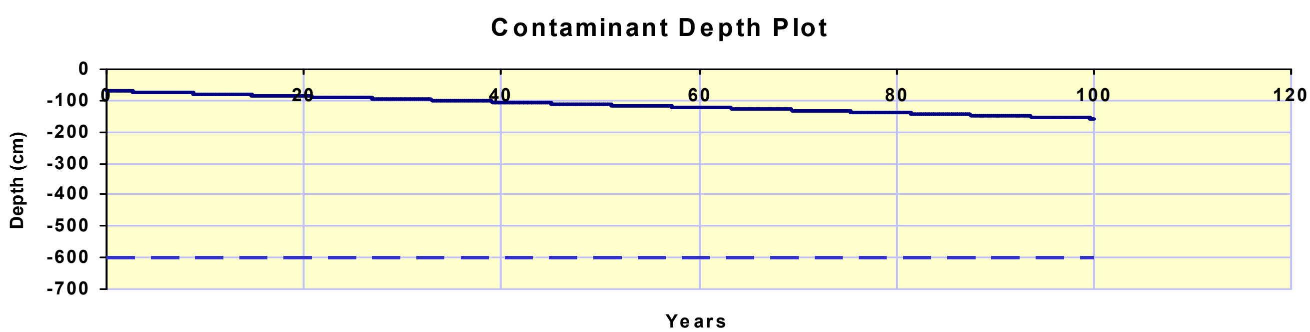
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI

Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825NI.APL

Starting Depth: 69.41 **cm**
Ending Depth: 156.80 **cm**
Total Depth: 600.00 **cm**







SESOIL Profile and Load Report

Layer No.	Number of Sub-Layers	Thickness		Intrinsic Permeability	Organic Carbon Content	Adsorption Coefficient	Cation Exchange Capacity	Freundlich Exponent	Solid Phase Degradation Rate	Liquid Phase Degradation Rate	Soil pH
		cm	feet	cm^2	percent	µg/g / µg/mL	mEq / 100 g soil	unitless	1/day	1/day	pH
1	10	198.0	6.50	1.00E-09	0.20	5.00	0.00	1.00	0.00E+00	0.00E+00	7.00
2	10	402.0	13.19	1.00E-09	0.20	5.00	0.00	1.00	0.00E+00	0.00E+00	7.00
3		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00
4		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00

Soil Parameters

Bulk Density (g/cm^3)	1.60
Effective Porosity (fraction)	0.30
Soil Pore Disconnectedness	7.00

Application Parameters

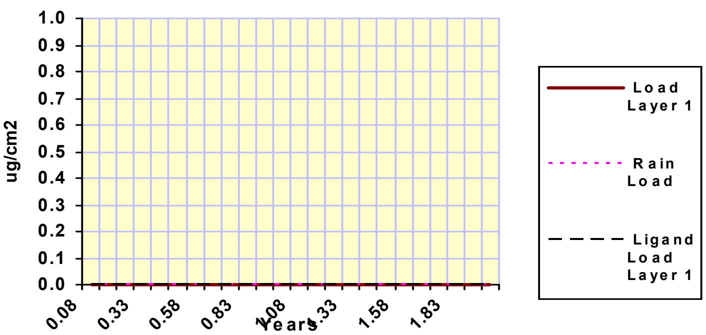
Area	cm^2	3.72E+5
	ft^2	400.42
Latitude	degrees	38.0
Spill Index		1

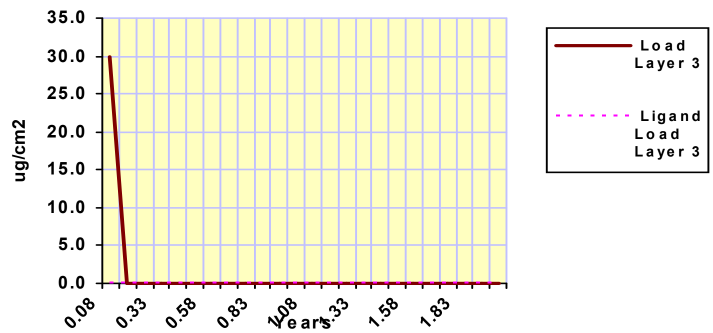
Chemical Parameters

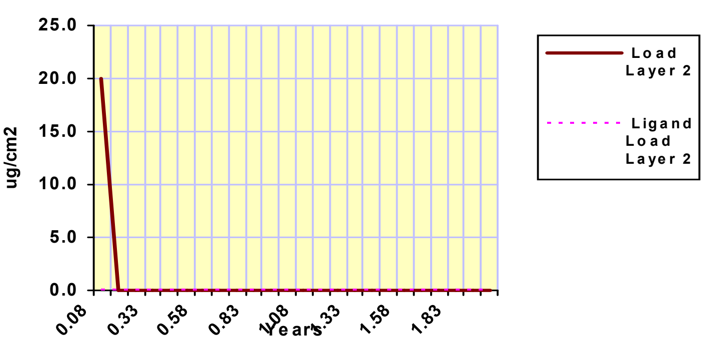
Water Solubility	(µg/mL)	8.14E+4	**Moles Ligand / Moles Chemical**	0.00
Henry's Law	(M^3atm/mol)	9.73E-3	**Ligand Molecular Weight** (g/mol)	0.00
K_{oc}	(µg/g)/(µg/mL)	0.00	**Base Hydrolysis Rate** (L/mol/day)	0.00
Valance	(g/mole)	0.00	**Ligand Dissociation Constant**	0.00
Air Diffusion Coefficient	(cm^2/sec)	.000	**Neutral Hydrolysis Rate** (L/mol/day)	0.00
Water Diffusion Coefficient	(cm^2/sec)	.000	**Acid Hydrolysis Rate** (L/mol/day)	0.00
Molecular Weight	(g/mol)	81.00		

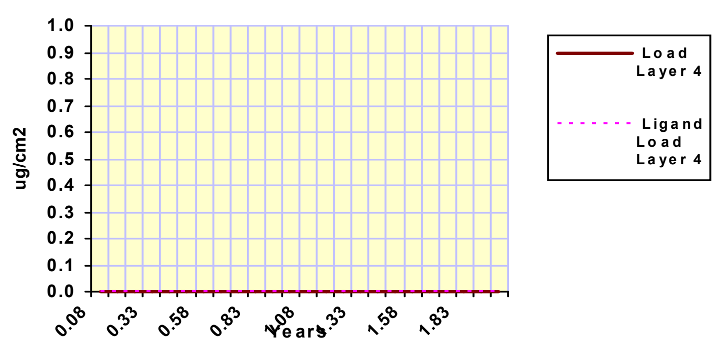
Output File: 4825 GR Selenium
C:\SEVIEW63\4825SE.OUT
Chemical File: Selenium (Kd)
C:\SEVIEW63\SELENIUM.CHM
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI
Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825SE.APL

Sublayer Loads	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Layer 1 (ug/g)									3.30E+00	
Layer 2 (ug/g)										
Layer 3 (ug/g)										
Layer 4 (ug/g)										









SESOIL Pollutant Cycle Report

Scenario Description: 4825 GR Selenium

SESOIL Output File: C:\SEVIEW63\4825SE.OUT

SESOIL Process	Pollutant Mass (µg)	Percent of Total
Volatilized	0.000E+00	0.00
In Soil Air	5.534E+04	0.14
Sur. Runoff	0.000E+00	0.00
In Washld	0.000E+00	0.00
Ads On Soil	7.560E+06	19.43
Hydrol Soil	0.000E+00	0.00
Degrad Soil	0.000E+00	0.00
Pure Phase	0.000E+00	0.00
Complexed	0.000E+00	0.00
Immobile CEC	0.000E+00	0.00
Hydrol CEC	0.000E+00	0.00
In Soil Moi	1.447E+05	0.37
Hydrol Mois	0.000E+00	0.00
Degrad Mois	0.000E+00	0.00
Other Trans	0.000E+00	0.00
Other Sinks	0.000E+00	0.00
Gwr. Runoff	3.093E+07	79.51
Total Output	3.869E+07	99.46
Total Input	3.891E+07	
Input - Output	2.101E+05	

Maximum leachate concentration: 8.039E-02 **mg/l**

Climate File: WARSAW 2 NW

C:\SEVIEW63\WARSAW2N.CLM

Chemical File: Selenium (Kd)

C:\SEVIEW63\SELENIUM.CHM

Soil File: Silty Clay

C:\SEVIEW63\4825.SOI

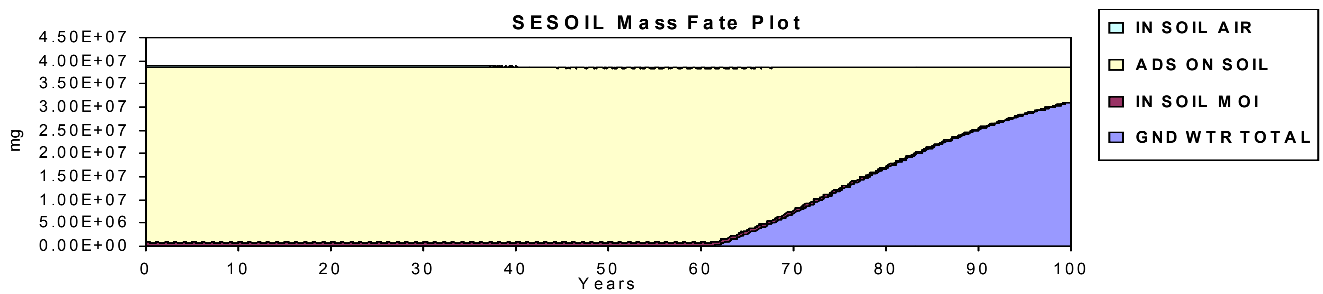
Application File: 4825 Glenbrook Road

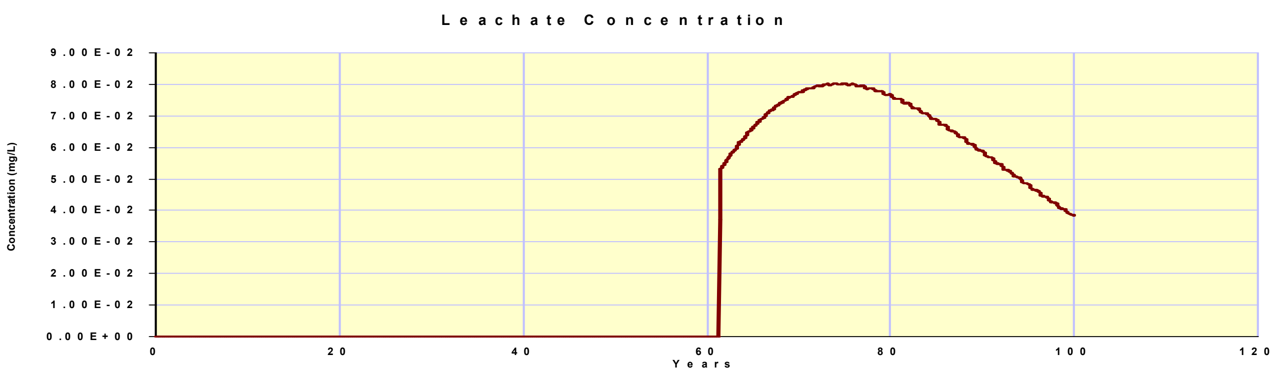
C:\SEVIEW63\4825SE.APL

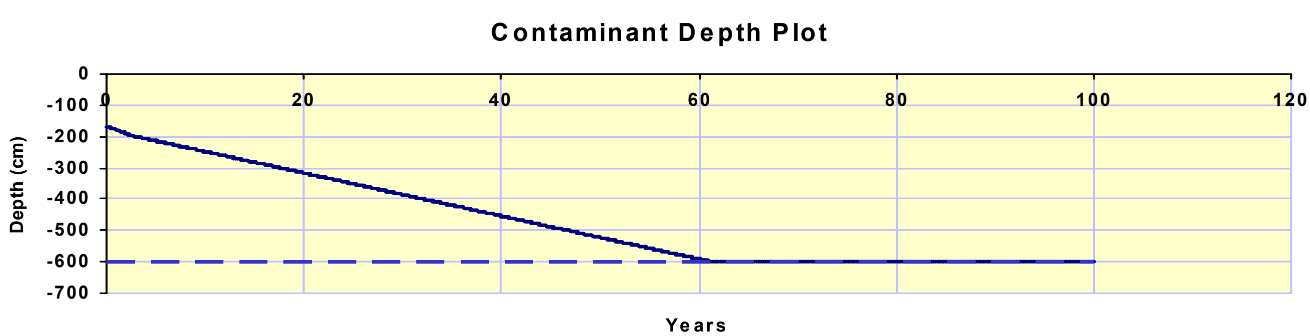
Starting Depth: 169.30 **cm**

Ending Depth: 600.50 **cm**

Total Depth: 600.00 **cm**



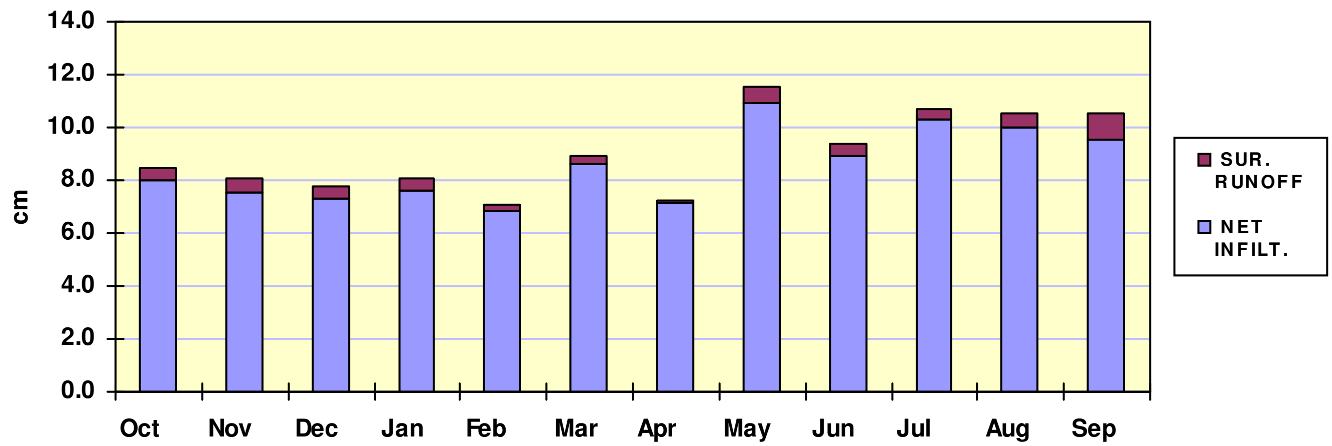


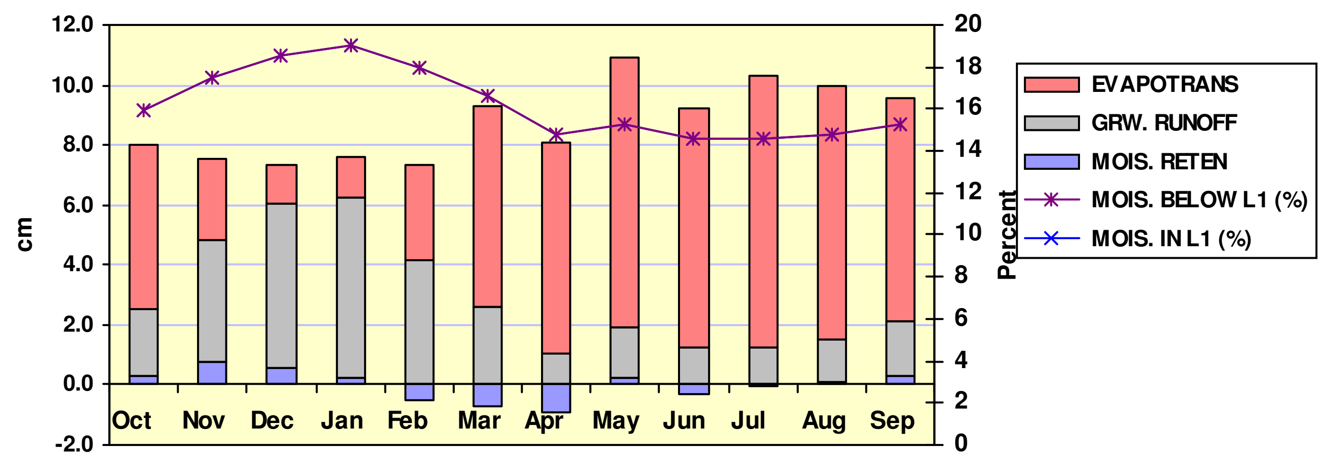


SESOIL Hydrologic Cycle Report

Scenario Description: 4825 GR Selenium

SESOIL Output File: C:\SEVIEW63\4825SE.OUT





	Surface Water Runoff		Net Infiltration		Evapotranspiration		Soil Moisture Retention		Groundwater Runoff (Recharge)		Soil Moisture	
											Layer 1	Below Layer 1
Units	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	Percent	Percent
October	0.47	0.19	8.01	3.15	5.48	2.16	0.32	0.13	2.22	0.87	15.94	15.94
November	0.49	0.19	7.56	2.98	2.75	1.08	0.77	0.30	4.04	1.59	17.47	17.47
December	0.44	0.17	7.33	2.89	1.31	0.52	0.56	0.22	5.47	2.15	18.58	18.58
January	0.49	0.19	7.58	2.98	1.35	0.53	0.23	0.09	6.00	2.36	19.03	19.03
February	0.25	0.10	6.82	2.69	3.14	1.24	-0.51	-0.20	4.19	1.65	18.01	18.01
March	0.28	0.11	8.64	3.40	6.71	2.64	-0.69	-0.27	2.62	1.03	16.63	16.63
April	0.14	0.06	7.12	2.80	7.03	2.77	-0.95	-0.37	1.04	0.41	14.74	14.74
May	0.58	0.23	10.94	4.31	9.01	3.55	0.26	0.10	1.67	0.66	15.25	15.25
June	0.49	0.19	8.91	3.51	8.01	3.15	-0.33	-0.13	1.23	0.48	14.59	14.59
July	0.41	0.16	10.30	4.06	9.05	3.56	-0.02	-0.01	1.27	0.50	14.56	14.56
August	0.52	0.20	10.00	3.94	8.50	3.35	0.09	0.04	1.41	0.56	14.74	14.74
September	0.97	0.38	9.53	3.75	7.40	2.91	0.29	0.11	1.85	0.73	15.31	15.31
Total	5.53	2.18	102.74	40.45	69.74	27.46	0.00	0.00	32.99	12.99		

SESOIL Profile and Load Report

Layer No.	Number of Sub-Layers	Thickness		Intrinsic Permeability	Organic Carbon Content	Adsorption Coefficient	Cation Exchange Capacity	Freundlich Exponent	Solid Phase Degradation Rate	Liquid Phase Degradation Rate	Soil pH
		cm	feet	cm 2	percent	µg/g / µg/mL	mEq / 100 g soil	unitless	1/day	1/day	pH
1	10	198.0	6.50	1.00E-09	0.20	8.30	0.00	1.00	0.00E+00	0.00E+00	7.00
2	10	402.0	13.19	1.00E-09	0.20	8.30	0.00	1.00	0.00E+00	0.00E+00	7.00
3		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00
4		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00

Soil Parameters

Bulk Density (g/cm^3)	1.60
Effective Porosity (fraction)	0.30
Soil Pore Disconnectedness	7.00

Application Parameters

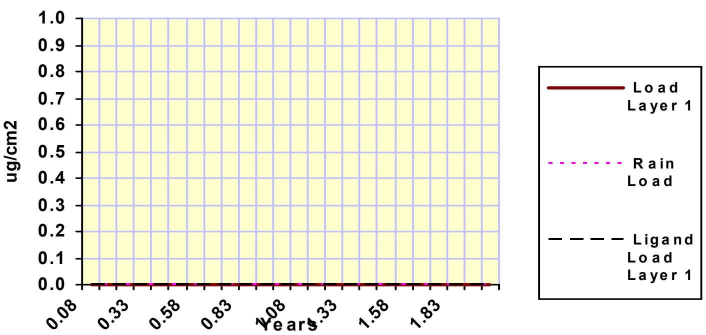
Area	cm ^{2}	3.72E+5
	ft ^{2}	400.42
Latitude	degrees	38.0
Spill Index		1

