

Remedial Investigation Report

**Former Philip Services Corporation Site
Rock Hill, South Carolina**

**Prepared For: South Carolina Department of Health &
Environmental Control**

September 2008

Remedial Investigation Report

Contents

Executive Summary

Section 1 Introduction

| | | |
|-----|------------------------|-----|
| 1.1 | Project Overview | 1-1 |
| 1.2 | RI Objectives..... | 1-2 |

Section 2 Project Background Summary

| | | |
|-------|-------------------------------------------------------|-----|
| 2.1 | Site Description and Background..... | 2-1 |
| 2.2 | Previous Investigations and Remedial Activities | 2-2 |
| 2.3 | Environmental Setting | 2-5 |
| 2.3.1 | Topography and Drainage | 2-5 |
| 2.3.2 | Geology and Hydrogeology | 2-6 |
| 2.4 | Historical Aerial Photographs | 2-8 |

Section 3 Remedial Investigation Approach

| | | |
|---------|--------------------------------------------------|------|
| 3.1 | Phase I Activities..... | 3-1 |
| 3.1.1 | Soil Sampling..... | 3-2 |
| 3.1.2 | Groundwater Sampling..... | 3-3 |
| 3.1.3 | Sediment Sampling | 3-4 |
| 3.1.4 | Monitor Well Inventory | 3-4 |
| 3.2 | Phase II Activities | 3-5 |
| 3.2.1 | Additional Soil Sampling..... | 3-5 |
| 3.2.2 | Well Installation | 3-5 |
| 3.2.3 | Site-Wide Groundwater Sampling | 3-6 |
| 3.2.4 | Engineering Data Collection..... | 3-7 |
| 3.2.4.1 | Aquifer Hydraulics Tests..... | 3-7 |
| 3.2.4.2 | Multi-Phase Extraction Tests..... | 3-7 |
| 3.2.4.3 | Biochemical and Geochemical Data Collection..... | 3-8 |
| 3.3 | Phase III Activities..... | 3-8 |
| 3.3.1 | Well Installation and Abandonment..... | 3-9 |
| 3.3.2 | Groundwater Sampling..... | 3-10 |

Section 4 Remedial Investigation Results

| | | |
|---------|---------------------------------------------------------------------|-----|
| 4.1 | Site-Specific Hydrogeology | 4-1 |
| 4.1.1 | Geology..... | 4-1 |
| 4.1.2 | Hydrogeology..... | 4-3 |
| 4.1.3 | Cross Sections | 4-4 |
| 4.2 | Environmental Media Sampling | 4-5 |
| 4.2.1 | Soil..... | 4-5 |
| 4.2.1.1 | Soil Area #1: Warehouse (Drum Management and Storage) Area | 4-7 |
| 4.2.1.2 | Soil Area #2: Incinerator / Drum Repackaging Area..... | 4-7 |

| | | |
|-----------|---------------------------------------------------------------------------------------------------|------|
| 4.2.1.3 | Soil Area #3: Solvent Ditch Area | 4-8 |
| 4.2.1.4 | Soil Area #4: South Drum Storage Area | 4-8 |
| 4.2.2 | Groundwater | 4-8 |
| 4.2.2.1 | GW Area #1: Incinerator / Drum Repackaging Area | 4-9 |
| 4.2.2.2 | GW Area #2: Solvent Ditch Area | 4-10 |
| 4.2.2.3 | GW Area #3: Burn Pits Area | 4-11 |
| 4.2.2.4 | GW Area #4: Fuel Oil Area | 4-12 |
| 4.2.3 | Surface Soil Sampling across Wildcat Creek | 4-12 |
| 4.2.4 | Sediment Sampling | 4-12 |
| 4.2.4.1 | Catch Basin / Water Collection Area Sampling | 4-12 |
| 4.2.4.2 | Creek Sediment Sampling | 4-13 |
| 4.3 | Hydraulic Analysis | 4-13 |
| 4.3.1 | Potentiometric Surface | 4-13 |
| 4.3.2 | Aquifer Performance Tests | 4-14 |
| 4.4 | MPE Pilot Test | 4-15 |
| 4.4.1 | Solvent Ditch Area | 4-15 |
| 4.4.2 | Fuel Oil Area | 4-15 |
| 4.5 | Biochemical and Geochemical Data | 4-15 |
| 4.6 | Monitor Well Inventory | 4-15 |
| 4.7 | Data Validation and Quality Control Summary | 4-16 |
| 4.7.1 | Data Usability Summary | 4-16 |
| 4.7.2 | Evaluation Procedure | 4-17 |
| 4.7.3 | Data Quality Indicators | 4-17 |
| 4.7.3.1 | Precision | 4-17 |
| 4.7.3.2 | Accuracy | 4-18 |
| 4.7.3.2.1 | Evaluation of Blanks | 4-19 |
| 4.7.3.2.2 | Laboratory Control Sample, Matrix Spike/Matrix Spike Duplicate, and Surrogate Recoveries | 4-20 |
| 4.7.3.2.3 | Internal Standard Areas and Retention Times | 4-21 |
| 4.7.3.2.4 | Instrument Calibration | 4-21 |
| 4.7.3.2.5 | Inductively Coupled Plasma Serial Dilution | 4-21 |
| 4.7.3.3 | Completeness | 4-21 |
| 4.7.3.4 | Sensitivity | 4-21 |
| 4.7.3.5 | Representativeness | 4-22 |
| 4.7.4 | Conclusion | 4-22 |