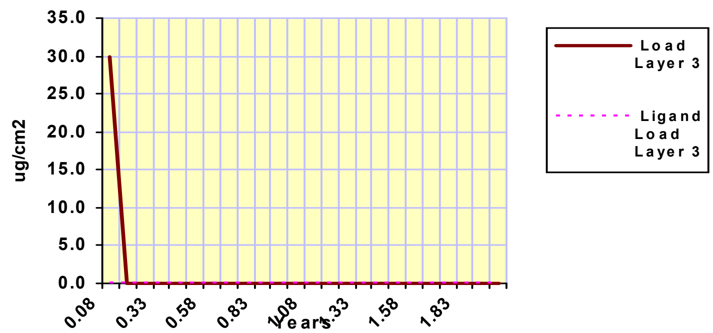
Chemical Parameters

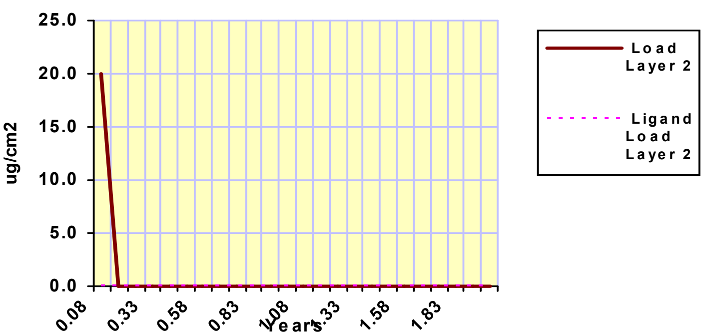
Water Solubility (µg/mL)	7.05E+4	**Moles Ligand / Moles Chemical**	0.00
Henry's Law (M^{3}atm/mol)	2.44E-2	**Ligand Molecular Weight** (g/mol)	0.00
K_{oc} (µg/g)/(µg/mL)	0.00	**Base Hydrolysis Rate** (L/mol/day)	0.00
Valance (g/mole)	0.00	**Ligand Dissociation Constant**	0.00
Air Diffusion Coefficient (cm^2/sec)	.000	**Neutral Hydrolysis Rate** (L/mol/day)	0.00
Water Diffusion Coefficient (cm^2/sec)	.000	**Acid Hydrolysis Rate** (L/mol/day)	0.00
Molecular Weight (g/mol)	108.00		

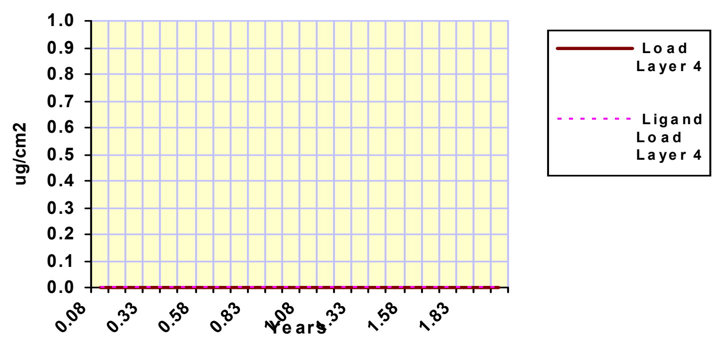
Output File: 4825 GR Silver
C:\SEVIEW63\4825AG.OUT
Chemical File: Silver (Kd)
C:\SEVIEW63\SILVERKD.CHM
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI
Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825AG.APL

Sublayer Loads	1	2	3	4	5	6	7	8	9	10
Layer 1 (ug/g)	8.60E+00									
Layer 2 (ug/g)										
Layer 3 (ug/g)										
Layer 4 (ug/g)										





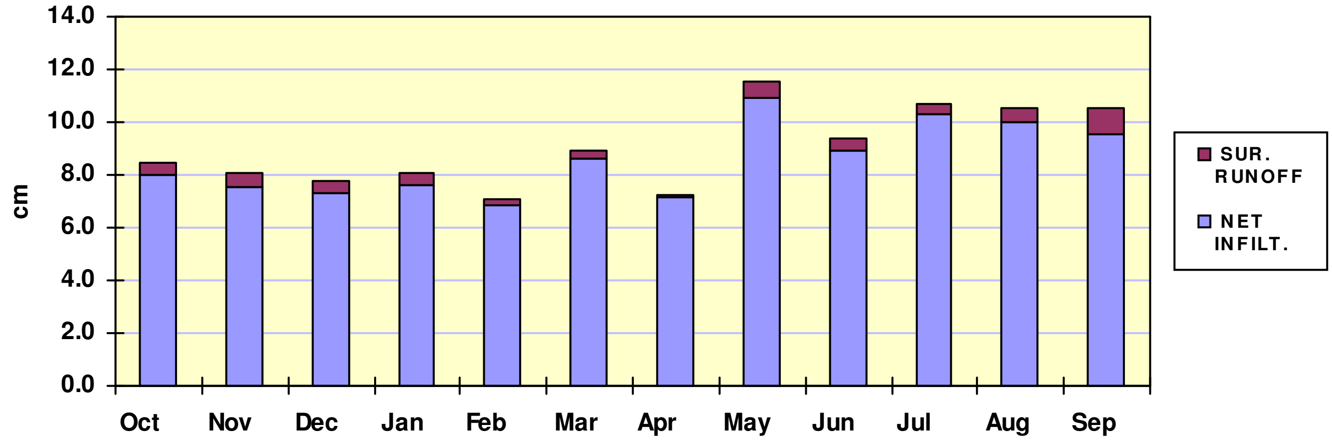


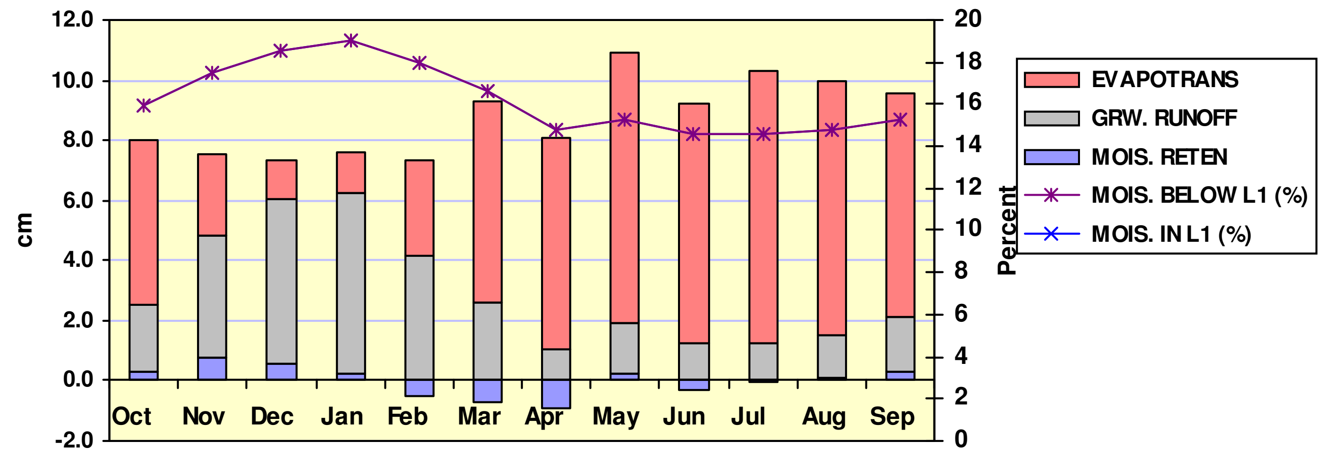


SESOIL Hydrologic Cycle Report

Scenario Description: 4825 GR Silver

SESOIL Output File: C:\SEVIEW63\4825AG.OUT





	Surface Water Runoff		Net Infiltration		Evapotranspiration		Soil Moisture Retention		Groundwater Runoff (Recharge)		Soil Moisture Layer 1	Soil Moisture Below Layer 1
Units	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	Percent	Percent
October	0.47	0.19	8.01	3.15	5.48	2.16	0.32	0.13	2.22	0.87	15.94	15.94
November	0.49	0.19	7.56	2.98	2.75	1.08	0.77	0.30	4.04	1.59	17.47	17.47
December	0.44	0.17	7.33	2.89	1.31	0.52	0.56	0.22	5.47	2.15	18.58	18.58
January	0.49	0.19	7.58	2.98	1.35	0.53	0.23	0.09	6.00	2.36	19.03	19.03
February	0.25	0.10	6.82	2.69	3.14	1.24	-0.51	-0.20	4.19	1.65	18.01	18.01
March	0.28	0.11	8.64	3.40	6.71	2.64	-0.69	-0.27	2.62	1.03	16.63	16.63
April	0.14	0.06	7.12	2.80	7.03	2.77	-0.95	-0.37	1.04	0.41	14.74	14.74
May	0.58	0.23	10.94	4.31	9.01	3.55	0.26	0.10	1.67	0.66	15.25	15.25
June	0.49	0.19	8.91	3.51	8.01	3.15	-0.33	-0.13	1.23	0.48	14.59	14.59
July	0.41	0.16	10.30	4.06	9.05	3.56	-0.02	-0.01	1.27	0.50	14.56	14.56
August	0.52	0.20	10.00	3.94	8.50	3.35	0.09	0.04	1.41	0.56	14.74	14.74
September	0.97	0.38	9.53	3.75	7.40	2.91	0.29	0.11	1.85	0.73	15.31	15.31
Total	5.53	2.18	102.74	40.45	69.74	27.46	0.00	0.00	32.99	12.99		

SESOIL Pollutant Cycle Report

Scenario Description: 4825 GR Silver

SESOIL Output File: C:\SEVIEW63\4825AG.OUT

SESOIL Process	Pollutant Mass (µg)	Percent of Total
Volatilized	0.000E+00	0.00
In Soil Air	1.087E+06	1.07
Sur. Runoff	0.000E+00	0.00
In Washld	0.000E+00	0.00
Ads On Soil	9.837E+07	97.02
Hydrol Soil	0.000E+00	0.00
Degrad Soil	0.000E+00	0.00
Pure Phase	0.000E+00	0.00
Complexed	0.000E+00	0.00
Immobile CEC	0.000E+00	0.00
Hydrol CEC	0.000E+00	0.00
In Soil Moi	1.134E+06	1.12
Hydrol Mois	0.000E+00	0.00
Degrad Mois	0.000E+00	0.00
Other Trans	0.000E+00	0.00
Other Sinks	0.000E+00	0.00
Gwr. Runoff	0.000E+00	0.00
Total Output	1.005E+08	99.21
Total Input	1.014E+08	
Input - Output	8.041E+05	

Maximum leachate concentration: 0.000E+00 **mg/l**

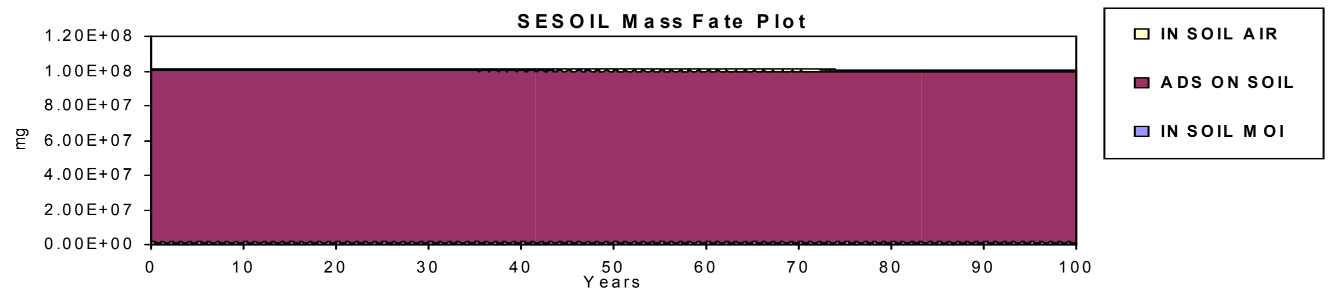
Climate File: WARSAW 2 NW
C:\SEVIEW63\WARSAW2N.CLM

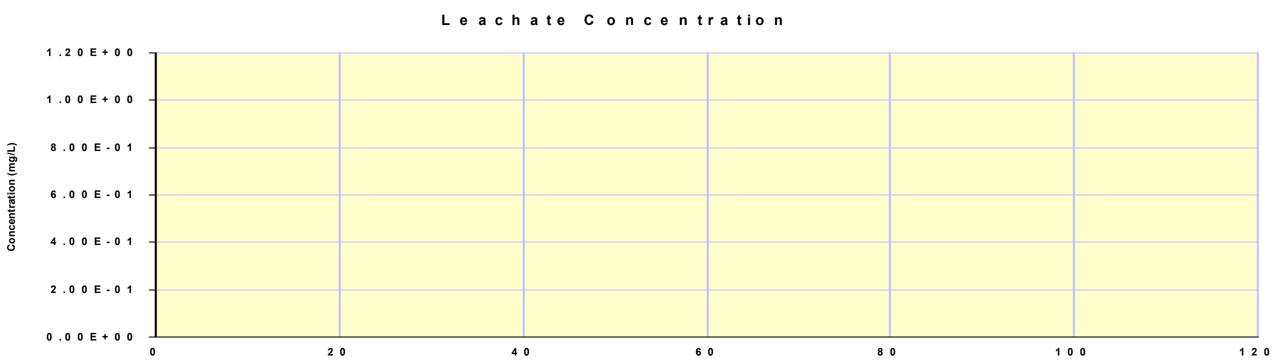
Chemical File: Silver (Kd)
C:\SEVIEW63\SILVERKD.CHM

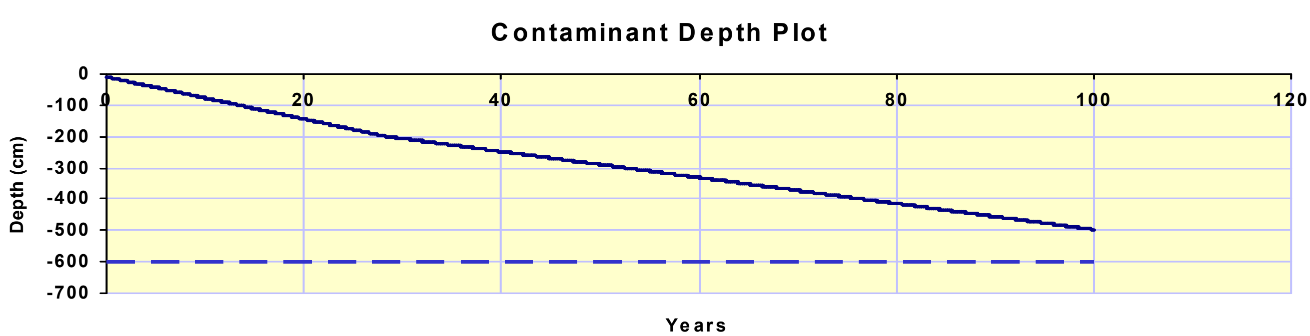
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI

Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825AG.APL

Starting Depth: 10.43 **cm**
Ending Depth: 496.80 **cm**
Total Depth: 600.00 **cm**







SESOIL Profile and Load Report

Layer No.	Number of Sub-Layers	Thickness		Intrinsic Permeability	Organic Carbon Content	Adsorption Coefficient	Cation Exchange Capacity	Freundlich Exponent	Solid Phase Degradation Rate	Liquid Phase Degradation Rate	Soil pH
		cm	feet	cm 2	percent	µg/g / µg/mL	mEq / 100 g soil	unitless	1/day	1/day	pH
1	10	198.0	6.50	1.00E-09	0.20	71.00	0.00	1.00	0.00E+00	0.00E+00	7.00
2	10	402.0	13.19	1.00E-09	0.20	71.00	0.00	1.00	0.00E+00	0.00E+00	7.00
3		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00
4		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00

Soil Parameters

Bulk Density (g/cm3)	1.60
Effective Porosity (fraction)	0.30
Soil Pore Disconnectedness	7.00

Application Parameters

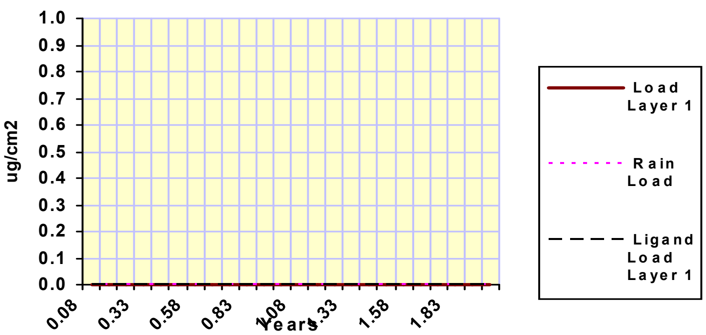
Area	cm 2	3.72E+5
	ft 2	400.42
Latitude	degrees	38.0
Spill Index		1

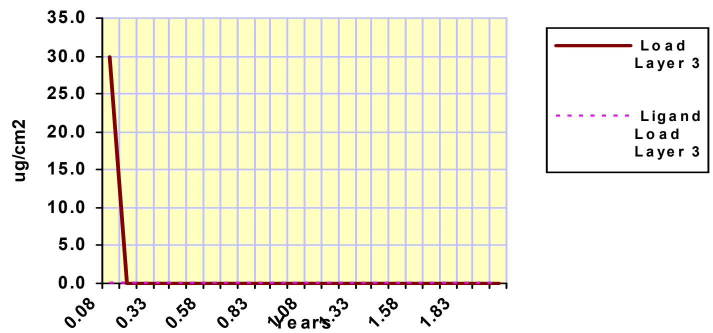
Chemical Parameters

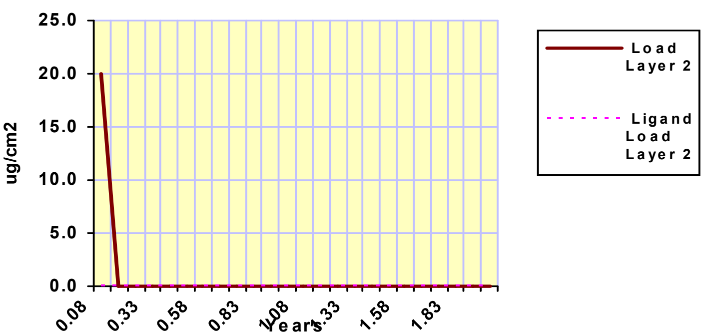
Water Solubility (µg/mL)	2.65E+4	**Moles Ligand / Moles Chemical**	0.00
Henry's Law (M3atm/mol)	2.44E-2	**Ligand Molecular Weight** (g/mol)	0.00
K_{oc} (µg/g)/(µg/mL)	0.00	**Base Hydrolysis Rate** (L/mol/day)	0.00
Valance (g/mole)	0.00	**Ligand Dissociation Constant**	0.00
Air Diffusion Coefficient (cm2/sec)	.000	**Neutral Hydrolysis Rate** (L/mol/day)	0.00
Water Diffusion Coefficient (cm2/sec)	.000	**Acid Hydrolysis Rate** (L/mol/day)	0.00
Molecular Weight (g/mol)	204.00		

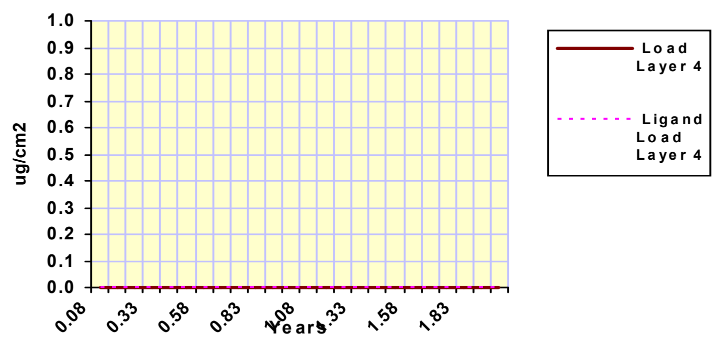
Output File: 4825 GR Thallium
C:\SEVIEW63\4825TI.OUT
Chemical File: Thallium (Soluble Salts) (Kd)
C:\SEVIEW63\THALLIUM.CHM
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI
Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825TI.APL

Sublayer Loads	1	2	3	4	5	6	7	8	9	10
Layer 1 (ug/g)	1.21E+01									
Layer 2 (ug/g)										
Layer 3 (ug/g)										
Layer 4 (ug/g)										