Section 5 Human Health Risk Assessment

| | | |
|-------|-----------------------|-----|
| 5.1 | Introduction | 5-1 |
| 5.2 | Data Summary | 5-2 |
| 5.2.1 | Surface Soil | 5-2 |
| 5.2.2 | Subsurface Soil | 5-2 |
| 5.2.3 | Groundwater | 5-3 |
| 5.2.4 | Quality Control | 5-4 |

| | | |
|----------|------------------------------------------------------------------------------------|------|
| 5.3 | Selection of COPCs..... | 5-4 |
| 5.3.1 | Exposure Units | 5-5 |
| 5.4 | Exposure Assessment..... | 5-6 |
| 5.4.1 | Receptors | 5-6 |
| 5.4.2 | Exposure Scenarios | 5-8 |
| 5.4.2.1 | Current O&M Worker Exposure Assumptions..... | 5-8 |
| 5.4.2.2 | Trespasser/Recreational Visitor Exposure Assumptions..... | 5-8 |
| 5.4.2.3 | Future Excavation Worker Exposure Assumptions | 5-9 |
| 5.4.2.4 | Future Industrial Worker Exposure Assumptions | 5-10 |
| 5.4.2.5 | Future Residential Exposure Assumptions..... | 5-10 |
| 5.4.3 | Exposure Point Concentrations..... | 5-11 |
| 5.4.3.1 | Calculation of Exposure Point Concentrations..... | 5-11 |
| 5.4.4 | Modeling Techniques Used to Estimate EPCs..... | 5-13 |
| 5.5 | Toxicity Assessment..... | 5-14 |
| 5.5.1 | Health Effects Criteria for Non-carcinogens | 5-14 |
| 5.5.2 | Health Effects Criteria for Potential Carcinogens | 5-15 |
| 5.5.3 | Toxicological Assessment | 5-18 |
| 5.6 | Risk Characterization..... | 5-18 |
| 5.6.1 | Results of Risk Calculations | 5-19 |
| 5.6.2 | Risk and Hazard Results..... | 5-19 |
| 5.6.2.1 | Surface Soil (Excluding Hot Spots and Beneath Structures) and Groundwater | 5-19 |
| 5.6.2.2 | Surface Soil (Hot Spot 1) and Groundwater | 5-20 |
| 5.6.2.3 | Surface Soil (Hot Spot 2) and Groundwater | 5-22 |
| 5.6.2.4 | Surface Soil (Hot Spot 3) and Groundwater | 5-23 |
| 5.6.2.5 | Surface Soil (Excluding Hot Spots) and Groundwater..... | 5-24 |
| 5.6.2.6 | Subsurface Soil (Excluding Hot Spots) and Groundwater | 5-25 |
| 5.6.2.7 | Subsurface Soil (Hot Spot RIMW-6) and Groundwater | 5-27 |
| 5.6.2.8 | Subsurface Soil (Hot Spot RISB-12) and Groundwater | 5-28 |
| 5.6.2.9 | Subsurface Soil (Hot Spot RISB-18) and Groundwater | 5-29 |
| 5.6.2.10 | Subsurface Soil (Hot Spot RISB-25) and Groundwater | 5-31 |
| 5.6.2.11 | Subsurface Soil (Hot Spot RISB-64) and Groundwater | 5-32 |
| 5.6.3 | Final COCs | 5-33 |
| 5.7 | Uncertainty Assessment | 5-35 |
| 5.7.1 | Types of Uncertainty | 5-35 |
| 5.7.2 | Data Evaluation..... | 5-36 |
| 5.7.3 | Dose-Response Assessment..... | 5-36 |
| 5.7.4 | Exposure Assessment..... | 5-37 |
| 5.7.5 | Risk Characterization | 5-37 |
| 5.8 | Summary and Conclusions | 5-37 |

Section 6 Conclusions

| | | |
|-------|-------------------------------------------|-----|
| 6.1 | Summary of Findings and Conclusions | 6-1 |
| 6.1.1 | Hydrogeology | 6-1 |
| 6.1.2 | Environmental Media Sampling Results..... | 6-2 |
| 6.1.3 | Hydraulic Analysis Results | 6-4 |
| 6.1.4 | Human Health Risk Assessment..... | 6-4 |
| 6.2 | Recommendations for Further Action..... | 6-5 |

Section 7 References

| | | |
|------------|-----|------------------------------------------------------------|
| Appendices | A | Soil Boring Logs |
| | B | Well Logs and Construction Diagrams |
| | C | Geophysical Survey Reports |
| | D | Analytical Results |
| | D-1 | Phase I Soil |
| | D-2 | Phase I Sediment |
| | D-3 | Phase I Groundwater |
| | D-4 | ColorTec |
| | D-5 | Phase II Soil |
| | D-6 | Phase II Groundwater |
| | D-7 | Phase III Groundwater |
| | E | Hydraulic Analysis Results |
| | F | MPE Pilot Study Results |
| | G | Data Validation Worksheets |
| | H | Risk Assessment Calculations |
| | H-1 | Contaminants of Potential Concern Screening |
| | H-2 | Exposure Assumptions |
| | H-3 | Exposure Point Concentration Tables |
| | H-4 | Pro-UCL Output |
| | H-5 | Risk Calculations |
| | I | Surface Contour Maps |
| CD-ROM | | Analytical Laboratory Reports and Data Validation Form I's |

Figures

- 2-1 Site Location Map
- 2-2 Areas of Concern
- 2-3 Regional Geomorphology
- 2-4 1979 USGS Aerial Photograph
- 2-5 1984 USGS Aerial Photograph
- 2-6 1989 USGS Aerial Photograph
- 3-1 Sample Location Map
- 3-2 Phase I Sample Location Map
- 3-3 Phase I Sampling Locations in Undeveloped Area and Background Sample Locations
- 3-4 Phase II Sample Location Map
- 3-5 Hydraulic Evaluation Monitoring
- 3-6 MPE Pilot Study Locations
- 3-7 Phase III Well Installation Locations
- 4-1 Regolith Potentiometric Surface Map
- 4-2 Bedrock Potentiometric Surface Map
- 4-3 Cross Section Location Map
- 4-4 Cross Section 1 - BTEX/Chlorinated Benzenes
- 4-5 Cross Section 1 - Chlorinated Ethenes/Ethanes
- 4-6 Cross Section 2 - BTEX/Chlorinated Benzenes
- 4-7 Cross Section 2 - Chlorinated Ethenes/Ethanes
- 4-8 Cross Section 3 - BTEX/Chlorinated Benzenes
- 4-9 Cross Section 3 - Chlorinated Ethenes/Ethanes
- 4-10 Cross Section 4 - BTEX/Chlorinated Benzenes
- 4-11 Cross Section 4 - Chlorinated Ethenes/Ethanes
- 4-12 Cross Section 5 - BTEX/Chlorinated Benzenes
- 4-13 Cross Section 5 - Chlorinated Ethenes/Ethanes
- 4-14 Surface Soil Locations with Detections of VOCs above Screening Criteria
- 4-15 Subsurface Soil Locations with Detections of VOCs above Screening Criteria
- 4-16 Total BTEX Concentration Map - Regolith Groundwater
- 4-17 Total Chlorinated Ethenes/Ethanes Concentration Map - Regolith Groundwater
- 4-18 Total Chlorinated Benzenes Concentration Map - Regolith Groundwater
- 4-19 Total BTEX Concentration Map - Bedrock Groundwater
- 4-20 Total Chlorinated Ethenes/Ethanes Concentration Map - Bedrock Groundwater
- 4-21 Total Chlorinated Benzenes Concentration Map - Bedrock Groundwater
- 4-22 Groundwater Areas of Concern
- 4-23 Regolith Potentiometric Surface Map Pre-Equilibrium (Extraction Pumps On)
- 4-24 Regolith Potentiometric Surface Map Post-Equilibrium (Extraction Pumps Off)
- 4-25 Bedrock Potentiometric Surface Map Pre-Equilibrium (Extraction Pumps On)
- 4-26 Bedrock Potentiometric Surface Map Post-Equilibrium (Extraction Pumps Off)
- 4-27 EW-2 Step Test
- 4-28 EW-3 Step Test
- 5-1 Site Conceptual Exposure Model

Tables

| | |
|------|----------------------------------------------------------------------------------------------------------------|
| 2-1 | Timeline of Investigations, Remedial Activities, and Other Events <i>(embedded in text)</i> |
| 3-1 | Phase I Sampling Summary |
| 3-2 | Phase I Onsite Sampling Deviation Summary |
| 3-3 | Phase II Sampling Summary |
| 3-4 | Packer Testing Detections |
| 3-5 | RIMW-15 Diffusion Tests – Laboratory Detections |
| 3-6 | Phase III Sampling Summary |
| 4-1 | Regulatory Criteria |
| 4-2 | September 2007 Groundwater Elevations |
| 4-3 | Calculated Vertical Gradients for Well Pairs |
| 4-4 | Well Summary |
| 4-5 | Summary of Soil Detections Above Screening Criteria |
| 4-6 | Summary of Groundwater Detections Above Screening Criteria |
| 4-7 | Hydraulic Analysis Groundwater Elevations |
| 4-8 | Summary of Sediment and Surface Soil Detections Above Screening Criteria |
| 4-9 | EW-2 Aquifer Performance Test Results |
| 4-10 | EW-3 Aquifer Performance Test Results |
| 4-11 | Summary of Biochemical and Geochemical Results |
| 4-12 | Qualifiers Added Because of Field Duplicate RPD Exceedances |
| 4-13 | Qualifiers Added Because of Laboratory Precision RPD Exceedances |
| 4-14 | Qualifiers Added Because of Trip Blank Detections |
| 4-15 | Qualifiers Added Because of Laboratory Blank Detections |
| 4-16 | Qualifiers Added Because of MS/MSD %R Exceedances |
| 4-17 | Qualifiers Added Because of Surrogate %R Exceedances |
| 4-18 | Qualifiers Added Because of Calibration %R Exceedances |
| 5-1 | Summary of Surface and Subsurface Soil Hot Spot Evaluation |
| 5-2 | Summary of Key Toxicological Properties for Chronic Noncarcinogenic Effects of Study Chemicals - Oral / Dermal |
| 5-3 | Summary of Key Toxicological Properties for Chronic Noncarcinogenic Effects of Study Chemicals - Inhalation |
| 5-4 | Summary of Key Toxicological Properties for Carcinogenic Effects of Study Chemicals - Oral / Dermal |
| 5-5 | Summary of Key Toxicological Properties for Carcinogenic Effects of Study Chemicals - Inhalation |
| 5-6 | Risk and Hazard Evaluation |
| 5-7 | Final Chemicals of Concern (COCs) |

Executive Summary

This executive summary presents an overview of the background, results, and conclusions of the remedial investigation (RI) that was conducted at the former Philip Services Corporation (PSC) site in Rock Hill, South Carolina. The PSC Site is a former hazardous waste transportation, storage, and disposal facility. Operations began at the site in 1966 and continued until 2003. These operations included waste incineration from 1980 to 1995. The South Carolina Department of Health and Environmental Control assumed environmental management responsibilities for the site in December 2003, when the current owners went bankrupt.

The objectives of the RI were to:

- Characterize the soil and sediment associated with site-related activities, particularly in previously identified Solid Waste Management Units, Areas of Concern, and waste operations/storage areas where limited or no soil samples have previously been obtained.
- Assess surface soil risks for the undeveloped portion of the site east of Wildcat Creek.
- Identify potential sources of constituents in groundwater and determine the nature and extent of these sources.
- Identify and/or confirm potential migration pathways.
- Characterize the nature and extent of contaminants in groundwater.
- Assess risks to human health.
- Support the development of the Feasibility Study (FS).

Camp Dresser & McKee Inc. (CDM) completed several activities to support these objectives, including reviewing data collected in previous investigations, sampling various environmental media (e.g., soil, groundwater, and sediment), installing additional monitoring wells, performing remedial technology engineering evaluations, and assessing potential human health risks. The RI field work was conducted in three phases from May 2006 through December 2007. The phased approach allowed for focus data collection with each phase building on the previous phase and addressing remaining data gaps.

The results of the RI revealed that contaminant migration and fate characteristics are controlled by four dominant hydrogeologic features: saprolite, alluvium, partially weathered rock (PWR), and bedrock. The saprolite contains shallow groundwater. Contaminants present in the saprolite migrate to the alluvium, PWR, and bedrock features. The alluvium is more permeable than the saprolite and exerts a high degree of control over the site hydrogeology. Contaminants migrating to the alluvium are

likely diluted by a higher flux of groundwater through this zone before eventually discharging to Wildcat Creek. The configuration of the PWR at the site is highly variable, and groundwater will either migrate from this zone to the alluvium or bedrock. Groundwater in the bedrock is controlled by fractures, and groundwater from this zone migrates to either alluvium deposits or underneath Wildcat Creek.