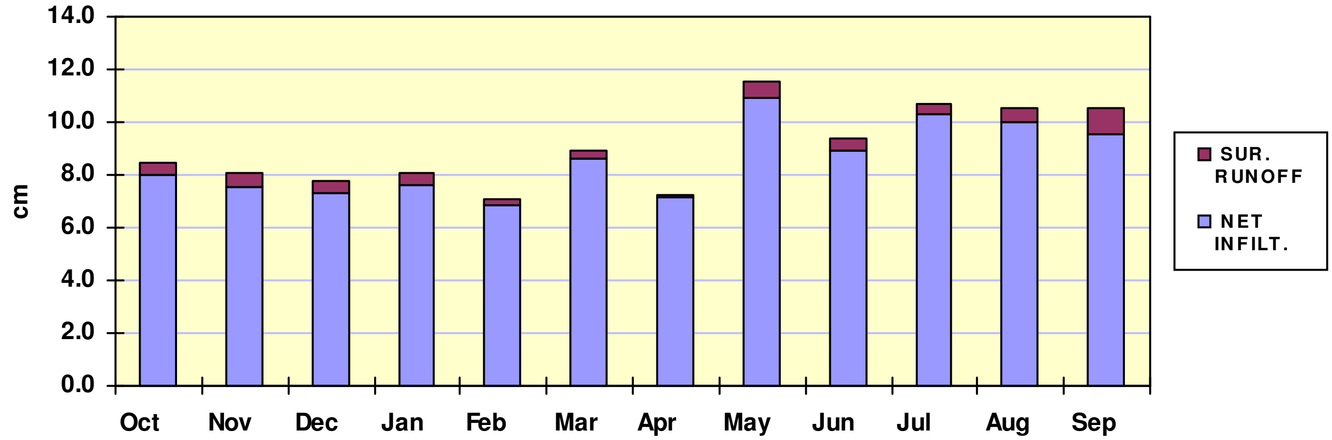


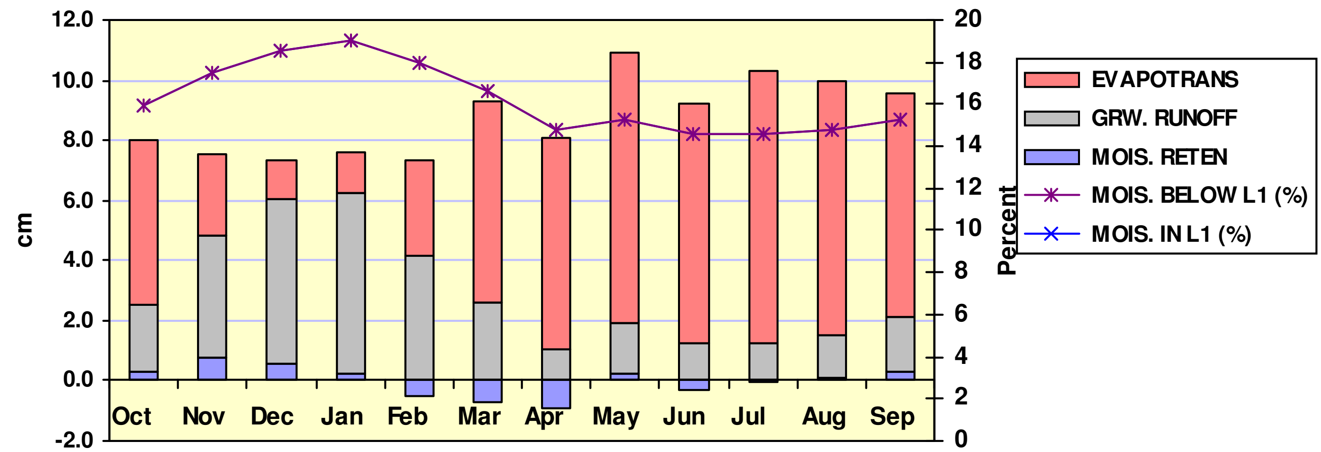


SESOIL Hydrologic Cycle Report

Scenario Description: 4825 GR Thallium

SESOIL Output File: C:\SEVIEW63\4825TI.OUT





	Surface Water Runoff		Net Infiltration		Evapotranspiration		Soil Moisture Retention		Groundwater Runoff (Recharge)		Soil Moisture Layer 1	Soil Moisture Below Layer 1
Units	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	Percent	Percent
October	0.47	0.19	8.01	3.15	5.48	2.16	0.32	0.13	2.22	0.87	15.94	15.94
November	0.49	0.19	7.56	2.98	2.75	1.08	0.77	0.30	4.04	1.59	17.47	17.47
December	0.44	0.17	7.33	2.89	1.31	0.52	0.56	0.22	5.47	2.15	18.58	18.58
January	0.49	0.19	7.58	2.98	1.35	0.53	0.23	0.09	6.00	2.36	19.03	19.03
February	0.25	0.10	6.82	2.69	3.14	1.24	-0.51	-0.20	4.19	1.65	18.01	18.01
March	0.28	0.11	8.64	3.40	6.71	2.64	-0.69	-0.27	2.62	1.03	16.63	16.63
April	0.14	0.06	7.12	2.80	7.03	2.77	-0.95	-0.37	1.04	0.41	14.74	14.74
May	0.58	0.23	10.94	4.31	9.01	3.55	0.26	0.10	1.67	0.66	15.25	15.25
June	0.49	0.19	8.91	3.51	8.01	3.15	-0.33	-0.13	1.23	0.48	14.59	14.59
July	0.41	0.16	10.30	4.06	9.05	3.56	-0.02	-0.01	1.27	0.50	14.56	14.56
August	0.52	0.20	10.00	3.94	8.50	3.35	0.09	0.04	1.41	0.56	14.74	14.74
September	0.97	0.38	9.53	3.75	7.40	2.91	0.29	0.11	1.85	0.73	15.31	15.31
Total	5.53	2.18	102.74	40.45	69.74	27.46	0.00	0.00	32.99	12.99		

SESOIL Pollutant Cycle Report

Scenario Description: 4825 GR Thallium

SESOIL Output File: C:\SEVIEW63\4825TI.OUT

SESOIL Process	Pollutant Mass (µg)	Percent of Total
Volatilized	0.000E+00	0.00
In Soil Air	1.831E+05	0.13
Sur. Runoff	0.000E+00	0.00
In Washld	0.000E+00	0.00
Ads On Soil	1.416E+08	99.24
Hydrol Soil	0.000E+00	0.00
Degrad Soil	0.000E+00	0.00
Pure Phase	0.000E+00	0.00
Complexed	0.000E+00	0.00
Immobile CEC	0.000E+00	0.00
Hydrol CEC	0.000E+00	0.00
In Soil Moi	1.908E+05	0.13
Hydrol Mois	0.000E+00	0.00
Degrad Mois	0.000E+00	0.00
Other Trans	0.000E+00	0.00
Other Sinks	0.000E+00	0.00
Gwr. Runoff	0.000E+00	0.00
Total Output	1.419E+08	99.50
Total Input	1.427E+08	
Input - Output	7.139E+05	

Maximum leachate concentration: 0.000E+00 **mg/l**

Climate File: WARSAW 2 NW
C:\SEVIEW63\WARSAW2N.CLM

Chemical File: Thallium (Soluble Salts) (Kd)
C:\SEVIEW63\THALLIUM.CHM

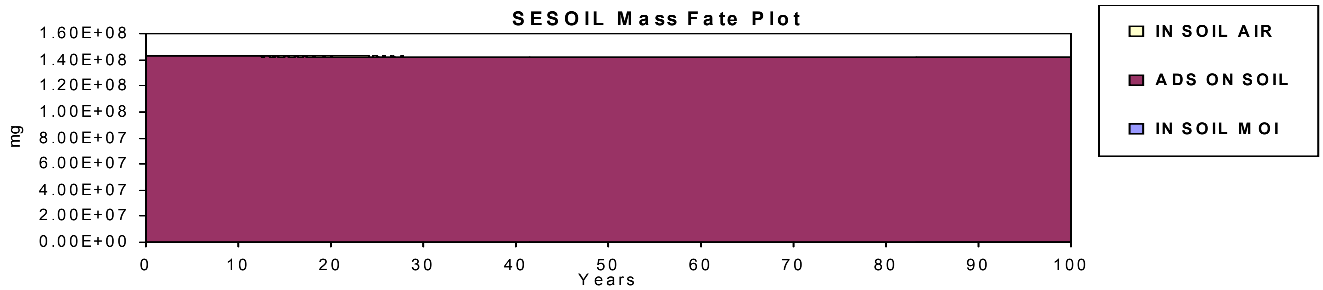
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI

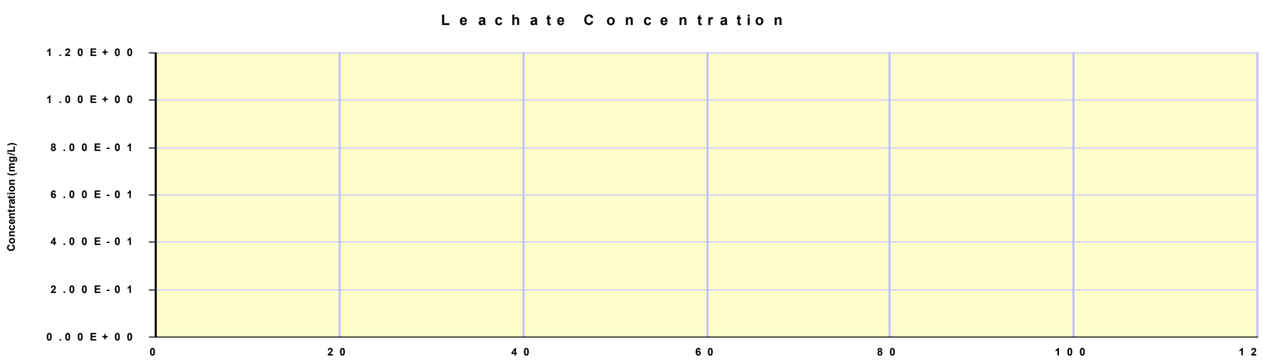
Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825TI.APL

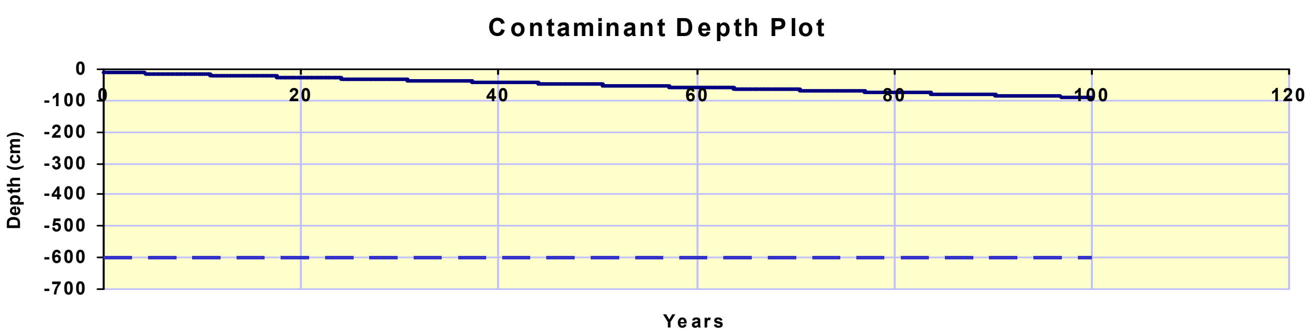
Starting Depth: 9.97 **cm**

Ending Depth: 90.00 **cm**

Total Depth: 600.00 **cm**







SESOIL Profile and Load Report

Layer No.	Number of Sub-Layers	Thickness		Intrinsic Permeability	Organic Carbon Content	Adsorption Coefficient	Cation Exchange Capacity	Freundlich Exponent	Solid Phase Degradation Rate	Liquid Phase Degradation Rate	Soil pH
		cm	feet	cm^2	percent	μg/g / μg/mL	mEq / 100 g soil	unitless	1/day	1/day	pH
1	10	198.0	6.50	1.00E-09	0.20	1000.00	0.00	1.00	0.00E+00	0.00E+00	7.00
2	10	402.0	13.19	1.00E-09	0.20	1000.00	0.00	1.00	0.00E+00	0.00E+00	7.00
3		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00
4		0.0	0.00	.0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00

Soil Parameters

Bulk Density (g/cm^3)	1.60
Effective Porosity (fraction)	0.30
Soil Pore Disconnectedness	7.00

Application Parameters

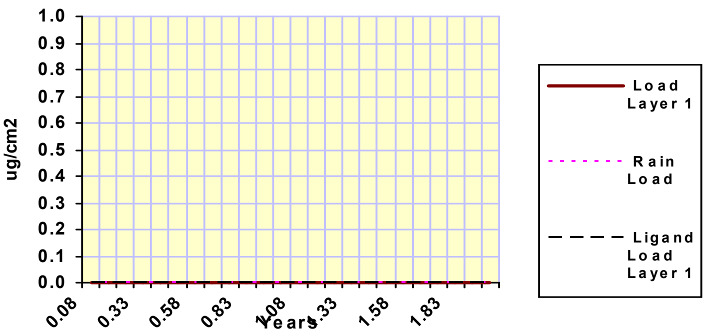
Area	cm^2	3.72E+5
	ft^2	400.42
Latitude	degrees	38.0
Spill Index		1

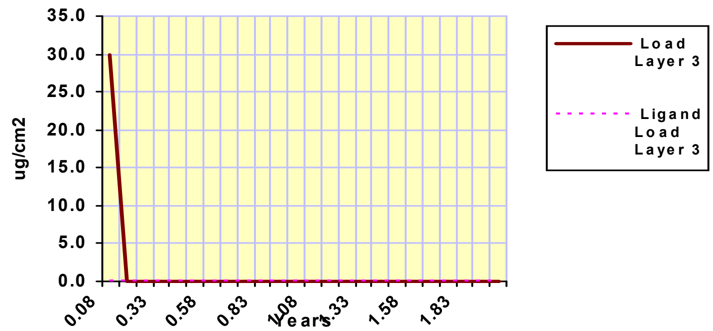
Chemical Parameters

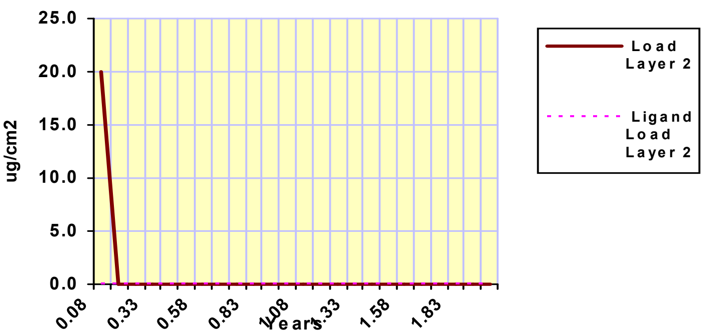
Water Solubility (μg/mL)	8.64E+4	**Moles Ligand / Moles Chemical**	0.00
Henry's Law (M^3atm/mol)	2.44E-2	**Ligand Molecular Weight** (g/mol)	0.00
K_{oc} (μg/g)/(μg/mL)	0.00	**Base Hydrolysis Rate** (L/mol/day)	0.00
Valance (g/mole)	0.00	**Ligand Dissociation Constant**	0.00
Air Diffusion Coefficient (cm^2/sec)	.000	**Neutral Hydrolysis Rate** (L/mol/day)	0.00
Water Diffusion Coefficient (cm^2/sec)	.000	**Acid Hydrolysis Rate** (L/mol/day)	0.00
Molecular Weight (g/mol)	50.90		

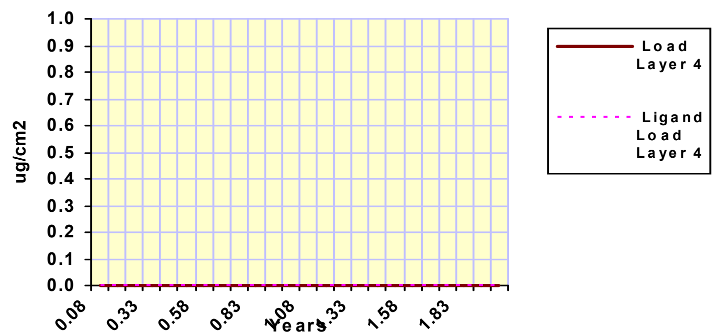
Output File: 4825 GR Vanadium
C:\SEVIEW63\4825V.OUT
Chemical File: Vanadium, Metallic (Kd)
C:\SEVIEW63\VANADIUM.CHM
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI
Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825V.APL

Sublayer Loads	1	2	3	4	5	6	7	8	9	10
Layer 1 (ug/g)					2.64E+02					
Layer 2 (ug/g)										
Layer 3 (ug/g)										
Layer 4 (ug/g)										





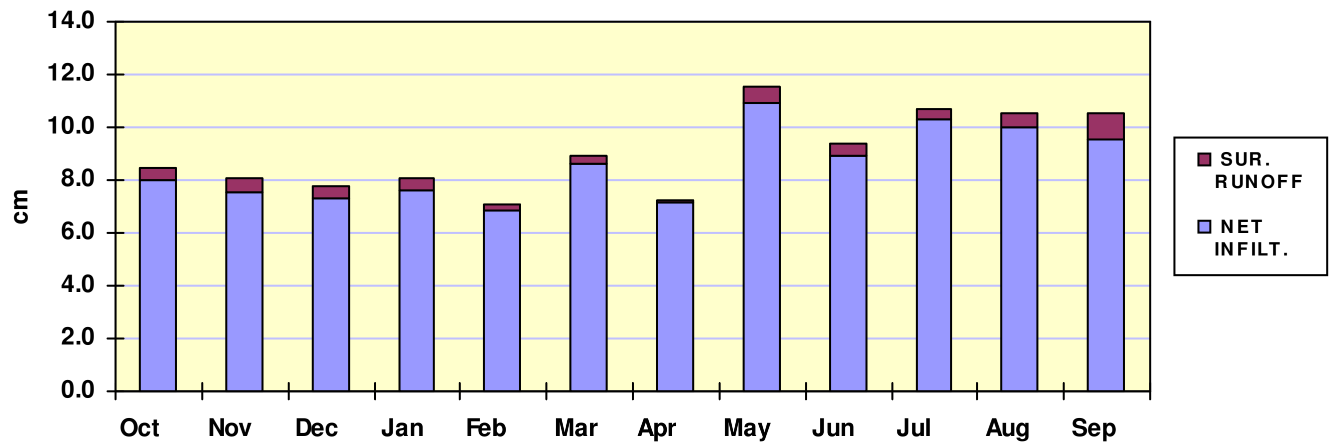


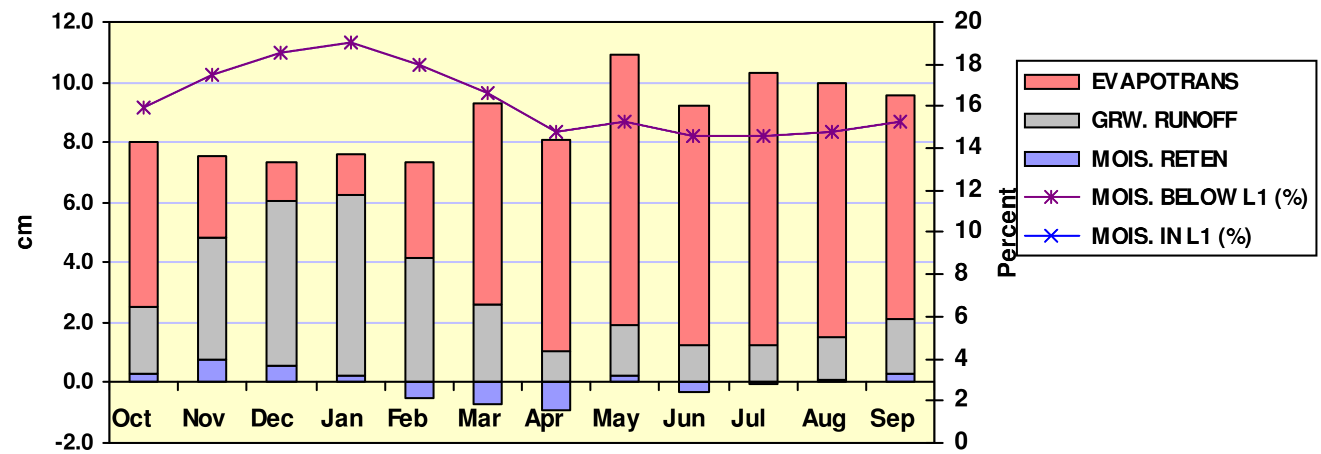


SESOIL Hydrologic Cycle Report

Scenario Description: 4825 GR Vanadium

SESOIL Output File: C:\SEVIEW63\4825V.OUT





	Surface Water Runoff		Net Infiltration		Evapotranspiration		Soil Moisture Retention		Groundwater Runoff (Recharge)		Soil Moisture	
											Layer 1	Below Layer 1
Units	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	Percent	Percent
October	0.47	0.19	8.01	3.15	5.48	2.16	0.32	0.13	2.22	0.87	15.94	15.94
November	0.49	0.19	7.56	2.98	2.75	1.08	0.77	0.30	4.04	1.59	17.47	17.47
December	0.44	0.17	7.33	2.89	1.31	0.52	0.56	0.22	5.47	2.15	18.58	18.58
January	0.49	0.19	7.58	2.98	1.35	0.53	0.23	0.09	6.00	2.36	19.03	19.03
February	0.25	0.10	6.82	2.69	3.14	1.24	-0.51	-0.20	4.19	1.65	18.01	18.01
March	0.28	0.11	8.64	3.40	6.71	2.64	-0.69	-0.27	2.62	1.03	16.63	16.63
April	0.14	0.06	7.12	2.80	7.03	2.77	-0.95	-0.37	1.04	0.41	14.74	14.74
May	0.58	0.23	10.94	4.31	9.01	3.55	0.26	0.10	1.67	0.66	15.25	15.25
June	0.49	0.19	8.91	3.51	8.01	3.15	-0.33	-0.13	1.23	0.48	14.59	14.59
July	0.41	0.16	10.30	4.06	9.05	3.56	-0.02	-0.01	1.27	0.50	14.56	14.56
August	0.52	0.20	10.00	3.94	8.50	3.35	0.09	0.04	1.41	0.56	14.74	14.74
September	0.97	0.38	9.53	3.75	7.40	2.91	0.29	0.11	1.85	0.73	15.31	15.31
Total	5.53	2.18	102.74	40.45	69.74	27.46	0.00	0.00	32.99	12.99		

SESOIL Pollutant Cycle Report

Scenario Description: 4825 GR Vanadium

SESOIL Output File: C:\SEVIEW63\4825V.OUT

SESOIL Process	Pollutant Mass (µg)	Percent of Total
Volatilized	0.000E+00	0.00
In Soil Air	2.856E+05	0.01
Sur. Runoff	0.000E+00	0.00
In Washld	0.000E+00	0.00
Ads On Soil	3.111E+09	99.94
Hydrol Soil	0.000E+00	0.00
Degrad Soil	0.000E+00	0.00
Pure Phase	0.000E+00	0.00
Complexed	0.000E+00	0.00
Immobile CEC	0.000E+00	0.00
Hydrol CEC	0.000E+00	0.00
In Soil Moi	2.978E+05	0.01
Hydrol Mois	0.000E+00	0.00
Degrad Mois	0.000E+00	0.00
Other Trans	0.000E+00	0.00
Other Sinks	0.000E+00	0.00
Gwr. Runoff	0.000E+00	0.00
Total Output	3.111E+09	99.95
Total Input	3.113E+09	
Input - Output	1.416E+06	

Maximum leachate concentration: 0.000E+00 **mg/l**

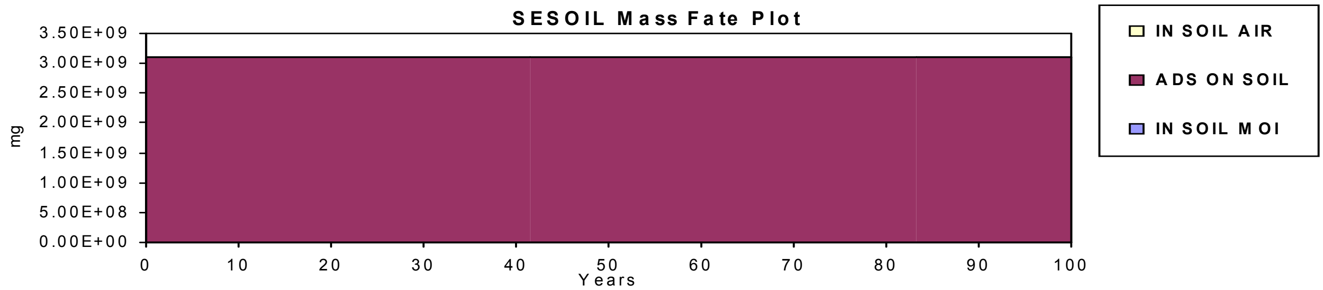
Climate File: WARSAW 2 NW
C:\SEVIEW63\WARSAW2N.CLM

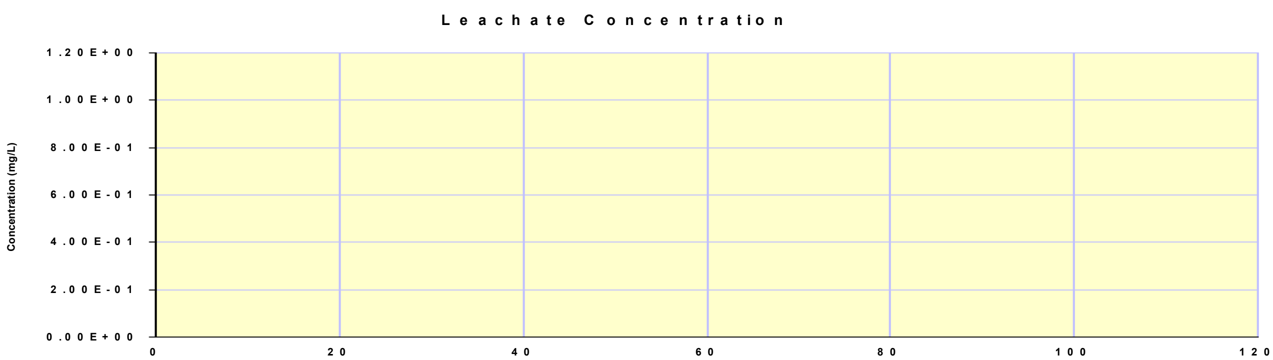
Chemical File: Vanadium, Metallic (Kd)
C:\SEVIEW63\VANADIUM.CHM

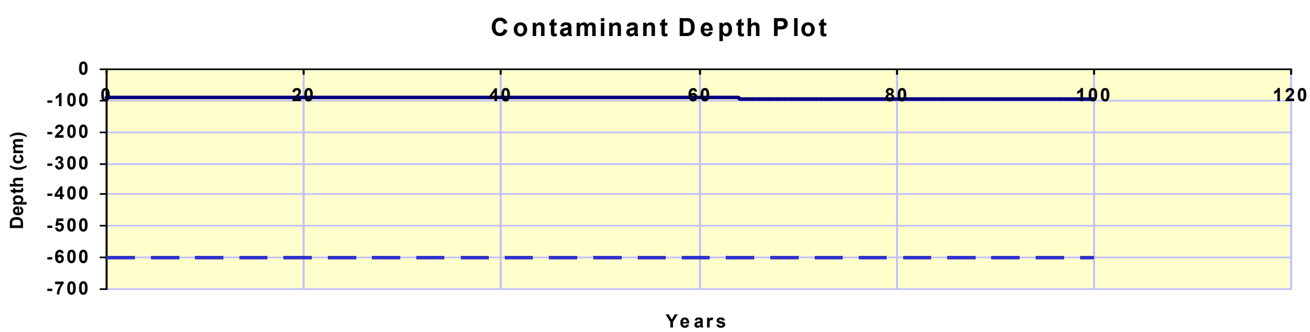
Soil File: Silty Clay
C:\SEVIEW63\4825.SOI

Application File: 4825 Glenbrook Road
C:\SEVIEW63\4825V.APL

Starting Depth: 89.16 **cm**
Ending Depth: 94.85 **cm**
Total Depth: 600.00 **cm**







APPENDIX G
USEPA REGION 3 APRIL 2011 E-MAIL

From: Ioven.Dawn@epamail.epa.gov <Ioven.Dawn@epamail.epa.gov>
To: Opdyke, Clifford A NAB
Cc: Hirsh.Steven@epamail.epa.gov <Hirsh.Steven@epamail.epa.gov>; Reeser, Leland H NAB02; Barber, Brenda M NAB
Sent: Tue Apr 19 11:01:36 2011
Subject: Re: 4825 HHRA at Spring Valley (UNCLASSIFIED)

Cliff,

Toxicity criteria for thallium has been removed from the most recent edition of the RSL Table (November 2010), presumably due to uncertainties surrounding the provisional RfD. Further, we received word from EPA HQ that the provisional RfD for metallic vanadium was being suspended, and that the IRIS file for vanadium pentoxide will soon be withdrawn. My suggestion for the 4825 BLRA, therefore, is to discuss the findings for these metals in soil in a qualitative manner. A comparison to the background levels of thallium and vanadium would also be very helpful. Any questions, please let me know. Thanks.

Dawn

Dawn A. Ioven, toxicologist
U.S. EPA - Region III
(3HS41)
1650 Arch street
Philadelphia, PA 19103
215.814.3320

From: "Opdyke, Clifford A NAB" <Clifford.A.Opdyke@usace.army.mil>
To: Dawn Ioven/R3/USEPA/US@EPA
Cc: Steven Hirsh/R3/USEPA/US@EPA, "Reeser, Leland H NAB02" <Leland.H.Reeser@usace.army.mil>, "Barber, Brenda M NAB" <Brenda.M.Barber@usace.army.mil>
Date: 04/14/2011 04:43 PM
Subject: 4825 HHRA at Spring Valley (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Dawn,
I've reviewed an internal draft of the HHRA at 4825 and a question came up regarding both thallium and vanadium.

These two compounds, after figuring their respective EPCs, had hazard quotients greater than unity for both child and adult residents. The uncertainties surrounding these two compounds and their respective Reference Doses is rather large and it was our thought to recommend no further action for these two compounds based upon this. However, before you got a hold of it, I thought it might be best to get your input up front rather than in a formal comment.

Below is the text that we've included in the uncertainty section:

"The RfD for vanadium is from USEPA's PPRTV program. Those toxicity values "have been developed specifically for EPA's Superfund program and have not undergone the multi-program review and consensus required for toxicity values to be placed in IRIS." Additionally, the PPRTV noted that the confidence in the study used as the basis for the PPRTV was low because the tissue accumulation associated with blood pressure and kidney affects from vanadium only existed in male rats. This indicates that remedial action decisions should not be based on the PPRTV for vanadium without further consultation with USEPA and the toxicity values for vanadium used here have a high degree of uncertainty and may change with further review.

5.4.3.11 The RfD used here to evaluate thallium is from a 1999 Public Health Goal from California's Office of Environmental Health Hazard Assessment (OEHHA). According to USEPA (2003) guidance, this is an acceptable, but "third tier", source of toxicity values. Since OEHHA derived its RfD for thallium, USEPA has performed toxicity reviews for thallium as part of the IRIS and PPRTV programs. In 2009, USEPA's IRIS program concluded that "the available toxicity database for thallium contains studies that are generally of poor quality" and that these studies have a number of uncertainties. The uncertainties include high background incidence of hair loss, lack of histopathological examination of skin tissue in low- and mid-dose groups, and inadequate examination of objective measures of neurotoxicity. Thus, the IRIS program did not derive any toxicity values for thallium. Similarly, in 2010, USEPA's PPRTV evaluated the available toxicity information for thallium and concluded that it is "inappropriate" to derive an RfD for thallium. However, the PPRTV did provide a provisional screening RfD for thallium of 1 x 10-5 (essentially the same as the OEHHA value) but indicates that "there is considerably more uncertainty associated with the derivation of a supplemental screening toxicity value" than a PPRTV. This indicates that the toxicity values for thallium used here have a high degree of uncertainty, may change with further review, and that remedial action decisions should not be based on the toxicity value for thallium used here without further consultation with USEPA."

What do you think?

Thanks up front for your reply.

Cliff

Classification: UNCLASSIFIED
Caveats: NONE

APPENDIX H
RISK CHARACTERIZATION TABLES

ADULT RESIDNETS

RME RESIDENT (ADULT)
CARCINOGENIC AND NONCARCINOGENIC RISK ESTIMATES - INGESTION OF SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (adult)	
COPC Concentration in Soil/Sediment ($C_{soil/sed}$)	chemical-specific	mg/Kg
Soil Ingestion Rate ($IR_{soil/sed}$)	100	mg/day
Exposure Frequency (EF)	350	days/yr
Exposure Duration (ED)	24	yrs
Fraction Contaminated Soil Ingested (FI)	1	unitless
Conversion Factor (CF)	0.000001	Kg/mg
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_{nc})	24	yrs
Oral Slope Factor (SF_o)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	70	Kg
Oral Reference Dose on (RfD_o)	chemical-specific	mg/Kg-day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)(SF_o)}{(BW)(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)}{(RfD_o)(BW)(AT_{nc})(365days/year)}$$

COPC [a]	CAS [b]	EPC (mg/kg) [c]	SF_o $(mg/kg\text{-}day)^{-1}$ [d]	RFD_o (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	30,605	--	1	--	--	4.19E-02	21%
Arsenic	7440-38-2	9.915	1.5	0.0003	6.99E-06	100%	4.53E-02	23%
Cobalt	7440-48-4	23.47	--	0.0003	--	--	1.07E-01	53%
Manganese	7439-96-5	638	--	0.14	--	--	6.24E-03	3%
Thallium	7440-28-0	3.157	--	--	--	--	--	--
Vanadium	7440-62-2	96.48	--	--	--	--	--	--
				Pathway Sums	7.E-06		2.E-01	

a/ COPC = Chemical of potential concern.
b/ CAS = Chemical Abstracts Service number.
c/ Exposure Point Concentration,
d/ mg/Kg-day = Milligrams per kilogram-day.
e/ "--" = Data unavailable.

RME RESIDENT (ADULT)
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES -- DERMAL CONTACT WITH SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions

Receptor	Resident (adult)	
COPC Concentration in Soil (C_{soil})	chemical-specific	mg/kg
Exposure Frequency (EF)	350	days/yr
Fraction of EF in Contact with Soil (ET)	1	unitless
Exposure Duration (ED)	24	yrs
Exposed Body Surface Area (SA)	5700	cm^2
Soil-to-Skin Adherence Factor (AF)	0.07	mg/cm^2-event
Dermal Soil Absorption Factor (DAF)	chemical-specific	unitless
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_n)	24	yrs
Oral Slope Factor Adjusted for GI Absorption (SF_d)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	70	Kg
Oral Reference Dose Adjusted for GI Absorption (RfD_d)	chemical-specific	mg/Kg-day
Conversion Factor (CF)	0.000001	Kg/mg
Oral Absorption Factor (OAF)	chemical-specific	unitless
Event Frequency (EV)	1	events/day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(SF_d)(CF)(EV)}{(BW)(AT_c)(365days/year)}$$

Where $SF_d = SF_o/OAF$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(CF)(EV)}{(RfD_d)(BW)(AT_n)(365days/year)}$$

Where $RfD_d = (RfD_o)*(OAF)$

COPC [a/]	CAS [b/]	EPC (mg/kg)[c/]	DAF (unitless)	SF_d (mg/kg-day)$^{-1}$[d/]	RFD_d (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	30,605	--	--	0.1	--	--	--	--
Arsenic	7440-38-2	9.915	0.03	1.5	0.0003	8.36E-07	100%	5.42E-03	100%
Cobalt	7440-48-4	23.47	--	--	0.7	--	--	--	--
Manganese	7439-96-5	638	--	--	0.00096	--	--	--	--
Thallium	7440-28-0	3.157	--	--	--	--	--	--	--
Vanadium	7440-62-2	96.48	--	--	--	--	--	--	--
					Pathway Sums	8.E-07		5.E-03	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ Exposure Point Concentration,

d/ mg/Kg-day = Milligrams per kilogram-day.

e/ "--" = Data unavailable.

RME RESIDENT (ADULT)
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES - INHALATION OF VOLATILES/PARTICULATES FROM SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (adult)	
COPC Ambient Air Concentration due to volatile (organics) or particulate (inorganics) emissions from soil (Cair-VOC/Particulate)	chemical-specific	µg/m³
Exposure Frequency (EF)	350	days/yr
Exposure Duration (ED)	24	yrs
Fraction of EF in Contact with Soil (ET)	0.0625	unitless
Averaging Time, Carcinogens (AT_C)	70	yrs
Averaging Time, Noncarcinogens (AT_N)	24	yrs
Inhalation Unit Risk Factor(URF)	chemical-specific	(µg/m³)⁻¹
Inhalation Reference Concentration (RfC)	chemical-specific	µg/m³
Volatilization Factor (VF)	chemical-specific	m³/kg
Particulate emission factor (PEF)	1.27E+09 (see Appenedix B)	m³/kg

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk =} \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)(URF)}{(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ =} \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)}{(RfC)(AT_{nc})(365days/year)}$$

where:

$$C_{air\text{-}VOC} = \frac{(C_{soil})}{(VF)}$$ for organics; and

$$C_{air\text{-}Particulate} = \frac{(C_{soil})}{(PEF)}$$ for inorganics

COPC[a/]	CAS[b/]	EPC (µg/kg)[c/]	Volatilization Factor (m³/kg)[d/]	$C_{air\text{-}VOC/Particulate}$ (µg/m³)[e/]	URF (µg/m³)⁻¹	RFC (µg/m³)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	30605000	--	2.41E-02	--	5.00E+00	--	--	2.89E-04	26%
Arsenic	7440-38-2	9915	--	7.81E-06	4.30E-03	1.50E-02	6.90E-10	17%	3.12E-05	3%
Cobalt	7440-48-4	2.35E+04	--	1.85E-05	9.00E-03	6.00E-03	3.42E-09	83%	1.85E-04	17%
Manganese	7439-96-5	638000	--	5.02E-04	--	5.00E-02	--	--	6.02E-04	54%
Thallium	7440-28-0	3157	--	2.49E-06	--	--	--	--	--	--
Vanadium	7440-62-2	96480	--	7.60E-05	--	--	--	--	--	--
						Pathway Sums	4.E-09		1.E-03	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ µg/Kg = Micrograms per kilogram.

d/ m³/kg = Cubic meters per kilogram. Volatilization Factors used for volatile organic compounds only.

e/ µg/m³ = Micrograms per cubic meter.

f/ "--" = Data unavailable.

RME RESIDENT (ADULT)
CARCINOGENIC AND NONCARCINOGENIC RISK ESTIMATES - INGESTION OF MIXED SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (adult)	
COPC Concentration in Soil/Sediment ($C_{soil/sed}$)	chemical-specific	mg/Kg
Soil Ingestion Rate ($IR_{soil/sed}$)	100	mg/day
Exposure Frequency (EF)	350	days/yr
Exposure Duration (ED)	24	yrs
Fraction Contaminated Soil Ingested (FI)	1	unitless
Conversion Factor (CF)	0.000001	Kg/mg
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_{nc})	24	yrs
Oral Slope Factor (SF_o)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	70	Kg
Oral Reference Dose on (RfD_o)	chemical-specific	mg/Kg-day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)(SF_o)}{(BW)(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)}{(RfD_o)(BW)(AT_{nc})(365days/year)}$$

COPC [a/]	CAS [b/]	EPC (mg/kg)[c/]	SF_o $(mg/kg\text{-}day)^{-1}$ [d/]	RFD_o (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	29,590	--	1	--	--	4.05E-02	9%
Arsenic	7440-38-2	61.08	1.5	0.0003	4.30E-05	100%	2.79E-01	65%
Cobalt	7440-48-4	22.77	--	0.0003	--	--	1.04E-01	24%
Manganese	7439-96-5	802.8	--	0.14	--	--	7.86E-03	2%
Thallium	7440-28-0	2.715	--	--	--	--	--	--
Vanadium	7440-62-2	99.07	--	--	--	--	--	--
Lewisite		0.07	--	1.00E-04	--	--	9.59E-04	0%
				Pathway Sums	4.E-05		4.E-01	

a/ COPC = Chemical of potential concern.
b/ CAS = Chemical Abstracts Service number.
c/ Exposure Point Concentration,
d/ mg/Kg-day = Milligrams per kilogram-day.
e/ "--" = Data unavailable.

RME RESIDENT (ADULT)

CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES -- DERMAL CONTACT WITH MIXED SOIL

4825 GLENBROOK ROAD

Exposure Assumptions

Receptor	Resident (adult)	
COPC Concentration in Soil (C_{soil})	chemical-specific	mg/kg
Exposure Frequency (EF)	350	days/yr
Fraction of EF in Contact with Soil (ET)	1	unitless
Exposure Duration (ED)	24	yrs
Exposed Body Surface Area (SA)	5700	cm^2
Soil-to-Skin Adherence Factor (AF)	0.07	mg/cm^2-event
Dermal Soil Absorption Factor (DAF)	chemical-specific	unitless
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_n)	24	yrs
Oral Slope Factor Adjusted for GI Absorption (SF_d)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	70	Kg
Oral Reference Dose Adjusted for GI Absorption (RfD_d)	chemical-specific	mg/Kg-day
Conversion Factor (CF)	0.000001	Kg/mg
Oral Absorption Factor (OAF)	chemical-specific	unitless
Event Frequency (EV)	1	events/day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(SF_d)(CF)(EV)}{(BW)(AT_c)(365 days/year)}$$

Where $SF_d = SF_o/OAF$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(CF)(EV)}{(RfD_d)(BW)(AT_n)(365 days/year)}$$

Where $RfD_d = (RfD_o)*(OAF)$

COPC [a/]	CAS [b/]	EPC (mg/kg)[c/]	DAF (unitless)	SF_d (mg/kg-day)$^{-1}$ [d/]	RFD_d (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	29,590	--	--	0.1	--	--	--	--
Arsenic	7440-38-2	61.080	0.03	1.5	0.0003	5.15E-06	100%	3.34E-02	60%
Cobalt	7440-48-4	23	--	--	0.7	--	--	--	--
Manganese	7439-96-5	803	--	--	0.00096	--	--	--	--
Thallium	7440-28-0	2.72	--	--	--	--	--	--	--
Vanadium	7440-62-2	99	--	--	--	--	--	--	--
Lewisite		0.07	0.1	--	1.70E-06	--	--	2.25E-02	40%
					Pathway Sums	5.E-06		6.E-02	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ Exposure Point Concentration,

d/ mg/Kg-day = Milligrams per kilogram-day.

e/ "--" = Data unavailable.