The results of environmental media sampling during the RI revealed that several chemicals, predominantly volatile organic compounds (VOCs), were detected above regulatory screening criteria in both surface and subsurface soil. Detected concentrations above criteria are limited to four soil focus areas: 1) Warehouse (Drum Storage and Management) Area, 2) Incinerator / Drum Repackaging Area, 3) Solvent Ditch Area, and 4) South Drum Storage Area. The highest concentrations in soil were detected in the Incinerator Area. The presence of several VOCs above EPA Region 9 Soil Screening Levels (SSLs) indicates that ongoing sources of groundwater contamination may be present in these areas.

The groundwater sampling results from the RI were consistent with the soil sampling results. In general, groundwater concentrations were high in areas with high soil concentrations. Several monitoring wells on site, encompassing the warehouse to Wildcat Creek, contain concentrations above EPA Maximum Contaminant Levels. Similar to soil, four focus areas were identified for soil based on observed concentrations and potential source areas: 1) Incinerator / Drum Repackaging Area, 2) Solvent Ditch Area, 3) Burn Pits, and 4) Fuel Oil Area.

The human health risk assessment conducted for the RI indicated that site-related environmental contamination posing potential cancer risks and noncancer hazard are related to contaminated groundwater, surface soil, and subsurface soils. The pathways of principal concern are exposure to chlorinated VOCs in groundwater through drinking water ingestion, and inhalation of VOCs in indoor air originating from groundwater. The final chemicals of concern (COCs) in soil related to potential human exposure risks are primarily metals (thallium and vanadium), with chlorinated VOCs limited to subsurface soils in two hot spot locations (RISB-25 and RISB-64). However, 19 additional chemicals were identified as COCs for soil based on SSL exceedances. Sixteen VOCs along with manganese were identified as COCs in groundwater based on calculated risks as well as a comparison to drinking water standards.

Section 1

Introduction

This document presents the results of the Remedial Investigation (RI) at the former Philip Services Corporation (PSC) site in Rock Hill, South Carolina. The RI was performed in three phases (Phase I, Phase II, and Phase III) and field work was completed between May 2006 and September 2007. Data obtained from Phase I was incorporated in the planning of Phase II work. Following analysis of the data collected from Phase II, it was determined that Phase III activities were necessary to better assess the nature and extent of contaminants in groundwater.

1.1 Project Overview

The purpose of this RI Report is to document the results of the RI conducted at the former PSC Site. The RI was designed to further refine information regarding the nature and extent of contamination, and assess potential human health risks. The RI data will also support identification and evaluation of remedial alternatives during the Feasibility Study (FS).

Although the PSC site is not a National Priority List site under the U.S. Environmental Protection Agency's Superfund program, the RI Report has been prepared in observance of Superfund guidance (CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act). The RI has also been conducted in general accordance with the provisions of the *National Oil and Hazardous Substances Pollution Contingency Plan* (40 CFR 300).

The field work for Phase I was conducted during the weeks of May 29, 2006 and June 5, 2006. This work included completing site-wide investigations of the surface and subsurface soil, sediment, and groundwater. Additionally, the existing wells were inventoried. Based on the results of the Phase I Investigation, groundwater monitor well and additional subsurface soil locations were chosen for the Phase II Investigation.

The field work for Phase II was conducted between December 11, 2006 and March 5, 2007. The Phase II work included installing 20 groundwater monitor wells, completing 11 additional soil borings, conducting a site-wide groundwater sampling event, performing a multi-phase extraction pilot study, and performing an aquifer hydraulic assessment. The Phase II results revealed that data gaps remained for groundwater contamination extent. Thus, a Phase III investigation was conducted to address these data gaps.

The field work for Phase III was conducted between August 13, 2007 and September 20, 2007. The Phase III work included installing 11 groundwater monitoring wells and performing groundwater sampling on the 11 newly installed wells and select additional wells to confirm results from Phase II.

In addition to the data collected in the three phases of the RI, results from recent pre-RI investigations were used in the overall evaluation of site conditions.

1.2 RI Objectives

The objectives of the RI, as outlined in the RI/FS Work Plan (CDM, August 2006), were as follows:

- Characterize the soil and sediment associated with site-related activities, particularly in previously identified Solid Waste Management Units (SWMUs), Areas of Concern (AOCs), and waste operations/storage areas where limited or no soil samples have previously been obtained.
- Assess surface soil risks for the undeveloped portion of the site east of Wildcat Creek.
- Identify potential sources of constituents in groundwater and determine the nature and extent of these sources.
- Identify and/or confirm potential migration pathways.
- Characterize the nature and extent of contaminants in groundwater.
- Assess risks to human health.
- Support the development of the FS.

The data collected during the RI were designed to fill existing data gaps and satisfy these objectives. The results of the data collection efforts are presented in this RI Report.

Section 2

Project Background Summary

2.1 Site Description and Background

The PSC Site is a former hazardous waste transportation, storage, and disposal facility. In 1966, Quality Drum Company and Industrial Chemical Company began operations consisting of waste storage, treatment, and recycling. The facility received spent solvents from offsite facilities, stored the solvents on the site in drums and tanks, and recovered these solvents through distillation. Until 1980, wastes from the distillation process (still bottoms) were sent to a local landfill. In 1980, a hazardous waste incinerator was installed for still bottoms treatment.

In May 1983, Stablex Inc. acquired the facility. At that time, approximately 26,000 drums and 200,000 gallons of bulk liquid waste (stored in tanks) were present on the site. In 1986, ownership of the property was transferred to NUKEM, who changed the facility name to ThermalKEM in 1987. ThermalKEM operated as a hazardous waste incinerator and storage facility under RCRA interim status (EPA I.D. No. SCD 044 442 333). Phillip Services Corporation (PSC) took over operation and management of the facility in November 1995 and ceased operation of the incinerator one month later. The South Carolina Department of Health and Environmental Control (SCDHEC) assumed the environmental management responsibilities following the bankruptcy of PSC in December 2003.

Through the years of operation, the facility has sustained two large structural fires. The facility also experienced a subsurface diesel fuel release, with the quantity of fuel spilled estimated to be greater than 200,000 gallons. Based on several investigations and groundwater sampling, an extraction and treatment system was installed in 1988. Additional extraction components (groundwater extraction wells EW-2 and EW-3 and a fuel interceptor trench) were installed in the mid 1990s.

The incinerator was dismantled after it was shutdown, and a pit was excavated into soil beneath its footprint to remove contaminated soil. This work was performed prior to SCDHEC management of the site. In 2004, the excavated pit was backfilled and the incinerator building was demolished under the direction of SCDHEC. Upgrades to the treatment system were also completed in 2005.