RME RESIDENT (ADULT)

CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES - INHALATION OF VOLATILES/PARTICULATES FROM MIXED SOIL

4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (adult)	
COPC Ambient Air Concentration due to volatile (organics) or particulate (inorganics) emissions from soil (Cair-VOC/Particulate)	chemical-specific	µg/m^3
Exposure Frequency (EF)	350	days/yr
Exposure Duration (ED)	24	yrs
Fraction of EF in Contact with Soil (ET)	0.0625	unitless
Averaging Time, Carcinogens (AT_C)	70	yrs
Averaging Time, Noncarcinogens (AT_N)	24	yrs
Inhalation Unit Risk Factor(URF)	chemical-specific	(µg/m^3)$^{-1}$
Inhalation Reference Concentration (RfC)	chemical-specific	µg/m^3
Volatilization Factor (VF)	chemical-specific	m^3/kg
Particulate emission factor (PEF)	1.27E+09 (see Appendix B)	m^3/kg

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)(URF)}{(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)}{(RfC)(AT_{nc})(365days/year)}$$

where:

$$C_{air\text{-}VOC} = \frac{(C_{soil})}{(VF)}$$ for organics; and

$$C_{air\text{-}Particulate} = \frac{(C_{soil})}{(PEF)}$$ for inorganics

COPC[a/]	CAS[b/]	EPC (µg/kg)[c/]	Volatilization Factor (m^3/kg)[d/]	$C_{air\text{-}VOC/Particulate}$ (µg/m^3)[e/]	URF (µg/m^3)$^{-1}$	RFC (µg/m^3)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	29590000	--	2.33E-02	--	5.00E+00	--	--	2.79E-04	20%
Arsenic	7440-38-2	61080	--	4.81E-05	4.30E-03	1.50E-02	4.25E-09	56%	1.92E-04	14%
Cobalt	7440-48-4	2.28E+04	--	1.79E-05	9.00E-03	6.00E-03	3.32E-09	44%	1.79E-04	13%
Manganese	7439-96-5	802800	--	6.32E-04	--	5.00E-02	--	--	7.58E-04	54%
Thallium	7440-28-0	2715	--	2.14E-06	--	--	--	--	--	--
Vanadium	7440-62-2	99070	--	7.80E-05	--	--	--	--	--	--
Lewisite		70	--	5.51E-08	--	3.00E+00	--	--	1.10E-09	
					Pathway Sums		8.E-09		1.E-03	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ µg/Kg = Micrograms per kilogram.

d/ m^3/kg = Cubic meters per kilogram. Volatilization Factors used for volatile organic compounds only.

e/ µg/m^3 = Micrograms per cubic meter.

f/ "--" = Data unavailable.

CT RESIDENT (ADULT)
CARCINOGENIC AND NONCARCINOGENIC RISK ESTIMATES - INGESTION OF SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (adult)	
COPC Concentration in Soil/Sediment ($C_{soil/sed}$)	chemical-specific	mg/Kg
Soil Ingestion Rate ($IR_{soil/sed}$)	50	mg/day
Exposure Frequency (EF)	350	days/yr
Exposure Duration (ED)	9	yrs
Fraction Contaminated Soil Ingested (FI)	1	unitless
Conversion Factor (CF)	0.000001	Kg/mg
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_{nc})	9	yrs
Oral Slope Factor (SF_o)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	70	Kg
Oral Reference Dose on (RfD_o)	chemical-specific	mg/Kg-day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)(SF_o)}{(BW)(AT_c)(365\text{days/year})}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)}{(RfD_o)(BW)(AT_{nc})(365\text{days/year})}$$

COPC [a]	CAS [b]	EPC (mg/kg) [c]	SF_o $(mg/kg\text{-}day)^{-1}$ [d]	RFD_o (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	25,431	--	1	--	--	1.74E-02	22%
Arsenic	7440-38-2	7.182	1.5	0.0003	9.49E-07	100%	1.64E-02	20%
Cobalt	7440-48-4	19.43	--	0.0003	--	--	4.44E-02	55%
Manganese	7439-96-5	507.7	--	0.14	--	--	2.48E-03	3%
Thallium	7440-28-0	2.129	--	--	--	--	--	--
Vanadium	7440-62-2	78.16	--	--	--	--	--	--
				Pathway Sums	9.E-07		8.E-02	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ Exposure Point Concentration,

d/ mg/Kg-day = Milligrams per kilogram-day.

e/ "--" = Data unavailable.

CT RESIDENT (ADULT)
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES -- DERMAL CONTACT WITH SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (adult)	
COPC Concentration in Soil (C_{soil})	chemical-specific	mg/kg
Exposure Frequency (EF)	350	days/yr
Fraction of EF in Contact with Soil (ET)	1	unitless
Exposure Duration (ED)	9	yrs
Exposed Body Surface Area (SA)	5700	cm^2
Soil-to-Skin Adherence Factor (AF)	0.01	mg/cm^2-event
Dermal Soil Absorption Factor (DAF)	chemical-specific	unitless
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_n)	9	yrs
Oral Slope Factor Adjusted for GI Absorption (SF_d)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	70	Kg
Oral Reference Dose Adjusted for GI Absorption (RfD_d)	chemical-specific	mg/Kg-day
Conversion Factor (CF)	0.000001	Kg/mg
Oral Absorption Factor (OAF)	chemical-specific	unitless
Event Frequency (EV)	1	events/day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(SF_d)(CF)(EV)}{(BW)(AT_c)(365\text{days/year})}$$

Where $SF_d = SF_o/OAF$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(CF)(EV)}{(RfD_d)(BW)(AT_n)(365\text{days/year})}$$

Where $RfD_d = (RfD_o)*(OAF)$

COPC [a]	CAS [b]	EPC (mg/kg)[c]	DAF (unitless)	SF_d (mg/kg-day)$^{-1}$[d]	RFD_d (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	25,431	--	--	0.1	--	--	--	--
Arsenic	7440-38-2	7.182	0.03	1.5	0.0003	3.24E-08	100%	5.61E-04	100%
Cobalt	7440-48-4	19.43	--	--	0.7	--	--	--	--
Manganese	7439-96-5	507.7	--	--	0.00096	--	--	--	--
Thallium	7440-28-0	2.129	--	--	--	--	--	--	--
Vanadium	7440-62-2	78.16	--	--	--	--	--	--	--
					Pathway Sums	3.E-08		6.E-04	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ Exposure Point Concentration,

d/ mg/Kg-day = Milligrams per kilogram-day.

e/ "--" = Data unavailable.

CT RESIDENT (ADULT)

CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES - INHALATION OF VOLATILES/PARTICULATES FROM SURFACE SOIL

4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (adult)	
COPC Ambient Air Concentration due to volatile (organics) or particulate (inorganics) emissions from soil (Cair-VOC/Particulate)	chemical-specific	µg/m^3
Exposure Frequency (EF)	350	days/yr
Exposure Duration (ED)	9	yrs
Fraction of EF in Contact with Soil (ET)	0.0625	unitless
Averaging Time, Carcinogens (AT_C)	70	yrs
Averaging Time, Noncarcinogens (AT_N)	9	yrs
Inhalation Unit Risk Factor(URF)	chemical-specific	(µg/m^3)$^{-1}$
Inhalation Reference Concentration (RfC)	chemical-specific	µg/m^3
Volatilization Factor (VF)	chemical-specific	m^3/kg
Particulate emission factor (PEF)	1.27E+09	m^3/kg
	(see Appenedix B)	

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)(URF)}{(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)}{(RfC)(AT_{nc})(365days/year)}$$

where:

$$C_{air\text{-}VOC} = \frac{(C_{soil})}{(VF)}$$ for organics; and

$$C_{air\text{-}Particulate} = \frac{(C_{soil})}{(PEF)}$$ for inorganics

COPC[a/]	CAS[b/]	EPC (µg/kg)[c/]	Volatilization Factor (m^3/kg)[d/]	$C_{air\text{-}VOC/Particulate}$ (µg/m^3)[e/]	URF (µg/m^3)$^{-1}$	RFC (µg/m^3)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	25431000	--	2.00E-02	--	5.00E+00	--	--	2.40E-04	27%
Arsenic	7440-38-2	7182	--	5.66E-06	4.30E-03	1.50E-02	1.87E-10	15%	2.26E-05	3%
Cobalt	7440-48-4	19430	--	1.53E-05	9.00E-03	6.00E-03	1.06E-09	85%	1.53E-04	17%
Manganese	7439-96-5	507700	--	4.00E-04	--	5.00E-02	--	--	4.79E-04	54%
Thallium	7440-28-0	2129	--	1.68E-06	--	--	--	--	--	--
Vanadium	7440-62-2	78160	--	6.15E-05	--	--	--	--	--	--
						Pathway Sums	1.E-09		9.E-04	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ µg/Kg = Micrograms per kilogram.

d/ m^3/kg = Cubic meters per kilogram. Volatilization Factors used for volatile organic compounds only.

e/ µg/m^3 = Micrograms per cubic meter.

f/ "--" = Data unavailable.

CT RESIDENT (ADULT)
CARCINOGENIC AND NONCARCINOGENIC RISK ESTIMATES - INGESTION OF MIXED SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (adult)	
COPC Concentration in Soil/Sediment ($C_{soil/sed}$)	chemical-specific	mg/Kg
Soil Ingestion Rate ($IR_{soil/sed}$)	50	mg/day
Exposure Frequency (EF)	350	days/yr
Exposure Duration (ED)	9	yrs
Fraction Contaminated Soil Ingested (FI)	1	unitless
Conversion Factor (CF)	0.000001	Kg/mg
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_{nc})	9	yrs
Oral Slope Factor (SF_o)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	70	Kg
Oral Reference Dose on (RfD_o)	chemical-specific	mg/Kg-day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)(SF_o)}{(BW)(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)}{(RfD_o)(BW)(AT_{nc})(365days/year)}$$

COPC [a]	**CAS** [b]	**EPC (mg/kg)** [c]	**SF_o $(mg/kg\text{-}day)^{-1}$** [d]	**RFD_o (mg/kg-day)**	**Cancer Risk**	**% Of Total**	**Hazard Quotient**	**% Of Total**
Aluminum	7429-90-5	27,221	--	1	--	--	1.86E-02	16%
Arsenic	7440-38-2	21.84	1.5	0.0003	2.88E-06	100%	4.99E-02	43%
Cobalt	7440-48-4	19.93	--	0.0003	--	--	4.55E-02	39%
Manganese	7439-96-5	474.5	--	0.14	--	--	2.32E-03	2%
Thallium	7440-28-0	2.236	--	--	--	--	--	--
Vanadium	7440-62-2	88.59	--	--	--	--	--	--
Lewisite		0.0585	--	1.00E-04	--	--	4.01E-04	0%
				Pathway Sums	3.E-06		1.E-01	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ Exposure Point Concentration,

d/ mg/Kg-day = Milligrams per kilogram-day.

e/ "--" = Data unavailable.

CT RESIDENT (ADULT)
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES -- DERMAL CONTACT WITH MIXED SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (adult)	
COPC Concentration in Soil (C_{soil})	chemical-specific	mg/kg
Exposure Frequency (EF)	350	days/yr
Fraction of EF in Contact with Soil (ET)	1	unitless
Exposure Duration (ED)	9	yrs
Exposed Body Surface Area (SA)	5700	cm^2
Soil-to-Skin Adherence Factor (AF)	0.01	mg/cm^2-event
Dermal Soil Absorption Factor (DAF)	chemical-specific	unitless
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_n)	9	yrs
Oral Slope Factor Adjusted for GI Absorption (SF_d)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	70	Kg
Oral Reference Dose Adjusted for GI Absorption (RfD_d)	chemical-specific	mg/Kg-day
Conversion Factor (CF)	0.000001	Kg/mg
Oral Absorption Factor (OAF)	chemical-specific	unitless
Event Frequency (EV)	1	events/day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(SF_d)(CF)(EV)}{(BW)(AT_c)(365days/year)}$$

Where $SF_d = SF_o/OAF$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(CF)(EV)}{(RfD_d)(BW)(AT_n)(365days/year)}$$

Where $RfD_d = (RfD_o)*(OAF)$

COPC [a/]	CAS [b/]	EPC (mg/kg)[c/]	DAF (unitless)	SF_d (mg/kg-day)$^{-1}$[d/]	RFD_d (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	27,221	--	--	0.1	--	--	--	--
Arsenic	7440-38-2	21.84	0.03	1.5	0.0003	9.87E-08	100%	1.71E-03	100%
Cobalt	7440-48-4	19.93	--	--	0.7	--	--	--	--
Manganese	7439-96-5	474.5	--	--	0.00096	--	--	--	--
Thallium	7440-28-0	2.236	--	--	--	--	--	--	--
Vanadium	7440-62-2	88.59	--	--	--	--	--	--	--
Lewisite		0.0585	0.1	--	1.70E-06	--	--	2.69E-03	61%
					Pathway Sums	1.E-07		4.E-03	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ Exposure Point Concentration,

d/ mg/Kg-day = Milligrams per kilogram-day.

e/ "--" = Data unavailable.

CT RESIDENT (ADULT)

CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES - INHALATION OF VOLATILES/PARTICULATES FROM MIXED SOIL

4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (adult)	
COPC Ambient Air Concentration due to volatile (organics) or particulate (inorganics) emissions from soil (Cair-VOC/Particulate)	chemical-specific	µg/m^3
Exposure Frequency (EF)	350	days/yr
Exposure Duration (ED)	9	yrs
Fraction of EF in Contact with Soil (ET)	0.0625	unitless
Averaging Time, Carcinogens (AT_C)	70	yrs
Averaging Time, Noncarcinogens (AT_N)	9	yrs
Inhalation Unit Risk Factor(URF)	chemical-specific	(µg/m^3)$^{-1}$
Inhalation Reference Concentration (RfC)	chemical-specific	µg/m^3
Volatilization Factor (VF)	chemical-specific	m^3/kg
Particulate emission factor (PEF)	1.27E+09 (see Appenedix B)	m^3/kg

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)(URF)}{(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)}{(RfC)(AT_{nc})(365days/year)}$$

where:

$$C_{air\text{-}VOC} = \frac{(C_{soil})}{(VF)}$$ for organics; and

$$C_{air\text{-}Particulate} = \frac{(C_{soil})}{(PEF)}$$ for inorganics

COPC[a/]	CAS[b/]	EPC (µg/kg)[c/]	Volatilization Factor (m^3/kg)[d/]	$C_{air\text{-}VOC/Particulate}$ (µg/m^3)[e/]	URF (µg/m^3)$^{-1}$	RFC (µg/m^3)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	27221000	--	2.14E-02	--	5.00E+00	--	--	2.57E-04	28%
Arsenic	7440-38-2	21840	--	1.72E-05	4.30E-03	1.50E-02	5.70E-10	34%	6.87E-05	7%
Cobalt	7440-48-4	1.99E+04	--	1.57E-05	9.00E-03	6.00E-03	1.09E-09	66%	1.57E-04	17%
Manganese	7439-96-5	474500	--	3.74E-04	--	5.00E-02	--	--	4.48E-04	48%
Thallium	7440-28-0	2236	--	1.76E-06	--	--	--	--	--	--
Vanadium	7440-62-2	88590	--	6.98E-05	--	--	--	--	--	--
Lewisite		58.5	--	4.61E-08	--	3.00E+00	--	--	9.20E-10	
					Pathway Sums		2.E-09		9.E-04	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ µg/Kg = Micrograms per kilogram.

d/ m^3/kg = Cubic meters per kilogram. Volatilization Factors used for volatile organic compounds only.

e/ µg/m^3 = Micrograms per cubic meter.

f/ "--" = Data unavailable.

CHILD RESIDENTS

RME RESIDENT (CHILD)
CARCINOGENIC AND NONCARCINOGENIC RISK ESTIMATES - INGESTION OF SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (child)	
COPC Concentration in Soil/Sediment ($C_{soil/sed}$)	chemical-specific	mg/Kg
Soil Ingestion Rate ($IR_{soil/sed}$)	100	mg/day
Exposure Frequency (EF)	350	days/yr
Exposure Duration (ED)	6	yrs
Fraction Contaminated Soil Ingested (FI)	1	unitless
Conversion Factor (CF)	0.000001	Kg/mg
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_{nc})	6	yrs
Oral Slope Factor (SF_o)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	15	Kg
Oral Reference Dose on (RfD_o)	chemical-specific	mg/Kg-day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)(SF_o)}{(BW)(AT_c)(365 days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)}{(RfD_o)(BW)(AT_{nc})(365 days/year)}$$

COPC [a]	CAS [b]	EPC (mg/kg) [c]	SF_o $(mg/kg\text{-}day)^{-1}$ [d]	RFD_o (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	30,605	--	1	--	--	1.96E-01	21%
Arsenic	7440-38-2	9.915	1.5	0.0003	8.15E-06	100%	2.11E-01	23%
Cobalt	7440-48-4	23.47	--	0.0003	--	--	5.00E-01	53%
Manganese	7439-96-5	638	--	0.14	--	--	2.91E-02	3%
Thallium	7440-28-0	3.157	--	--	--	--	--	--
Vanadium	7440-62-2	96.48	--	--	--	--	--	--
				Pathway Sums	8.E-06		9.E-01	

a/ COPC = Chemical of potential concern.
b/ CAS = Chemical Abstracts Service number.
c/ Exposure Point Concentration,
d/ mg/Kg-day = Milligrams per kilogram-day.
e/ "--" = Data unavailable.

RME RESIDENT (CHILD)
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES -- DERMAL CONTACT WITH SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions

Receptor	Resident (child)	
COPC Concentration in Soil (C_{soil})	chemical-specific	mg/kg
Exposure Frequency (EF)	350	days/yr
Fraction of EF in Contact with Soil (ET)	1	unitless
Exposure Duration (ED)	6	yrs
Exposed Body Surface Area (SA)	2920	cm^2
Soil-to-Skin Adherence Factor (AF)	0.2	mg/cm^2-event
Dermal Soil Absorption Factor (DAF)	chemical-specific	unitless
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_n)	6	yrs
Oral Slope Factor Adjusted for GI Absorption (SF_d)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	15	Kg
Oral Reference Dose Adjusted for GI Absorption (RfD_d)	chemical-specific	mg/Kg-day
Conversion Factor (CF)	0.000001	Kg/mg
Oral Absorption Factor (OAF)	chemical-specific	unitless
Event Frequency (EV)	1	events/day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(SF_d)(CF)(EV)}{(BW)(AT_c)(365\text{days/year})}$$

Where $SF_d = SF_o/OAF$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(CF)(EV)}{(RfD_d)(BW)(AT_n)(365\text{days/year})}$$

Where $RfD_d = (RfD_o)*(OAF)$

COPC [a/]	CAS [b/]	EPC (mg/kg)[c/]	DAF (unitless)	SF_d (mg/kg-day)$^{-1}$ [d/]	RFD_d (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	30,605	--	--	0.1	--	--	--	--
Arsenic	7440-38-2	9.915	0.03	1.5	0.0003	1.43E-06	100%	3.70E-02	100%
Cobalt	7440-48-4	23.47	--	--	0.7	--	--	--	--
Manganese	7439-96-5	638	--	--	0.00096	--	--	--	--
Thallium	7440-28-0	3.157	--	--	--	--	--	--	--
Vanadium	7440-62-2	96.48	--	--	--	--	--	--	--
					Pathway Sums	1.E-06		4.E-02	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ Exposure Point Concentration,

d/ mg/Kg-day = Milligrams per kilogram-day.

e/ "--" = Data unavailable.