Figure 2-1 presents a current site location map. The site consists of approximately 44.5 acres of industrial property on the west side of Wildcat Creek and approximately 108 acres of undeveloped woodland on the east side of Wildcat Creek. Robertson Road borders the industrial portion of the property to the northeast, and the Norfolk Southern Railroad forms the northwestern boundary. Wildcat and Fishing Creeks border the industrial property on the southeast and southwest, respectively.

The site is immediately surrounded by undeveloped land and commercial/industrial properties. Osmose Wood Preserving Inc. is located directly across the railroad to the

northwest. Low-density residential properties and a high school are located in the vicinity of the site. Higher density residential areas are located to the southeast and northeast, towards the City of Rock Hill.

2.2 Previous Investigations and Remedial Activities

Several previous investigation and remedial activities have occurred at the PSC site. The timeline of events, as derived from Section 2.3 of the RCRA Facility Investigation Part 1 Report (PSC, August 1999), is shown in the following table. This table is not intended to be completely comprehensive of investigation and remedial activities, and CDM has been unable to confirm several of the activities and dates presented in the RCRA Facility Investigation Part 1 Report.

Table 2-1
Timeline of Investigations, Remedial Activities, and Other Events
Remedial Investigation Report
PSC Site, Rock Hill, South Carolina

| Date(s) | Activity |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prior to 1983 | Six monitoring wells existed on site. |
| June 1983 to March 1984 | Excess drum inventory was brought under permitted storage capacity, and contaminated surface soil was removed. |
| June 1983 to September 1984 | Old tanks were cleaned out, and tanker trucks were removed and cleaned out. |
| 1983 October | Burn pit soil was excavated. |
| | Groundwater monitoring was initiated. |
| | A soil investigation was conducted identifying soil type and general geotechnical conditions. |
| | Six additional monitoring wells were installed throughout the site. |
| | The Solvent Ditch was removed and cleaned. |
| 1984 | A hydrogeologic study revealed "solvent-like odors" in borings slightly downgradient of the Solvent Ditch. |
| | Borings were completed as monitoring wells to assess groundwater quality in the vicinity of the Solvent Ditch. |
| | A quarterly groundwater quality monitoring program was initiated voluntarily. |
| 1985 | A geophysical investigation was conducted to search for buried materials at the site. The Burn Pits were identified and soil in this area was excavated. |

| Date(s) | Activity |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1985 and 1986 | Additional hydrogeologic investigations were performed to assess groundwater quality in the vicinity of the Solvent Ditch. |
| November 1986 | Water identified in the Incinerator Building Sump during EPA's RCRA Facility Assessment was removed. The leak found to be the source of water was repaired. |
| 1986 and 1987 | Studies were conducted to design an extraction well (EW-1) to contain and remediate groundwater at the Solvent Ditch. |
| 1988 | Well BP-1A installed in the area of the former Burn Pits. |
| July | Extraction well EW-1 was installed and connected along with production well PW-1 to the plant groundwater treatment system. Pump and treat remediation of groundwater began. |
| | RCRA Part B hazardous waste incinerator and storage permit SCD04444233 was issued but appealed by a local citizen's group. |
| | An aquifer performance test was conducted at extraction well EW-1. |
| June 1990 | Diesel fuel was detected in piezometer P-2 during the routine measurement of water level elevations. |
| 1991 | An investigative study and remediation feasibility study was conducted for the diesel fuel area. |
| February | The Preliminary RFI on the diesel fuel area was submitted to EPA. |
| 1992 | Pumping of production well PW-1 was discontinued because volatile organic compound (VOC) concentrations at MW-100 had decreased to below detection limits. |
| January | An additional product delineation investigation was conducted in the diesel fuel area. |
| March | A lineament study of regional fracture traces was conducted. |
| January and July | ENSR conducted field investigations in support of the RFI Work Plan to be submitted in August 1992. Five saprolite wells and three bedrock wells were installed, including three well points in the bed of Wildcat Creek. |
| July 1993 | Diesel fuel was detected in EW-1. The pumping rate was decreased to between 10 - 25 gallons per minute (gpm). |
| September and | Extraction wells EW-2 and EW-3 were installed. |

| Date(s) | Activity |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| October 1994 | |
| August to October 1995 | The diesel fuel interceptor trench was installed. |
| December 1995 | Operation of the incinerator ceased and a revised Part B Permit Application was submitted. |
| February and March 1996 | EW-2, EW-3, and the interceptor trench were connected to the groundwater treatment system. The trench sump pump was also connected to an oil/water separator unit. |
| April to June 2004 | Additional investigations were conducted by CDM and SCDHEC involving groundwater sampling, surface water sampling, surface soil sampling, and a test pit investigation. |
| June 2004 | Incinerator excavation pit was backfilled and the incinerator building was demolished. |
| September - October 2005 | Upgrades were completed for the extraction and treatment system consisting of replacing equipment and adding instrumentation and automation. |

Through the RCRA Part B Permit Corrective Action process at the PSC site, four SWMUs and seven AOCs were identified and included in the permit. These SWMUs and AOCs are graphically shown on **Figure 2-2**. The SWMUs and AOCs, as listed in the RFI Part 1 Report, and a brief description of the wastes managed/disposed in each area are presented below:

- ***Incinerator Building Sump (SWMU 8)*** - contained incinerator ash and water from the incinerator water seals. The incinerator was operated from 1981 to 1995.
- ***Container Storage Area (SWMU 11)*** - large drum storage area on ground surface containing drums of spent halogenated and non-halogenated solvents. This location was used for container storage from pre-1983 until 1995.
- ***Truck Washing Station and Sump (SWMU 19)*** - wastes managed included wash water, residue, and soil from trucks carrying spent halogenated and non-halogenated solvents. The truck washing station/sump was operated from 1981 until 1995.
- ***Burn Pits (SWMU 41)*** - previous disposal area of solvent distillation still bottoms by open pit burning. The burn pits were operated approximately between 1966 and the early 1970's. Impacted soil was excavated in this area in 1985 under supervision of SCDHEC.