RME RESIDENT (CHILD)
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES - INHALATION OF VOLATILES/PARTICULATES FROM SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions

Receptor	Resident (child)	
COPC Ambient Air Concentration due to volatile (organics) or particulate (inorganics) emissions from soil (Cair-VOC/Particulate)	chemical-specific	µg/m^3
Exposure Frequency (EF)	350	days/yr
Exposure Duration (ED)	6	yrs
Fraction of EF in Contact with Soil (ET)	0.074	unitless
Averaging Time, Carcinogens (AT_C)	70	yrs
Averaging Time, Noncarcinogens (AT_N)	6	yrs
Inhalation Unit Risk Factor(URF)	chemical-specific	(µg/m^3)$^{-1}$
Inhalation Reference Concentration (RfC)	chemical-specific	µg/m^3
Volatilization Factor (VF)	chemical-specific	m^3/kg
Particulate emission factor (PEF)	1.27E+09 (see Appenedix B)	m^3/kg

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)(URF)}{(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)}{(RfC)(AT_{nc})(365days/year)}$$

where:

$$C_{air\text{-}VOC} = \frac{(C_{soil})}{(VF)}$$ for organics; and

$$C_{air\text{-}Particulate} = \frac{(C_{soil})}{(PEF)}$$ for inorganics

COPC[a/]	CAS[b/]	EPC (µg/kg)[c/]	Volatilization Factor (m^3/kg)[d/]	$C_{air\text{-}VOC/Particulate}$ (µg/m^3)[e/]	URF (µg/m^3)$^{-1}$	RFC (µg/m^3)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	30605000	--	2.41E-02	--	5.00E+00	--	--	3.42E-04	26%
Arsenic	7440-38-2	9915	--	7.81E-06	4.30E-03	1.50E-02	2.04E-10	17%	3.69E-05	3%
Cobalt	7440-48-4	2.35E+04	--	1.85E-05	9.00E-03	6.00E-03	1.01E-09	83%	2.19E-04	17%
Manganese	7439-96-5	638000	--	5.02E-04	--	5.00E-02	--	--	7.13E-04	54%
Thallium	7440-28-0	3157	--	2.49E-06	--	--	--	--	--	--
Vanadium	7440-62-2	96480	--	7.60E-05	--	--	--	--	--	--
				Pathway Sums			1.E-09		1.E-03	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ µg/Kg = Micrograms per kilogram.

d/ m^3/kg = Cubic meters per kilogram. Volatilization Factors used for volatile organic compounds only.

e/ µg/m^3 = Micrograms per cubic meter.

f/ "--" = Data unavailable.

RME RESIDENT (CHILD)
CARCINOGENIC AND NONCARCINOGENIC RISK ESTIMATES - INGESTION OF MIXED SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (child)	
COPC Concentration in Soil/Sediment ($C_{soil/sed}$)	chemical-specific	mg/Kg
Soil Ingestion Rate ($IR_{soil/sed}$)	100	mg/day
Exposure Frequency (EF)	350	days/yr
Exposure Duration (ED)	6	yrs
Fraction Contaminated Soil Ingested (FI)	1	unitless
Conversion Factor (CF)	0.000001	Kg/mg
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_{nc})	6	yrs
Oral Slope Factor (SF_o)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	15	Kg
Oral Reference Dose on (RfD_o)	chemical-specific	mg/Kg-day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)(SF_o)}{(BW)(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)}{(RfD_o)(BW)(AT_{nc})(365days/year)}$$

COPC [a/]	CAS [b/]	EPC (mg/kg) [c/]	SF_o $(mg/kg\text{-}day)^{-1}$ [d/]	RFD_o (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	29,590	--	1	--	--	1.89E-01	9%
Arsenic	7440-38-2	61.08	1.5	0.0003	5.02E-05	100%	1.30E+00	65%
Cobalt	7440-48-4	22.77	--	0.0003	--	--	4.85E-01	24%
Manganese	7439-96-5	802.8	--	0.14	--	--	3.67E-02	2%
Thallium	7440-28-0	2.715	--	--	--	--	--	--
Vanadium	7440-62-2	99.07	--	--	--	--	--	--
Lewisite		0.07	--	1.00E-04	--	--	4.47E-03	0%
				Pathway Sums	5.E-05		2.E+00	

a/ COPC = Chemical of potential concern.
b/ CAS = Chemical Abstracts Service number.
c/ Exposure Point Concentration,
d/ mg/Kg-day = Milligrams per kilogram-day.
e/ "--" = Data unavailable.

RME RESIDENT (CHILD)
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES -- DERMAL CONTACT WITH MIXED SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (child)	
COPC Concentration in Soil (C_{soil})	chemical-specific	mg/kg
Exposure Frequency (EF)	350	days/yr
Fraction of EF in Contact with Soil (ET)	1	unitless
Exposure Duration (ED)	6	yrs
Exposed Body Surface Area (SA)	2920	cm^2
Soil-to-Skin Adherence Factor (AF)	0.2	mg/cm^2-event
Dermal Soil Absorption Factor (DAF)	chemical-specific	unitless
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_n)	6	yrs
Oral Slope Factor Adjusted for GI Absorption (SF_d)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	15	Kg
Oral Reference Dose Adjusted for GI Absorption (RfD_d)	chemical-specific	mg/Kg-day
Conversion Factor (CF)	0.000001	Kg/mg
Oral Absorption Factor (OAF)	chemical-specific	unitless
Event Frequency (EV)	1	events/day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(SF_d)(CF)(EV)}{(BW)(AT_c)(365days/year)}$$

Where $SF_d = SF_o/OAF$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(CF)(EV)}{(RfD_d)(BW)(AT_n)(365days/year)}$$

Where $RfD_d = (RfD_o)*(OAF)$

COPC [a/]	CAS [b/]	EPC (mg/kg)[c/]	DAF (unitless)	SF_d (mg/kg-day)$^{-1}$[d/]	RFD_d (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	29,590	--	--	0.1	--	--	--	--
Arsenic	7440-38-2	61.08	0.03	1.5	0.0003	8.80E-06	100%	2.28E-01	60%
Cobalt	7440-48-4	22.77	--	--	0.7	--	--	--	--
Manganese	7439-96-5	802.8	--	--	0.00096	--	--	--	--
Thallium	7440-28-0	2.715	--	--	--	--	--	--	--
Vanadium	7440-62-2	99.07	--	--	--	--	--	--	--
Lewisite		0.07	0.1	--	1.70E-06	--	--	1.54E-01	40%
					Pathway Sums	9.E-06		4.E-01	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ Exposure Point Concentration,

d/ mg/Kg-day = Milligrams per kilogram-day.

e/ "--" = Data unavailable.

RME RESIDENT (CHILD)
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES - INHALATION OF VOLATILES/PARTICULATES FROM MIXED SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (child)	
COPC Ambient Air Concentration due to volatile (organics) or particulate (inorganics) emissions from soil (Cair-VOC/Particulate)	chemical-specific	$\mu g/m^3$
Exposure Frequency (EF)	350	days/yr
Exposure Duration (ED)	6	yrs
Fraction of EF in Contact with Soil (ET)	0.074	unitless
Averaging Time, Carcinogens (AT_C)	70	yrs
Averaging Time, Noncarcinogens (AT_N)	6	yrs
Inhalation Unit Risk Factor(URF)	chemical-specific	$(\mu g/m^3)^{-1}$
Inhalation Reference Concentration (RfC)	chemical-specific	$\mu g/m^3$
Volatilization Factor (VF)	chemical-specific	m^3/kg
Particulate emission factor (PEF)	1.27E+09	m^3/kg
	(see Appenedix B)	

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)(URF)}{(AT_c)(365 days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)}{(RfC)(AT_{nc})(365 days/year)}$$

where:

$$C_{air\text{-}VOC} = \frac{(C_{soil})}{(VF)}$$ for organics; and

$$C_{air\text{-}Particulate} = \frac{(C_{soil})}{(PEF)}$$ for inorganics

COPC[a/]	CAS[b/]	EPC $(\mu g/kg)$[c/]	Volatilization Factor (m^3/kg)[d/]	$C_{air\text{-}VOC/Particulate}$ $(\mu g/m^3)$[e/]	URF $(\mu g/m^3)^{-1}$	RFC $(\mu g/m^3)$	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	29590000	--	2.33E-02	--	5.00E+00	--	--	3.31E-04	20%
Arsenic	7440-38-2	61080	--	4.81E-05	4.30E-03	1.50E-02	1.26E-09	56%	2.28E-04	14%
Cobalt	7440-48-4	2.28E+04	--	1.79E-05	9.00E-03	6.00E-03	9.81E-10	44%	2.12E-04	13%
Manganese	7439-96-5	802800	--	6.32E-04	--	5.00E-02	--	--	8.97E-04	54%
Thallium	7440-28-0	2715	--	2.14E-06	--	--	--	--	--	--
Vanadium	7440-62-2	99070	--	7.80E-05	--	--	--	--	--	--
Lewisite		70	--	5.51E-08	--	3.00E+00	--	--	1.30E-09	
					Pathway Sums		2.E-09		2.E-03	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ µg/Kg = Micrograms per kilogram.

d/ m^3/kg = Cubic meters per kilogram. Volatilization Factors used for volatile organic compounds only.

e/ µg/m^3 = Micrograms per cubic meter.

f/ "--" = Data unavailable.

CT RESIDENT (CHILD)

CARCINOGENIC AND NONCARCINOGENIC RISK ESTIMATES - INGESTION OF SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (child)	
COPC Concentration in Soil/Sediment ($C_{soil/sed}$)	chemical-specific	mg/Kg
Soil Ingestion Rate ($IR_{soil/sed}$)	100	mg/day
Exposure Frequency (EF)	350	days/yr
Exposure Duration (ED)	6	yrs
Fraction Contaminated Soil Ingested (FI)	1	unitless
Conversion Factor (CF)	0.000001	Kg/mg
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_{nc})	6	yrs
Oral Slope Factor (SF_o)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	15	Kg
Oral Reference Dose on (RfD_o)	chemical-specific	mg/Kg-day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)(SF_o)}{(BW)(AT_c)(365 days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)}{(RfD_o)(BW)(AT_{nc})(365 days/year)}$$

COPC [a/]	CAS [b/]	EPC (mg/kg) [c/]	SF_o $(mg/kg\text{-}day)^{-1}$ [d/]	RFD_o (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	25,431	--	1	--	--	1.63E-01	22%
Arsenic	7440-38-2	7.182	1.5	0.0003	5.90E-06	100%	1.53E-01	20%
Cobalt	7440-48-4	19.43	--	0.0003	--	--	4.14E-01	55%
Manganese	7439-96-5	507.7	--	0.14	--	--	2.32E-02	3%
Thallium	7440-28-0	2.129	--	--	--	--	--	--
Vanadium	7440-62-2	78.16	--	--	--	--	--	--
				Pathway Sums	6.E-06		8.E-01	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ Exposure Point Concentration,

d/ mg/Kg-day = Milligrams per kilogram-day.

e/ "--" = Data unavailable.

CT RESIDENT (CHILD)
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES -- DERMAL CONTACT WITH SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (child)	
COPC Concentration in Soil (C_{soil})	chemical-specific	mg/kg
Exposure Frequency (EF)	350	days/yr
Fraction of EF in Contact with Soil (ET)	1	unitless
Exposure Duration (ED)	6	yrs
Exposed Body Surface Area (SA)	2920	cm^2
Soil-to-Skin Adherence Factor (AF)	0.04	mg/cm^2-event
Dermal Soil Absorption Factor (DAF)	chemical-specific	unitless
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_n)	6	yrs
Oral Slope Factor Adjusted for GI Absorption (SF_d)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	15	Kg
Oral Reference Dose Adjusted for GI Absorption (RfD_d)	chemical-specific	mg/Kg-day
Conversion Factor (CF)	0.000001	Kg/mg
Oral Absorption Factor (OAF)	chemical-specific	unitless
Event Frequency (EV)	1	events/day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(SF_d)(CF)(EV)}{(BW)(AT_c)(365days/year)}$$

Where $SF_d = SF_o/OAF$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(CF)(EV)}{(RfD_d)(BW)(AT_n)(365days/year)}$$

Where $RfD_d = (RfD_o)*(OAF)$

COPC [a/]	CAS [b/]	EPC (mg/kg)[c/]	DAF (unitless)	SF_d (mg/kg-day)$^{-1}$[d/]	RFD_d (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	25,431	--	--	0.1	--	--	--	--
Arsenic	7440-38-2	7.182	0.03	1.5	0.0003	2.07E-07	100%	5.36E-03	100%
Cobalt	7440-48-4	19.43	--	--	0.7	--	--	--	--
Manganese	7439-96-5	507.7	--	--	0.00096	--	--	--	--
Thallium	7440-28-0	2.129	--	--	--	--	--	--	--
Vanadium	7440-62-2	78.16	--	--	--	--	--	--	--
					Pathway Sums	2.E-07		5.E-03	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ Exposure Point Concentration,

d/ mg/Kg-day = Milligrams per kilogram-day.

e/ "--" = Data unavailable.

CT RESIDENT (CHILD)
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES - INHALATION OF VOLATILES/PARTICULATES FROM SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (child)	
COPC Ambient Air Concentration due to volatile (organics) or particulate (inorganics) emissions from soil (Cair-VOC/Particulate)	chemical-specific	µg/m³
Exposure Frequency (EF)	350	days/yr
Exposure Duration (ED)	6	yrs
Fraction of EF in Contact with Soil (ET)	0.074	unitless
Averaging Time, Carcinogens (AT_C)	70	yrs
Averaging Time, Noncarcinogens (AT_N)	6	yrs
Inhalation Unit Risk Factor(URF)	chemical-specific	$(\mu g/m^3)^{-1}$
Inhalation Reference Concentration (RfC)	chemical-specific	µg/m³
Volatilization Factor (VF)	chemical-specific	m³/kg
Particulate emission factor (PEF)	1.27E+09	m³/kg
	(see Appenedix B)	

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)(URF)}{(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)}{(RfC)(AT_{nc})(365days/year)}$$

where:

$$C_{air\text{-}VOC} = \frac{(C_{soil})}{(VF)}$$ for organics; and

$$C_{air\text{-}Particulate} = \frac{(C_{soil})}{(PEF)}$$ for inorganics

COPC[a/]	CAS[b/]	EPC (µg/kg)[c/]	Volatilization Factor (m³/kg)[d/]	$C_{air\text{-}VOC/Particulate}$ (µg/m³)[e/]	URF $(\mu g/m^3)^{-1}$	RFC (µg/m³)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	25431000	--	2.00E-02	--	5.00E+00	--	--	2.84E-04	27%
Arsenic	7440-38-2	7182	--	5.66E-06	4.30E-03	1.50E-02	1.48E-10	15%	2.68E-05	3%
Cobalt	7440-48-4	19430	--	1.53E-05	9.00E-03	6.00E-03	8.37E-10	85%	1.81E-04	17%
Manganese	7439-96-5	507700	--	4.00E-04	--	5.00E-02	--	--	5.67E-04	54%
Thallium	7440-28-0	2129	--	1.68E-06	--	--	--	--	--	--
Vanadium	7440-62-2	78160	--	6.15E-05	--	--	--	--	--	--
					Pathway Sums		1.E-09		1.E-03	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ µg/Kg = Micrograms per kilogram.

d/ m³/kg = Cubic meters per kilogram. Volatilization Factors used for volatile organic compounds only.

e/ µg/m³ = Micrograms per cubic meter.

f/ "--" = Data unavailable.

CT RESIDENT (CHILD)
CARCINOGENIC AND NONCARCINOGENIC RISK ESTIMATES - INGESTION OF MIXED SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (child)	
COPC Concentration in Soil/Sediment ($C_{soil/sed}$)	chemical-specific	mg/Kg
Soil Ingestion Rate ($IR_{soil/sed}$)	100	mg/day
Exposure Frequency (EF)	350	days/yr
Exposure Duration (ED)	6	yrs
Fraction Contaminated Soil Ingested (FI)	1	unitless
Conversion Factor (CF)	0.000001	Kg/mg
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_{nc})	6	yrs
Oral Slope Factor (SF_o)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	15	Kg
Oral Reference Dose on (RfD_o)	chemical-specific	mg/Kg-day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)(SF_o)}{(BW)(AT_c)(365 days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)}{(RfD_o)(BW)(AT_{nc})(365 days/year)}$$

COPC [a]	CAS [b]	EPC (mg/kg) [c]	SF_o $(mg/kg\text{-}day)^{-1}$ [d]	RFD_o (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	27,221	--	1	--	--	1.74E-01	16%
Arsenic	7440-38-2	21.84	1.5	0.0003	1.80E-05	100%	4.65E-01	43%
Cobalt	7440-48-4	19.93	--	0.0003	--	--	4.25E-01	39%
Manganese	7439-96-5	474.5	--	0.14	--	--	2.17E-02	2%
Thallium	7440-28-0	2.236	--	--	--	--	--	--
Vanadium	7440-62-2	88.59	--	--	--	--	--	--
Lewisite		0.0585	--	1.00E-04	--	--	3.74E-03	0.34%
				Pathway Sums	2.E-05		1.E+00	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ Exposure Point Concentration,

d/ mg/Kg-day = Milligrams per kilogram-day.

e/ "--" = Data unavailable.

CT RESIDENT (CHILD)
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES -- DERMAL CONTACT WITH MIXED SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (child)	
COPC Concentration in Soil (C_{soil})	chemical-specific	mg/kg
Exposure Frequency (EF)	350	days/yr
Fraction of EF in Contact with Soil (ET)	1	unitless
Exposure Duration (ED)	6	yrs
Exposed Body Surface Area (SA)	2920	cm^2
Soil-to-Skin Adherence Factor (AF)	0.04	mg/cm^2-event
Dermal Soil Absorption Factor (DAF)	chemical-specific	unitless
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_n)	6	yrs
Oral Slope Factor Adjusted for GI Absorption (SF_d)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	15	Kg
Oral Reference Dose Adjusted for GI Absorption (RfD_d)	chemical-specific	mg/Kg-day
Conversion Factor (CF)	0.000001	Kg/mg
Oral Absorption Factor (OAF)	chemical-specific	unitless
Event Frequency (EV)	1	events/day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(SF_d)(CF)(EV)}{(BW)(AT_c)(365 days/year)}$$

Where $SF_d = SF_o/OAF$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(CF)(EV)}{(RfD_d)(BW)(AT_n)(365 days/year)}$$

Where $RfD_d = (RfD_o)*(OAF)$

COPC [a/]	CAS [b/]	EPC (mg/kg)[c/]	DAF (unitless)	SF_d (mg/kg-day)$^{-1}$[d/]	RFD_d (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	27,221	--	--	0.1	--	--	--	--
Arsenic	7440-38-2	21.84	0.03	1.5	0.0003	6.29E-07	100%	1.63E-02	100%
Cobalt	7440-48-4	19.93	--	--	0.7	--	--	--	--
Manganese	7439-96-5	474.5	--	--	0.00096	--	--	--	--
Thallium	7440-28-0	2.236	--	--	--	--	--	--	--
Vanadium	7440-62-2	88.59	--	--	--	--	--	--	--
Lewisite		0.0585	0.1	--	1.70E-06	--	--	2.57E-02	61%
					Pathway Sums	6.E-07		4.E-02	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ Exposure Point Concentration,

d/ mg/Kg-day = Milligrams per kilogram-day.

e/ "--" = Data unavailable.

CT RESIDENT (CHILD)

CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES - INHALATION OF VOLATILES/PARTICULATES FROM MIXED SOIL

4825 GLENBROOK ROAD

Exposure Assumptions

Receptor	Resident (child)	
COPC Ambient Air Concentration due to volatile (organics) or particulate (inorganics) emissions from soil (Cair-VOC/Particulate)	chemical-specific	$\mu g/m^3$
Exposure Frequency (EF)	350	days/yr
Exposure Duration (ED)	6	yrs
Fraction of EF in Contact with Soil (ET)	0.074	unitless
Averaging Time, Carcinogens (AT_C)	70	yrs
Averaging Time, Noncarcinogens (AT_N)	6	yrs
Inhalation Unit Risk Factor(URF)	chemical-specific	$(\mu g/m^3)^{-1}$
Inhalation Reference Concentration (RfC)	chemical-specific	$\mu g/m^3$
Volatilization Factor (VF)	chemical-specific	m^3/kg
Particulate emission factor (PEF)	1.27E+09	m^3/kg
	(see Appenedix B)	

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)(URF)}{(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)}{(RfC)(AT_{nc})(365days/year)}$$

where:

$$C_{air\text{-}VOC} = \frac{(C_{soil})}{(VF)} \quad \text{for organics; and}$$

$$C_{air\text{-}Particulate} = \frac{(C_{soil})}{(PEF)} \quad \text{for inorganics}$$

COPC[a/]	CAS[b/]	EPC ($\mu g/kg$)[c/]	Volatilization Factor (m^3/kg)[d/]	$C_{air\text{-}VOC/Particulate}$ ($\mu g/m^3$)[e/]	URF $(\mu g/m^3)^{-1}$	RFC ($\mu g/m^3$)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	27221000	--	2.14E-02	--	5.00E+00	--	--	3.04E-04	28%
Arsenic	7440-38-2	21840	--	1.72E-05	4.30E-03	1.50E-02	4.50E-10	34%	8.14E-05	7%
Cobalt	7440-48-4	1.99E+04	--	1.57E-05	9.00E-03	6.00E-03	8.59E-10	66%	1.86E-04	17%
Manganese	7439-96-5	474500	--	3.74E-04	--	5.00E-02	--	--	5.30E-04	48%
Thallium	7440-28-0	2236	--	1.76E-06	--	--	--	--	--	--
Vanadium	7440-62-2	88590	--	6.98E-05	--	--	--	--	--	--
Lewisite		58.5	--	4.61E-08	--	3.00E+00	--	--	1.09E-09	0.0%
					Pathway Sums		1.E-09		1.E-03	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ µg/Kg = Micrograms per kilogram.

d/ m^3/kg = Cubic meters per kilogram. Volatilization Factors used for volatile organic compounds only.

e/ $\mu g/m^3$ = Micrograms per cubic meter.

f/ "--" = Data unavailable.