- ***Solvent Ditch Area of Concern*** – spill and leakage from tank trucks and the tank farm migrated to this area via stormwater runoff. This ditch was operated from the 1960's until 1983. Soil excavation was performed to remove visibly impacted material in 1983.
- ***Fuel Oil Area of Concern*** – suspected diesel fuel leaks from underground piping associated with three underground storage tanks (USTs) and from diesel fuel delivery piping to the incinerator.
- ***Drum Repacking Area Fire Area of Concern*** – this building housed spent halogenated and non-halogenated solvents in lab pack form and drums of solids and sludges from spent solvents. The building was destroyed by fire in 1995 and rebuilt the same year.
- ***Blend Tank Overflow Area of Concern*** – tank farm where liquids containing spent halogenated and non-halogenated solvents were blended for incineration prior to 1995. After 1995, solvents were blended with diesel fuel in this area.
- ***Scrubber Containment Overflow Area of Concern*** – wastes managed at this location included caustic solutions of scrubber water with particulate matter from incineration.
- ***Boiler Explosion Area of Concern*** – the boiler was used as a backup steam supply for the scrubber and was replaced after it exploded in March 1991. No wastes were managed here but approximately 50 gallons of diesel fuel would have exploded with this boiler.
- ***Stormwater Outflows Areas of Concern*** – collection and outflow areas for stormwater runoff from the site and treatment, storage, and disposal areas.

These SWMUs and AOCs are described further in the RFI Part 1 Report. Figure 2-2 also identifies additional areas of concern for this RI/FS, including the Stablex Materials Area, other drum storage and management areas, and a stormwater pond. The Stablex Materials Area was identified by SCDHEC in historical photographs, and a geophysical survey conducted by SCDHEC indicated that there were subsurface anomalies in the area. While the Stablex Materials Area was planned for use as a disposal area, it is unknown whether any wastes were deposited there.

2.3 Environmental Setting

2.3.1 Topography and Drainage

The PSC site is located in the Piedmont Physiographic Province of South Carolina. This province is characterized by gently rolling hills and ridges intersected by stream and river valleys. Within the vicinity of the site, land surface elevations range from

about 650 feet east of the site down to about 480 feet on Fishing Creek south of the site (Figure 2-1). Elevations on the site average from about 510 feet to 530 feet.

Two surface water features are adjacent to the site. Fishing Creek flows from the northwest to form the south boundary of the site and continues to flow to the south downstream of the site. Wildcat Creek flows from the north to form the east boundary of the operations area of the former facility. Wildcat Creek flows into Fishing Creek along the south boundary of the site. Most surface drainage from the operations area of the former facility is directed to the east into Wildcat Creek through several stormwater outfalls. One stormwater outfall also directs surface runoff from the southwest corner of the operations area to Fishing Creek.

Although the topographic relief is relatively subtle in the site vicinity, topographic patterns do exist that may provide additional insight into subsurface conditions. **Figure 2-3** provides a visual aid for evaluating the topography and geomorphology of the site vicinity. It should be recognized that this figure has a vertical exaggeration of about 5 to 1. Vertical exaggeration is necessary to discern the topographic patterns. With regard to elevation and slope, three distinct patterns are discernable from the figure. The most striking pattern exists east of the site where elevations are the highest and surface slopes the steepest. This east geomorphic area is likely to be underlain by rock that has undergone less weathering than the other two geomorphic areas that have been eroded to lower elevations with low slopes. This is particularly true of the southwest geomorphic area, which has very subtle slopes and the lowest elevations in the site vicinity. This geomorphology indicates that the underlying rock is more weathered than the rock beneath the other two areas. The north geomorphic area has moderate elevations/slopes compared to the other two areas, and the underlying rock is likely moderately weathered.

Wildcat Creek follows the apparent contact between the north and east geomorphic areas. Prior to its confluence with Wildcat Creek, Fishing Creek follows the contact between the north and the southwest geomorphic areas. Below Wildcat Creek, Fishing Creek follows the contact between the east and southwest geomorphic areas. These geomorphic expressions and related surface water flow patterns have additional implications to the regional geology and hydrogeology, as discussed below.

2.3.2 Geology and Hydrogeology

The geology of the Piedmont Physiographic Province of South Carolina includes crystalline bedrock of metamorphic and igneous origin. The metamorphic rocks range from coarsely-crystalline, weather-resistant gneiss to easily weathered mica schist and the finer-grained form called phyllite. Igneous rock, referred to as gabbro, reportedly exists beneath the site. Gabbro is a crystalline rock that is dark in color and contains minerals that are moderately susceptible to weathering processes. It is probable that this gabbro has been subjected to some degree of metamorphism and may be more appropriately classified as a meta-gabbro. Although the mineral composition may not

be significantly altered by the regional metamorphism, it could have imparted structural changes in the rock such as development of regional fracture systems. If regional metamorphism has not affected the rock, stress-relief fractures are expected in this unaltered rock type.

The east geomorphic area is likely underlain by a rock more resistant to weathering than the rock beneath the site. This rock is also likely to be igneous in origin based on the uniformly radial drainage pattern that has developed in this area. This indicates that fractures having strong directional characteristics do not likely exist in the east area.

The regional nomenclature applied to aquifer systems in the Piedmont Province is to classify the system as the Piedmont Aquifer regardless of the depth zone. Groundwater in Piedmont Aquifer systems typically occurs in three zones of interest. In descending order these zones include the regolith zone, the transition zone between bedrock and the regolith, and the bedrock zone.

The regolith zone at the site consists primarily of saprolite, the unconsolidated weathering product of the underlying parent rock that retains the relic structure of the parent rock. The regolith zone also includes the recent stream alluvium deposits associated with Fishing Creek and Wildcat Creek. The regolith thickness at the site ranges from 15 feet to 35 feet. The saprolite and the alluvium are fully connected hydraulically and behave as a single groundwater zone. However, it is probable that the permeability of the alluvium (primarily sand with silt) is higher than the permeability of the saprolite (primarily silt with sand and clay size materials). The depth to groundwater in the regolith measured at the site ranges from 5 feet near the streams to 20 feet at the higher elevations.

Groundwater flow in the regolith zone is from areas of topographic highs to areas of topographic lows. Recharge to this zone occurs at all elevations from precipitation, and this recharge represents a driving force for groundwater flow. Where the land surface intersects the elevation of the saturated zone in the regolith (such as along streams), groundwater discharge occurs creating a groundwater migration pattern toward the nearest surface stream. Some quantity of groundwater in the regolith zone also migrates downward to recharge the transition zone and the bedrock zone.