OUTDOOR WORKERS

RME OUTDOOR WORKER

CARCINOGENIC AND NONCARCINOGENIC RISK ESTIMATES - INGESTION OF SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Outdoor Worker	
COPC Concentration in Soil/Sediment ($C_{soil/sed}$)	chemical-specific	mg/Kg
Soil Ingestion Rate ($IR_{soil/sed}$)	330	mg/day
Exposure Frequency (EF)	250	days/yr
Exposure Duration (ED)	25	yrs
Fraction Contaminated Soil Ingested (FI)	1	unitless
Conversion Factor (CF)	0.000001	Kg/mg
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_{nc})	25	yrs
Oral Slope Factor (SF_o)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	70	Kg
Oral Reference Dose on (RfD_o)	chemical-specific	mg/Kg-day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)(SF_o)}{(BW)(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)}{(RfD_o)(BW)(AT_{nc})(365days/year)}$$

COPC [a]	**CAS** [b]	**EPC (mg/kg)** [c]	**SF_o (mg/kg-day)$^{-1}$** [d]	**RFD_o (mg/kg-day)**	**Cancer Risk**	**% Of Total**	**Hazard Quotient**	**% Of Total**
Aluminum	7429-90-5	30,605	--	1	--	--	9.88E-02	21%
Arsenic	7440-38-2	9.915	1.5	0.0003	1.72E-05	100%	1.07E-01	23%
Cobalt	7440-48-4	23.47	--	0.0003	--	--	2.53E-01	53%
Manganese	7439-96-5	638	--	0.14	--	--	1.47E-02	3%
Thallium	7440-28-0	3.157	--	--	--	--	--	--
Vanadium	7440-62-2	96.48	--	--	--	--	--	--
				Pathway Sums	2.E-05		5.E-01	

a/ COPC = Chemical of potential concern.
b/ CAS = Chemical Abstracts Service number.
c/ Exposure Point Concentration,
d/ mg/Kg-day = Milligrams per kilogram-day.
e/ "--" = Data unavailable.

RME OUTDOOR WORKER
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES -- DERMAL CONTACT WITH SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Outdoor Worker	
COPC Concentration in Soil (C_{soil})	chemical-specific	mg/kg
Exposure Frequency (EF)	250	days/yr
Fraction of EF in Contact with Soil (ET)	1	unitless
Exposure Duration (ED)	25	yrs
Exposed Body Surface Area (SA)	3300	cm^2
Soil-to-Skin Adherence Factor (AF)	0.2	mg/cm^2-event
Dermal Soil Absorption Factor (DAF)	chemical-specific	unitless
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_n)	25	yrs
Oral Slope Factor Adjusted for GI Absorption (SF_d)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	70	Kg
Oral Reference Dose Adjusted for GI Absorption (RfD_d)	chemical-specific	mg/Kg-day
Conversion Factor (CF)	0.000001	Kg/mg
Oral Absorption Factor (OAF)	chemical-specific	unitless
Event Frequency (EV)	1	events/day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(SF_d)(CF)(EV)}{(BW)(AT_c)(365 days/year)}$$

Where $SF_d = SF_o/OAF$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(CF)(EV)}{(RfD_d)(BW)(AT_n)(365 days/year)}$$

Where $RfD_d = (RfD_o)*(OAF)$

COPC [a/]	CAS [b/]	EPC (mg/kg)[c/]	DAF (unitless)	SF_d (mg/kg-day)$^{-1}$ [d/]	RFD_d (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	30,605	--	--	0.1	--	--	--	--
Arsenic	7440-38-2	9.915	0.03	1.5	0.0003	1.03E-06	100%	6.40E-03	100%
Cobalt	7440-48-4	23.47	--	--	0.7	--	--	--	--
Manganese	7439-96-5	638	--	--	0.00096	--	--	--	--
Thallium	7440-28-0	3.157	--	--	--	--	--	--	--
Vanadium	7440-62-2	96.48	--	--	--	--	--	--	--
					Pathway Sums	1.E-06		6.E-03	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ Exposure Point Concentration,

d/ mg/Kg-day = Milligrams per kilogram-day.

e/ "--" = Data unavailable.

RME OUTDOOR WORKER
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES - INHALATION OF VOLATILES/PARTICULATES FROM SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Outdoor Worker	
COPC Ambient Air Concentration due to volatile (organics) or particulate (inorganics) emissions from soil (Cair-VOC/Particulate)	chemical-specific	µg/m³
Exposure Frequency (EF)	250	days/yr
Exposure Duration (ED)	25	yrs
Fraction of EF in Contact with Soil (ET)	1	unitless
Averaging Time, Carcinogens (AT_C)	70	yrs
Averaging Time, Noncarcinogens (AT_N)	25	yrs
Inhalation Unit Risk Factor(URF)	chemical-specific	$(\mu g/m^3)^{-1}$
Inhalation Reference Concentration (RfC)	chemical-specific	µg/m³
Volatilization Factor (VF)	chemical-specific	m³/kg
Particulate emission factor (PEF)	1.27E+09	m³/kg
	(see Appenedix B)	

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)(URF)}{(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)}{(RfC)(AT_{nc})(365days/year)}$$

where:

$$C_{air\text{-}VOC} = \frac{(C_{soil})}{(VF)} \quad \text{for organics; and}$$

$$C_{air\text{-}Particulate} = \frac{(C_{soil})}{(PEF)} \quad \text{for inorganics}$$

COPC[a/]	CAS[b/]	EPC (µg/kg)[c/]	Volatilization Factor (m³/kg)[d/]	$C_{air\text{-}VOC/Particulate}$ (µg/m³)[e/]	URF $(\mu g/m^3)^{-1}$	RFC (µg/m³)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	30605000	--	2.41E-02	--	5.00E+00	--	--	3.30E-03	26%
Arsenic	7440-38-2	9915	--	7.81E-06	4.30E-03	1.50E-02	8.21E-09	17%	3.56E-04	3%
Cobalt	7440-48-4	2.35E+04	--	1.85E-05	9.00E-03	6.00E-03	4.07E-08	83%	2.11E-03	17%
Manganese	7439-96-5	638000	--	5.02E-04	--	5.00E-02	--	--	6.88E-03	54%
Thallium	7440-28-0	3157	--	2.49E-06	--	--	--	--	--	--
Vanadium	7440-62-2	96480	--	7.60E-05	--	--	--	--	--	--
						Pathway Sums	5.E-08		1.E-02	

a/ COPC = Chemical of potential concern.
b/ CAS = Chemical Abstracts Service number.
c/ µg/Kg = Micrograms per kilogram.
d/ m³/kg = Cubic meters per kilogram. Volatilization Factors used for volatile organic compounds only.
e/ µg/m³ = Micrograms per cubic meter.
f/ "--" = Data unavailable.

RME OUTDOOR WORKER
CARCINOGENIC AND NONCARCINOGENIC RISK ESTIMATES - INGESTION OF MIXED SOIL
4825 GLENBROOK ROAD

Exposure Assumptions

Receptor	Outdoor Worker	
COPC Concentration in Soil/Sediment ($C_{soil/sed}$)	chemical-specific	mg/Kg
Soil Ingestion Rate ($IR_{soil/sed}$)	330	mg/day
Exposure Frequency (EF)	250	days/yr
Exposure Duration (ED)	25	yrs
Fraction Contaminated Soil Ingested (FI)	1	unitless
Conversion Factor (CF)	0.000001	Kg/mg
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_{nc})	25	yrs
Oral Slope Factor (SF_o)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	70	Kg
Oral Reference Dose on (RfD_o)	chemical-specific	mg/Kg-day

Risk and Hazard Equations

Carcinogenic:

$$\text{Risk} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)(SF_o)}{(BW)(AT_c)(365 days/year)}$$

Non-Carcinogenic:

$$\text{HQ} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)}{(RfD_o)(BW)(AT_{nc})(365 days/year)}$$

COPC [a]	CAS [b]	EPC (mg/kg)[c]	SF_o $(mg/kg\text{-}day)^{-1}$ [d]	RFD_o (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	29,590	--	1	--	--	9.55E-02	9%
Arsenic	7440-38-2	61.08	1.5	0.0003	1.06E-04	100%	6.57E-01	65%
Cobalt	7440-48-4	22.77	--	0.0003	--	--	2.45E-01	24%
Manganese	7439-96-5	802.8	--	0.14	--	--	1.85E-02	2%
Thallium	7440-28-0	2.715	--	--	--	--	--	--
Vanadium	7440-62-2	99.07	--	--	--	--	--	--
Lewisite		0.07	--	1.00E-04	--	--	2.26E-03	0%
				Pathway Sums	1.E-04		1.E+00	

a/ COPC = Chemical of potential concern.
b/ CAS = Chemical Abstracts Service number.
c/ Exposure Point Concentration,
d/ mg/Kg-day = Milligrams per kilogram-day.
e/ "--" = Data unavailable.

RME OUTDOOR WORKER
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES -- DERMAL CONTACT WITH MIXED SOIL
4825 GLENBROOK ROAD

Exposure Assumptions

Receptor	Outdoor Worker	
COPC Concentration in Soil (C_{soil})	chemical-specific	mg/kg
Exposure Frequency (EF)	250	days/yr
Fraction of EF in Contact with Soil (ET)	1	unitless
Exposure Duration (ED)	25	yrs
Exposed Body Surface Area (SA)	3300	cm^2
Soil-to-Skin Adherence Factor (AF)	0.2	mg/cm^2-event
Dermal Soil Absorption Factor (DAF)	chemical-specific	unitless
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_n)	25	yrs
Oral Slope Factor Adjusted for GI Absorption (SF_d)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	70	Kg
Oral Reference Dose Adjusted for GI Absorption (RfD_d)	chemical-specific	mg/Kg-day
Conversion Factor (CF)	0.000001	Kg/mg
Oral Absorption Factor (OAF)	chemical-specific	unitless
Event Frequency (EV)	1	events/day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(SF_d)(CF)(EV)}{(BW)(AT_c)(365 days/year)}$$

Where $SF_d = SF_o/OAF$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(CF)(EV)}{(RfD_d)(BW)(AT_n)(365 days/year)}$$

Where $RfD_d = (RfD_o)*(OAF)$

COPC [a]	CAS [b]	EPC (mg/kg)[c]	DAF (unitless)	SF_d (mg/kg-day)$^{-1}$[d]	RFD_d (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	29,590	--	--	0.1	--	--	--	--
Arsenic	7440-38-2	61.08	0.03	1.5	0.0003	6.34E-06	100%	3.94E-02	100%
Cobalt	7440-48-4	22.77	--	--	0.7	--	--	--	--
Manganese	7439-96-5	802.8	--	--	0.00096	--	--	--	--
Thallium	7440-28-0	2.715	--	--	--	--	--	--	--
Vanadium	7440-62-2	99.07	--	--	--	--	--	--	--
Lewisite		0.07	0.1	--	1.70E-06	--	--	2.66E-02	
					Pathway Sums	6.E-06		7.E-02	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ Exposure Point Concentration,

d/ mg/Kg-day = Milligrams per kilogram-day.

e/ "--" = Data unavailable.

RME OUTDOOR WORKER
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES - INHALATION OF VOLATILES/PARTICULATES FROM MIXED SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Outdoor Worker	
COPC Ambient Air Concentration due to volatile (organics) or particulate (inorganics) emissions from soil (Cair-VOC/Particulate)	chemical-specific	µg/m³
Exposure Frequency (EF)	250	days/yr
Exposure Duration (ED)	25	yrs
Fraction of EF in Contact with Soil (ET)	1	unitless
Averaging Time, Carcinogens (AT_C)	70	yrs
Averaging Time, Noncarcinogens (AT_N)	25	yrs
Inhalation Unit Risk Factor(URF)	chemical-specific	(µg/m³)⁻¹
Inhalation Reference Concentration (RfC)	chemical-specific	µg/m³
Volatilization Factor (VF)	chemical-specific	m³/kg
Particulate emission factor (PEF)	1.27E+09	m³/kg
	(see Appenedix B)	

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)(URF)}{(AT_c)(365 days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)}{(RfC)(AT_{nc})(365 days/year)}$$

where:

$$C_{air\text{-}VOC} = \frac{(C_{soil})}{(VF)}$$ for organics; and

$$C_{air\text{-}Particulate} = \frac{(C_{soil})}{(PEF)}$$ for inorganics

COPC[a/]	CAS[b/]	EPC (µg/kg)[c/]	Volatilization Factor (m³/kg)[d/]	$C_{air\text{-}VOC/Particulate}$ (µg/m³)[e/]	URF (µg/m³)⁻¹	RFC (µg/m³)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	29590000	--	2.33E-02	--	5.00E+00	--	--	3.19E-03	20%
Arsenic	7440-38-2	61080	--	4.81E-05	4.30E-03	1.50E-02	5.06E-08	56%	2.20E-03	14%
Cobalt	7440-48-4	2.28E+04	--	1.79E-05	9.00E-03	6.00E-03	3.95E-08	44%	2.05E-03	13%
Manganese	7439-96-5	802800	--	6.32E-04	--	5.00E-02	--	--	8.66E-03	54%
Thallium	7440-28-0	2715	--	2.14E-06	--	--	--	--	--	--
Vanadium	7440-62-2	99070	--	7.80E-05	--	--	--	--	--	--
Lewisite		70	--	5.51E-08	--	3.00E+00	--	--	1.26E-08	
					Pathway Sums		9.E-08		2.E-02	

a/ COPC = Chemical of potential concern.
b/ CAS = Chemical Abstracts Service number.
c/ µg/Kg = Micrograms per kilogram.
d/ m³/kg = Cubic meters per kilogram. Volatilization Factors used for volatile organic compounds only.
e/ µg/m³ = Micrograms per cubic meter.
f/ "--" = Data unavailable.

CT OUTDOOR WORKER
CARCINOGENIC AND NONCARCINOGENIC RISK ESTIMATES - INGESTION OF SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Outdoor Worker	
COPC Concentration in Soil/Sediment ($C_{soil/sed}$)	chemical-specific	mg/Kg
Soil Ingestion Rate ($IR_{soil/sed}$)	330	mg/day
Exposure Frequency (EF)	219	days/yr
Exposure Duration (ED)	9	yrs
Fraction Contaminated Soil Ingested (FI)	1	unitless
Conversion Factor (CF)	0.000001	Kg/mg
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_{nc})	9	yrs
Oral Slope Factor (SF_o)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	70	Kg
Oral Reference Dose on (RfD_o)	chemical-specific	mg/Kg-day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)(SF_o)}{(BW)(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)}{(RfD_o)(BW)(AT_{nc})(365days/year)}$$

COPC [a/]	CAS [b/]	EPC (mg/kg) [c/]	SF_o $(mg/kg\text{-}day)^{-1}$ [d/]	RFD_o (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	25,431	--	1	--	--	7.19E-02	22%
Arsenic	7440-38-2	7.182	1.5	0.0003	3.92E-06	100%	6.77E-02	20%
Cobalt	7440-48-4	19.43	--	0.0003	--	--	1.83E-01	55%
Manganese	7439-96-5	507.7	--	0.14	--	--	1.03E-02	3%
Thallium	7440-28-0	2.129	--	--	--	--	--	--
Vanadium	7440-62-2	78.16	--	--	--	--	--	--
				Pathway Sums	4.E-06		3.E-01	

a/ COPC = Chemical of potential concern.
b/ CAS = Chemical Abstracts Service number.
c/ Exposure Point Concentration,
d/ mg/Kg-day = Milligrams per kilogram-day.
e/ "--" = Data unavailable.

CT OUTDOOR WORKER
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES -- DERMAL CONTACT WITH SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions

Receptor	Outdoor Worker	
COPC Concentration in Soil (C_{soil})	chemical-specific	mg/kg
Exposure Frequency (EF)	219	days/yr
Fraction of EF in Contact with Soil (ET)	1	unitless
Exposure Duration (ED)	9	yrs
Exposed Body Surface Area (SA)	3300	cm^2
Soil-to-Skin Adherence Factor (AF)	0.02	mg/cm^2-event
Dermal Soil Absorption Factor (DAF)	chemical-specific	unitless
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_n)	9	yrs
Oral Slope Factor Adjusted for GI Absorption (SF_d)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	70	Kg
Oral Reference Dose Adjusted for GI Absorption (RfD_d)	chemical-specific	mg/Kg-day
Conversion Factor (CF)	0.000001	Kg/mg
Oral Absorption Factor (OAF)	chemical-specific	unitless
Event Frequency (EV)	1	events/day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(SF_d)(CF)(EV)}{(BW)(AT_c)(365days/year)}$$

Where $SF_d = SF_o/OAF$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(CF)(EV)}{(RfD_d)(BW)(AT_n)(365days/year)}$$

Where $RfD_d = (RfD_o)*(OAF)$

COPC [a/]	CAS [b/]	EPC (mg/kg)[c/]	DAF (unitless)	SF_d (mg/kg-day)$^{-1}$[d/]	RFD_d (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	25,431	--	--	0.1	--	--	--	--
Arsenic	7440-38-2	7.182	0.03	1.5	0.0003	2.35E-08	100%	4.06E-04	100%
Cobalt	7440-48-4	19.43	--	--	0.7	--	--	--	--
Manganese	7439-96-5	507.7	--	--	0.00096	--	--	--	--
Thallium	7440-28-0	2.129	--	--	--	--	--	--	--
Vanadium	7440-62-2	78.16	--	--	--	--	--	--	--
					Pathway Sums	2.E-08		4.E-04	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ Exposure Point Concentration,

d/ mg/Kg-day = Milligrams per kilogram-day.

e/ "--" = Data unavailable.

CT OUTDOOR WORKER

CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES - INHALATION OF VOLATILES/PARTICULATES FROM SURFACE SOIL

4825 GLENBROOK ROAD

Exposure Assumptions

Receptor	Outdoor Worker	
COPC Ambient Air Concentration due to volatile (organics) or particulate (inorganics) emissions from soil (Cair-VOC/Particulate)	chemical-specific	µg/m³
Exposure Frequency (EF)	219	days/yr
Exposure Duration (ED)	9	yrs
Fraction of EF in Contact with Soil (ET)	0.333	unitless
Averaging Time, Carcinogens (AT_C)	70	yrs
Averaging Time, Noncarcinogens (AT_N)	9	yrs
Inhalation Unit Risk Factor(URF)	chemical-specific	(µg/m³)⁻¹
Inhalation Reference Concentration (RfC)	chemical-specific	µg/m³
Volatilization Factor (VF)	chemical-specific	m³/kg
Particulate emission factor (PEF)	1.27E+09 (see Appenedix B)	m³/kg

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)(URF)}{(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)}{(RfC)(AT_{nc})(365days/year)}$$

where:

$$C_{air\text{-}VOC} = \frac{(C_{soil})}{(VF)}$$ for organics; and

$$C_{air\text{-}Particulate} = \frac{(C_{soil})}{(PEF)}$$ for inorganics

COPC[a/]	CAS[b/]	EPC (µg/kg)[c/]	Volatilization Factor (m³/kg)[d/]	$C_{air\text{-}VOC/Particulate}$ (µg/m³)[e/]	URF (µg/m³)⁻¹	RFC (µg/m³)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	25431000	--	2.00E-02	--	5.00E+00	--	--	8.00E-04	27%
Arsenic	7440-38-2	7182	--	5.66E-06	4.30E-03	1.50E-02	6.25E-10	15%	7.53E-05	3%
Cobalt	7440-48-4	19430	--	1.53E-05	9.00E-03	6.00E-03	3.54E-09	85%	5.09E-04	17%
Manganese	7439-96-5	507700	--	4.00E-04	--	5.00E-02	--	--	1.60E-03	54%
Thallium	7440-28-0	2129	--	1.68E-06	--	--	--	--	--	--
Vanadium	7440-62-2	78160	--	6.15E-05	--	--	--	--	--	--
						Pathway Sums	4.E-09		3.E-03	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ µg/Kg = Micrograms per kilogram.

d/ m³/kg = Cubic meters per kilogram. Volatilization Factors used for volatile organic compounds only.

e/ µg/m³ = Micrograms per cubic meter.

f/ "--" = Data unavailable.