The transition zone between the regolith and bedrock zones consists of partially weathered bedrock and primarily of rock fragments, boulder-size rocks, and fractured bedrock that is in full hydraulic connection with the overlying regolith zone. Wells typically cannot be installed through the transition zone using auger techniques, and rotary or sonic techniques are required.

Groundwater flow in the transition zone follows similar patterns to the regolith zone. However, because of groundwater flow through fractures, the flow path of least resistance may differ in this zone, and the permeability is typically much higher than the regolith zone. Some quantity of groundwater in the transition zone migrates

downward to recharge the bedrock zone. Lateral groundwater flow in the transition zone is toward discharge points such as streams. Groundwater in the transition zone may migrate in the downstream direction of stream flow before the vertical gradient effectively causes it to discharge.

Groundwater in the gabbro bedrock beneath the site occurs in the primary pore space of the rock and in fractures developed in the rock. The primary porosity of the gabbro is likely very low and not significant for groundwater migration. However, the primary porosity may contain site-related constituents that could be slowly released into fractures, resulting in low concentrations of site-related constituents in groundwater migrating through the fractures for an indeterminate period of time.

The bedrock may include fractures developed from historic deformation events. These types of fractures are usually directional in nature, and a primary direction of fracture orientation can be discerned along with an antecedent fracture direction that tends to be about 60° from the primary direction. These fractures can exist at great depths in the Piedmont, and production wells can be successful at depths of over 500 feet. Stress relief fractures may also be present. These fractures develop as the weight of overlying rock is removed by weathering and the rock expands creating a fracture. Stress relief fractures are horizontal more so than deformation fractures and are usually rare below a depth of 200 feet.

Groundwater migration in the bedrock rock follows the same general rules as the other two zones and migrates from topographic high areas of recharge to topographic low areas of discharge such as streams. However, features of a more regional scale, such as major drainage basin divides and rivers, rather than features of a site-specific scale, such as Wildcat Creek, may influence groundwater flow patterns in deep bedrock. Furthermore, the groundwater flow paths of least resistance in the bedrock zone are along fractures. Based on potential fracture directions, the regional groundwater migration in bedrock ranges from southeast to southwest.

2.4 Historical Aerial Photographs

CDM obtained historical aerial photographs which show different levels of activity at the site during 1979 (**Figure 2-4**), 1984 (**Figure 2-5**), and 1989 (**Figure 2-6**). All aerial photographs were obtained from the United States Geological Survey.

Section 3

Remedial Investigation Approach

This section summarizes the field investigation activities completed at the PSC site. The section is divided into three major subsections: Phase I, Phase II, and Phase III. CDM prepared several documents to guide the RI and refine the approach, including:

- PSC Remedial Investigation/Feasibility Study (RI/FS) Work Plan (Work Plan) - CDM, May 2006
- Field Sampling Plan (FSP) - CDM, May 2006
- Quality Assurance Project Plan (QAPP) - CDM, Revised December 2006
- Phase I Technical Memorandum and Phase II Work Plan (Phase I Report) - CDM, October 2006
- Phase II Sampling Results and Hydrogeologic Findings - Interim Report (Phase II Report) - CDM, May 2007

The results of the RI are included in Section 4 (Summary of Findings). A summary of all soil and permanent monitor well sample locations, including wells installed prior to the Remedial Investigation, is provided in **Figure 3-1**.

3.1 Phase I Activities

This subsection describes the Phase I field activities, which were conducted in general accordance with the approach and procedures prescribed in the approved Work Plan and FSP. Some deviations occurred based on field observations, access conditions, and SCDHEC recommendations. These deviations are discussed further in Sections 3.1.2 and 3.2.2.

Specifically, CDM conducted the following activities during Phase I:

- Surface/subsurface soil sampling at 52 onsite locations (RISB-1 through -52) and two offsite background locations (RI-BCK1 and RI-BCK2).
- Surface soil sampling at 10 locations (RISS-1 through -10) on the undeveloped property east of the industrial facility, across Wildcat Creek.
- Sediment sampling at seven locations (RISD-1 through -5, RISD-WCBK, and RISD-FCBK) in Wildcat Creek and Fishing Creek.
- Sediment sampling at two onsite locations, one in a stormwater catch basin (RICB-3) and one inside the warehouse building (RI-WASTE).
- Groundwater sampling at four onsite locations (RITW-12, -28, -34, and -38)

- Well inventorying of existing groundwater monitor wells using available documentation.

Phase I did not include surface water sampling because an extensive surface water investigation was previously completed in 2004 by CDM and SCDHEC and revealed minimal surface water impacts. That investigation included installing vapor diffusion modules in Fishing and Wildcat Creeks and performing onsite screening using a portable gas chromatograph. The investigation also included collecting surface water samples for offsite laboratory analyses. Limited impacts were observed in the onsite screening and no organics were detected in the laboratory surface water samples. Additional details can be found in the *Summary Report – Initial Site Investigation* (CDM, October 2004).

Summary Phase I location maps are provided as **Figure 3-2** and **Figure 3-3** for activities on the west and east side of Wildcat Creek, respectively. A sample summary table is presented as **Table 3-1**. Additional Phase I activity details are provided in the following subsections.

3.1.1 Soil Sampling

Phase I soil sampling consisted of three sampling activities: onsite surface and subsurface soil sampling, surface soil sampling across Wildcat Creek, and background surface and subsurface soil sampling.

Onsite Soil Sampling

Surface and/or subsurface soil samples were collected from 52 onsite locations using direct push technology, as shown on Figure 3-2. Samples were collected in each boring from the surface (0-1 feet) and at 2-foot intervals thereafter up to the groundwater table (or refusal). Soil lithology was recorded for each of the subsurface locations, and the boring logs are presented in **Appendix A**.

Each of the collected samples was screened onsite shortly after collection using Color-Tec methods as an early indication of volatile chlorinated ethenes. Details regarding the Color-Tec procedure are available in the Field Sampling Plan (CDM, May 2006). Phase I Color-Tec screening data are presented in **Appendix D, Table D-4**. This table includes photoionization detector (PID) readings for each sample and a correlation of Color-Tec data to laboratory results. Color-Tec and PID results were used for screening purposes only. They were not included in the human health risk assessment and will not be used for remedial action evaluations.