CT OUTDOOR WORKER
CARCINOGENIC AND NONCARCINOGENIC RISK ESTIMATES - INGESTION OF MIXED SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Outdoor Worker	
COPC Concentration in Soil/Sediment ($C_{soil/sed}$)	chemical-specific	mg/Kg
Soil Ingestion Rate ($IR_{soil/sed}$)	330	mg/day
Exposure Frequency (EF)	219	days/yr
Exposure Duration (ED)	9	yrs
Fraction Contaminated Soil Ingested (FI)	1	unitless
Conversion Factor (CF)	0.000001	Kg/mg
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_{nc})	9	yrs
Oral Slope Factor (SF_o)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	70	Kg
Oral Reference Dose on (RfD_o)	chemical-specific	mg/Kg-day

Risk and Hazard Equations

Carcinogenic:

$$\text{Risk} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)(SF_o)}{(BW)(AT_c)(365\text{days/year})}$$

Non-Carcinogenic:

$$\text{HQ} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)}{(RfD_o)(BW)(AT_{nc})(365\text{days/year})}$$

COPC [a/]	CAS [b/]	EPC (mg/kg) [c/]	SF_o $(mg/kg\text{-}day)^{-1}$ [d/]	RFD_o (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	27,221	--	1	--	--	7.70E-02	16%
Arsenic	7440-38-2	21.84	1.5	0.0003	1.19E-05	100%	2.06E-01	43%
Cobalt	7440-48-4	19.93	--	0.0003	--	--	1.88E-01	39%
Manganese	7439-96-5	474.5	--	0.14	--	--	9.59E-03	2%
Thallium	7440-28-0	2.236	--	--	--	--	--	--
Vanadium	7440-62-2	88.59	--	--	--	--	--	--
Lewisite		0.0585	--	1.00E-04	--	--	1.65E-03	0%
				Pathway Sums	1.E-05		5.E-01	

a/ COPC = Chemical of potential concern.
b/ CAS = Chemical Abstracts Service number.
c/ Exposure Point Concentration,
d/ mg/Kg-day = Milligrams per kilogram-day.
e/ "--" = Data unavailable.

CT OUTDOOR WORKER
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES -- DERMAL CONTACT WITH MIXED SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Outdoor Worker	
COPC Concentration in Soil (C_{soil})	chemical-specific	mg/kg
Exposure Frequency (EF)	219	days/yr
Fraction of EF in Contact with Soil (ET)	1	unitless
Exposure Duration (ED)	9	yrs
Exposed Body Surface Area (SA)	3300	cm^2
Soil-to-Skin Adherence Factor (AF)	0.02	mg/cm^2-event
Dermal Soil Absorption Factor (DAF)	chemical-specific	unitless
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_n)	9	yrs
Oral Slope Factor Adjusted for GI Absorption (SF_d)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	70	Kg
Oral Reference Dose Adjusted for GI Absorption (RfD_d)	chemical-specific	mg/Kg-day
Conversion Factor (CF)	0.000001	Kg/mg
Oral Absorption Factor (OAF)	chemical-specific	unitless
Event Frequency (EV)	1	events/day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(SF_d)(CF)(EV)}{(BW)(AT_c)(365 days/year)}$$

Where $SF_d = SF_o/OAF$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(CF)(EV)}{(RfD_d)(BW)(AT_n)(365 days/year)}$$

Where $RfD_d = (RfD_o)*(OAF)$

COPC [a]	CAS [b]	EPC (mg/kg)[c]	DAF (unitless)	SF_d (mg/kg-day)$^{-1}$[d]	RFD_d (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	27,221	--	--	0.1	--	--	--	--
Arsenic	7440-38-2	21.84	0.03	1.5	0.0003	7.15E-08	100%	1.24E-03	100%
Cobalt	7440-48-4	19.93	--	--	0.7	--	--	--	--
Manganese	7439-96-5	474.5	--	--	0.00096	--	--	--	--
Thallium	7440-28-0	2.236	--	--	--	--	--	--	--
Vanadium	7440-62-2	88.59	--	--	--	--	--	--	--
Lewisite		0.0585	0.1	--	1.70E-06	--	--	1.95E-03	
					Pathway Sums	7.E-08		3.E-03	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ Exposure Point Concentration,

d/ mg/Kg-day = Milligrams per kilogram-day.

e/ "--" = Data unavailable.

CT OUTDOOR WORKER

CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES - INHALATION OF VOLATILES/PARTICULATES FROM MIXED SOIL

4825 GLENBROOK ROAD

Exposure Assumptions

Receptor	Outdoor Worker	
COPC Ambient Air Concentration due to volatile (organics) or particulate (inorganics) emissions from soil (Cair-VOC/Particulate)	chemical-specific	µg/m^3
Exposure Frequency (EF)	219	days/yr
Exposure Duration (ED)	9	yrs
Fraction of EF in Contact with Soil (ET)	0.333	unitless
Averaging Time, Carcinogens (AT_C)	70	yrs
Averaging Time, Noncarcinogens (AT_N)	9	yrs
Inhalation Unit Risk Factor(URF)	chemical-specific	(µg/m^3)$^{-1}$
Inhalation Reference Concentration (RfC)	chemical-specific	µg/m^3
Volatilization Factor (VF)	chemical-specific	m^3/kg
Particulate emission factor (PEF)	1.27E+09	m^3/kg
	(see Appenedix B)	

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)(URF)}{(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)}{(RfC)(AT_{nc})(365days/year)}$$

where:

$$C_{air\text{-}VOC} = \frac{(C_{soil})}{(VF)}$$ for organics; and

$$C_{air\text{-}Particulate} = \frac{(C_{soil})}{(PEF)}$$ for inorganics

COPC[a/]	CAS[b/]	EPC (µg/kg)[c/]	Volatilization Factor (m^3/kg)[d/]	$C_{air\text{-}VOC/Particulate}$ (µg/m^3)[e/]	URF (µg/m^3)$^{-1}$	RFC (µg/m^3)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	27221000	--	2.14E-02	--	5.00E+00	--	--	8.56E-04	28%
Arsenic	7440-38-2	21840	--	1.72E-05	4.30E-03	1.50E-02	1.90E-09	34%	2.29E-04	7%
Cobalt	7440-48-4	1.99E+04	--	1.57E-05	9.00E-03	6.00E-03	3.63E-09	66%	5.23E-04	17%
Manganese	7439-96-5	474500	--	3.74E-04	--	5.00E-02	--	--	1.49E-03	48%
Thallium	7440-28-0	2236	--	1.76E-06	--	--	--	--	--	--
Vanadium	7440-62-2	88590	--	6.98E-05	--	--	--	--	--	--
Lewisite		58.5	--	4.61E-08	--	3.00E+00	--	--	3.07E-09	
					Pathway Sums		6.E-09		3.E-03	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ µg/Kg = Micrograms per kilogram.

d/ m^3/kg = Cubic meters per kilogram. Volatilization Factors used for volatile organic compounds only.

e/ µg/m^3 = Micrograms per cubic meter.

f/ "--" = Data unavailable.

CHILD GREEN SPACE USERS

RME RECREATIONAL GREEN SPACE USER (CHILD)
CARCINOGENIC AND NONCARCINOGENIC RISK ESTIMATES - INGESTION OF SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Recreational Green Space User (child)	
COPC Concentration in Soil/Sediment ($C_{soil/sed}$)	chemical-specific	mg/Kg
Soil Ingestion Rate ($IR_{soil/sed}$)	100	mg/day
Exposure Frequency (EF)	52	days/yr
Exposure Duration (ED)	6	yrs
Fraction Contaminated Soil Ingested (FI)	1	unitless
Conversion Factor (CF)	0.000001	Kg/mg
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_{nc})	6	yrs
Oral Slope Factor (SF_o)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	15	Kg
Oral Reference Dose on (RfD_o)	chemical-specific	mg/Kg-day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)(SF_o)}{(BW)(AT_c)(365 days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)}{(RfD_o)(BW)(AT_{nc})(365 days/year)}$$

COPC [a]	CAS [b]	EPC (mg/kg)[c]	SF_o $(mg/kg\text{-}day)^{-1}$ [d]	RFD_o (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	24058	--	1	--	--	2.28E-02	16%
Arsenic	7440-38-2	8.779	1.5	0.0003	1.07E-06	100%	2.78E-02	20%
Cobalt	7440-48-4	27.59	--	0.0003	--	--	8.73E-02	61%
Manganese	7439-96-5	614.2	--	0.14	--	--	4.17E-03	3%
Thallium	7440-28-0	5.009	--	--	--	--	--	--
Vanadium	7440-62-2	105.7	--	--	--	--	--	--
				Pathway Sums	1.E-06		1.E-01	

a/ COPC = Chemical of potential concern.
b/ CAS = Chemical Abstracts Service number.
c/ Exposure Point Concentration,
d/ mg/Kg-day = Milligrams per kilogram-day.
e/ "--" = Data unavailable.

RME RECREATIONAL GREEN SPACE USER (CHILD)
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES -- DERMAL CONTACT WITH SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions

Receptor	Recreational Green Space User (child)	
COPC Concentration in Soil (C_{soil})	chemical-specific	mg/kg
Exposure Frequency (EF)	52	days/yr
Fraction of EF in Contact with Soil (ET)	1	unitless
Exposure Duration (ED)	6	yrs
Exposed Body Surface Area (SA)	2920	cm^2
Soil-to-Skin Adherence Factor (AF)	0.2	mg/cm^2-event
Dermal Soil Absorption Factor (DAF)	chemical-specific	unitless
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_n)	6	yrs
Oral Slope Factor Adjusted for GI Absorption (SF_d)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	15	Kg
Oral Reference Dose Adjusted for GI Absorption (RfD_d)	chemical-specific	mg/Kg-day
Conversion Factor (CF)	0.000001	Kg/mg
Oral Absorption Factor (OAF)	chemical-specific	unitless
Event Frequency (EV)	1	events/day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(SF_d)(CF)(EV)}{(BW)(AT_c)(365 days/year)}$$

Where $SF_d = SF_o/OAF$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(CF)(EV)}{(RfD_d)(BW)(AT_n)(365 days/year)}$$

Where $RfD_d = (RfD_o)*(OAF)$

COPC [a]	CAS [b]	EPC (mg/kg)[c]	DAF (unitless)	SF_d (mg/kg-day)$^{-1}$[d]	RFD_d (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	24058	--	--	0.1	--	--	--	--
Arsenic	7440-38-2	8.779	0.03	1.5	0.0003	1.88E-07	100%	4.87E-03	100%
Cobalt	7440-48-4	27.59	--	--	0.7	--	--	--	--
Manganese	7439-96-5	614.2	--	--	0.00096	--	--	--	--
Thallium	7440-28-0	5.009	--	--	--	--	--	--	--
Vanadium	7440-62-2	105.7	--	--	--	--	--	--	--
					Pathway Sums	2.E-07		5.E-03	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ Exposure Point Concentration,

d/ mg/Kg-day = Milligrams per kilogram-day.

e/ "--" = Data unavailable.

RME RECREATIONAL GREEN SPACE USER (CHILD)
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES - INHALATION OF VOLATILES/PARTICULATES FROM SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Recreational Green Space User (child)	
COPC Ambient Air Concentration due to volatile (organics) or particulate (inorganics) emissions from soil (Cair-VOC/Particulate)	chemical-specific	µg/m³
Exposure Frequency (EF)	52	days/yr
Exposure Duration (ED)	6	yrs
Fraction of EF in Contact with Soil (ET)	0.074	unitless
Averaging Time, Carcinogens (AT_C)	70	yrs
Averaging Time, Noncarcinogens (AT_N)	6	yrs
Inhalation Unit Risk Factor(URF)	chemical-specific	(µg/m³)⁻¹
Inhalation Reference Concentration (RfC)	chemical-specific	µg/m³
Volatilization Factor (VF)	chemical-specific	m³/kg
Particulate emission factor (PEF)	1.27E+09 (see Appenedix B)	m³/kg

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)(URF)}{(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)}{(RfC)(AT_{nc})(365days/year)}$$

where:

$$C_{air\text{-}VOC} = \frac{(C_{soil})}{(VF)}$$ for organics; and

$$C_{air\text{-}Particulate} = \frac{(C_{soil})}{(PEF)}$$ for inorganics

COPC[a/]	CAS[b/]	EPC (µg/kg)[c/]	Volatilization Factor (m³/kg)[d/]	$C_{air\text{-}VOC/Particulate}$ (µg/m³)[e/]	URF (µg/m³)⁻¹	RFC (µg/m³)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	24058000	--	1.89E-02	--	5.00E+00	--	--	3.99E-05	22%
Arsenic	7440-38-2	8779	--	6.91E-06	4.30E-03	1.50E-02	2.69E-11	13%	4.86E-06	3%
Cobalt	7440-48-4	2.76E+04	--	2.17E-05	9.00E-03	6.00E-03	1.77E-10	87%	3.82E-05	21%
Manganese	7439-96-5	614200	--	4.84E-04	--	5.00E-02	--	--	1.02E-04	55%
Thallium	7440-28-0	5009	--	3.94E-06	--	--	--	--	--	--
Vanadium	7440-62-2	105700	--	8.32E-05	--	--	--	--	--	--
						Pathway Sums	2.E-10		2.E-04	

a/ COPC = Chemical of potential concern.
b/ CAS = Chemical Abstracts Service number.
c/ µg/Kg = Micrograms per kilogram.
d/ m³/kg = Cubic meters per kilogram. Volatilization Factors used for volatile organic compounds only.
e/ µg/m³ = Micrograms per cubic meter.
f/ "--" = Data unavailable.

CT RECREATIONAL GREEN SPACE USER (CHILD)
CARCINOGENIC AND NONCARCINOGENIC RISK ESTIMATES - INGESTION OF SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Resident (child)	
COPC Concentration in Soil/Sediment ($C_{soil/sed}$)	chemical-specific	mg/Kg
Soil Ingestion Rate ($IR_{soil/sed}$)	100	mg/day
Exposure Frequency (EF)	52	days/yr
Exposure Duration (ED)	6	yrs
Fraction Contaminated Soil Ingested (FI)	1	unitless
Conversion Factor (CF)	0.000001	Kg/mg
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_{nc})	6	yrs
Oral Slope Factor (SF_o)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	15	Kg
Oral Reference Dose on (RfD_o)	chemical-specific	mg/Kg-day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)(SF_o)}{(BW)(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(IR_{soil})(EF)(ED)(FI)(CF)}{(RfD_o)(BW)(AT_{nc})(365days/year)}$$

COPC [a/]	CAS [b/]	EPC (mg/kg) [c/]	SF_o $(mg/kg\text{-}day)^{-1}$ [d/]	RFD_o (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	19977	--	1	--	--	1.90E-02	19%
Arsenic	7440-38-2	7.421	1.5	0.0003	9.06E-07	100%	2.35E-02	24%
Cobalt	7440-48-4	16.59	--	0.0003	--	--	5.25E-02	54%
Manganese	7439-96-5	422.4	--	0.14	--	--	2.87E-03	3%
Thallium	7440-28-0	3.13	--	--	--	--	--	--
Vanadium	7440-62-2	75.02	--	--	--	--	--	--
				Pathway Sums	9.E-07		1.E-01	

a/ COPC = Chemical of potential concern.
b/ CAS = Chemical Abstracts Service number.
c/ Exposure Point Concentration,
d/ mg/Kg-day = Milligrams per kilogram-day.
e/ "--" = Data unavailable.

CT RECREATIONAL GREEN SPACE USER (CHILD)
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES -- DERMAL CONTACT WITH SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions

Receptor	Recreational Green Space User (child)	
COPC Concentration in Soil (C_{soil})	chemical-specific	mg/kg
Exposure Frequency (EF)	52	days/yr
Fraction of EF in Contact with Soil (ET)	1	unitless
Exposure Duration (ED)	6	yrs
Exposed Body Surface Area (SA)	2920	cm^2
Soil-to-Skin Adherence Factor (AF)	0.04	mg/cm^2-event
Dermal Soil Absorption Factor (DAF)	chemical-specific	unitless
Averaging Time, Carcinogens (AT_c)	70	yrs
Averaging Time, Noncarcinogens (AT_n)	6	yrs
Oral Slope Factor Adjusted for GI Absorption (SF_d)	chemical-specific	$(mg/Kg\text{-}day)^{-1}$
Body Weight (BW)	15	Kg
Oral Reference Dose Adjusted for GI Absorption (RfD_d)	chemical-specific	mg/Kg-day
Conversion Factor (CF)	0.000001	Kg/mg
Oral Absorption Factor (OAF)	chemical-specific	unitless
Event Frequency (EV)	1	events/day

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(SF_d)(CF)(EV)}{(BW)(AT_c)(365days/year)}$$

Where $SF_d = SF_o/OAF$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{soil})(EF)(ET)(ED)(SA)(AF)(DAF)(CF)(EV)}{(RfD_d)(BW)(AT_n)(365days/year)}$$

Where $RfD_d = (RfD_o)*(OAF)$

COPC [a]	CAS [b]	EPC (mg/kg)[c]	DAF (unitless)	SF_d (mg/kg-day)$^{-1}$[d]	RFD_d (mg/kg-day)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	19977	--	--	0.1	--	--	--	--
Arsenic	7440-38-2	7.421	0.03	1.5	0.0003	3.18E-08	100%	8.23E-04	100%
Cobalt	7440-48-4	16.59	--	--	0.7	--	--	--	--
Manganese	7439-96-5	422.4	--	--	0.00096	--	--	--	--
Thallium	7440-28-0	3.13	--	--	--	--	--	--	--
Vanadium	7440-62-2	75.02	--	--	--	--	--	--	--
					Pathway Sums	3.E-08		8.E-04	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ Exposure Point Concentration,

d/ mg/Kg-day = Milligrams per kilogram-day.

e/ "--" = Data unavailable.

CT RECREATIONAL GREEN SPACE USER (CHILD)
CARCINOGENIC AND NONCOARCINOGENIC RISK ESTIMATES - INHALATION OF VOLATILES/PARTICULATES FROM SURFACE SOIL
4825 GLENBROOK ROAD

Exposure Assumptions		
Receptor	Recreational Green Space User (child)	
COPC Ambient Air Concentration due to volatile (organics) or particulate (inorganics) emissions from soil (Cair-VOC/Particulate)	chemical-specific	µg/m^3
Exposure Frequency (EF)	52	days/yr
Exposure Duration (ED)	6	yrs
Fraction of EF in Contact with Soil (ET)	0.074	unitless
Averaging Time, Carcinogens (AT_C)	70	yrs
Averaging Time, Noncarcinogens (AT_N)	6	yrs
Inhalation Unit Risk Factor(URF)	chemical-specific	(µg/m^3)$^{-1}$
Inhalation Reference Concentration (RfC)	chemical-specific	µg/m^3
Volatilization Factor (VF)	chemical-specific	m^3/kg
Particulate emission factor (PEF)	1.27E+09 (see Appenedix B)	m^3/kg

Risk and Hazard Equations

Carcinogenic:

$$\textbf{Risk} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)(URF)}{(AT_c)(365days/year)}$$

Non-Carcinogenic:

$$\textbf{HQ} = \frac{(C_{air\text{-}VOC/Particulate})(EF)(ED)(ET)}{(RfC)(AT_{nc})(365days/year)}$$

where:

$$C_{air\text{-}VOC} = \frac{(C_{soil})}{(VF)}$$ for organics; and

$$C_{air\text{-}Particulate} = \frac{(C_{soil})}{(PEF)}$$ for inorganics

COPC[a/]	CAS[b/]	EPC (µg/kg)[c/]	Volatilization Factor (m^3/kg)[d/]	$C_{air\text{-}VOC/Particulate}$ (µg/m^3)[e/]	URF (µg/m^3)$^{-1}$	RFC (µg/m^3)	Cancer Risk	% Of Total	Hazard Quotient	% Of Total
Aluminum	7429-90-5	19977000	--	1.57E-02	--	5.00E+00	--	--	3.32E-05	25%
Arsenic	7440-38-2	7421	--	5.84E-06	4.30E-03	1.50E-02	2.27E-11	18%	4.11E-06	3%
Cobalt	7440-48-4	16590	--	1.31E-05	9.00E-03	6.00E-03	1.06E-10	82%	2.30E-05	18%
Manganese	7439-96-5	422400	--	3.33E-04	--	5.00E-02	--	--	7.01E-05	54%
Thallium	7440-28-0	3130	--	2.46E-06	--	--	--	--	--	--
Vanadium	7440-62-2	75020	--	5.91E-05	--	--	--	--	--	--
						Pathway Sums	1.E-10		1.E-04	

a/ COPC = Chemical of potential concern.

b/ CAS = Chemical Abstracts Service number.

c/ µg/Kg = Micrograms per kilogram.

d/ m^3/kg = Cubic meters per kilogram. Volatilization Factors used for volatile organic compounds only.

e/ µg/m^3 = Micrograms per cubic meter.

f/ "--" = Data unavailable.