In general, each surface soil sample was sent to Analytical Services Inc. (ASI) for analysis of EPA's Target Compound List (TCL) of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), and EPA's Target Analyte List (TAL) for metals. One subsurface soil sample from each boring was also submitted to the laboratory for the same analyses. The subsurface sample was generally selected based on the interval that showed the highest Color-Tec or PID result. Samples in the

vicinity of the former incinerator and drum storage areas were also analyzed for polychlorinated biphenyls (PCBs). Table 3-1 shows the complete laboratory sample summary.

Five of the originally planned boring locations were modified, and another eight locations were added. These changes were based on the Color-Tec screening results, access conditions, and/or SCDHEC guidance. The changes were designed to better satisfy the RI/FS objectives. A summary of changes from the original approach is shown on **Table 3-2**.

Other deviations from the work plan included the following:

- Subsurface laboratory split samples were collected from 4-foot intervals instead of 2-foot intervals for logistical reasons.
- Because eight sample locations were added, SCDHEC attempted to minimize the additional number of laboratory samples by using the onsite screening data. The sample summary provided in Table 3-1 shows what samples and analyses were run for each boring location, and Table 3-2 summarizes the changes that were made.

Sampling across Wildcat Creek

Ten surface soil samples were collected across Wildcat Creek in the undeveloped and wooded area of the property, as shown on Figure 3-3. This quantity of samples (1 for every ~10 acres) was intended to provide sufficient data for statistical analysis, if required. It was also intended to allow representation of the entire undeveloped area. There were no deviations from the work plan associated with surface soil sampling across the creek. Surface soil samples were sent to ASI for analysis of TCL SVOCs and TAL Metals.

Background Sampling

In addition to the onsite borings, two background soil samples were obtained for surface (0-1 foot) and subsurface (3-4 feet) with a hand auger within a 1-mile radius of the site. RISB-BK1 was collected approximately 1,000 feet northwest of the site, north of Robertson Road. RISB-BK2 was collected south of South Pointe High School, approximately 0.5 miles from the site. The approximate locations of the background samples are shown in Figure 3-3. Background samples were sent to ASI for analysis of TCL VOCs, SVOCs, and TAL Metals.

3.1.2 Groundwater Sampling

During Phase I, the Geoprobe® encountered refusal prior to reaching the water table in most of the borings. Therefore, groundwater samples could not be obtained in all boreholes as originally planned, nor could they be obtained from multiple depths.

Temporary wells were installed and allowed to recharge at nine locations (RITW-11, -12, -13, -15, -21, -25, -28, -34, and -38) where the water table was reached. Of the temporary well locations, four (RITW-12, -28, -34, and -38, as shown on Figure 3-2) provided sufficient recharge for sample collection. Samples were collected from each of these locations and sent to ASI for TCL VOC analyses. An additional sample for Color-Tec analysis was obtained from RITW-15. However, this location did not yield enough groundwater for VOC analysis.

Each temporary well was completed as a 1-inch well with a 10-foot screen. Groundwater was sampled from the wells between 24 and 48 hours following installation using low-flow sampling methods with a peristaltic pump. All temporary wells were abandoned by removing the PVC riser/screen and grouting the hole with a tremie pipe.

3.1.3 Sediment Sampling

Sediment sampling was conducted at seven locations along Wildcat Creek and Fishing Creek, as shown in Figure 3-2. Two of these locations (RISD-WCBKG and RISD-FCBKG) represent background conditions upstream of the site, one for each creek. The remaining locations were intended to be immediately downgradient of the scour areas for Outflows 1, 2, 3, and 4 and for the former burn pits.

A sediment sample was collected from only one stormwater catch basin (RICB-3) as sediment was not present in the remaining catch basins identified in the work plan. An additional sediment sample (RI-WASTE) was collected inside the warehouse building at SCDHEC's request after a pool of water was discovered near the former drum conveying area.

All sediment samples were collected using stainless steel bowls and spoons. The stream sediment samples were collected immediately downstream of each outflow location. Background sample RISD-WCBKG was collected approximately 50 feet upstream of Robertson Rd, and background sample RISD-FCBKG was collected upstream of Vernsdale Rd (about 50 feet north of the railroad tracks).

Sediment samples were sent to ASI for analysis of TCL VOCs, SVOCs, and TAL Metals.

3.1.4 Monitor Well Inventory

CDM conducted a monitor well inventory of the existing wells at the PSC site. This task consisted of reviewing available boring logs, construction details, and analytical data for each well. The objectives of this task were to develop a better understanding of well construction and usability and to determine a groundwater sampling scope for Phase II.

3.2 Phase II Activities

Phase II included supplemental soil sampling, monitor well installation, and monitor well sampling to support the RI objectives. Phase II included the following activities:

- Focused soil sampling to further characterize and bound the extent of constituents (horizontal and vertical) and to isolate potential source areas.
- Installing 13 shallow (Regolith or PWR) and 4 bedrock monitoring wells, 3 piezometers, and 5 staff gages to further refine the extent of contaminants in groundwater and to support FS evaluations.
- Conducting site-wide groundwater sampling to locate groundwater source areas and migration pathways.
- Collecting engineering data to support the FS.

These activities were described and completed in general accordance with the Phase I Report. The FSP was also used as a guide for some of the procedures followed during Phase II.

3.2.1 Additional Soil Sampling

Soil borings were completed at 11 locations (RISB-56 through -59 and RISB-61 through -67), as shown in **Figure 3-4**. Samples were collected from each of these locations at various depths and submitted to ASI for analysis. The sampling depths and associated analysis parameters are summarized in **Table 3-3**.

Soil samples were also collected at eight additional monitor well installation locations (RIMW-1, -5 through 8, -13, -19, and RIPZ-3), as shown on **Figure 3-4**. The sampling depths and analysis parameters are summarized in **Table 3-3**.

Boring logs for the additional soil samples are located in **Appendix A**.

3.2.2 Well Installation

Seventeen groundwater wells (RIMW-1, RIMW-3 through -16, and RIMW-18 and -19) and three piezometers (RIPZ-1 through -3) were installed, as shown on **Figure 3-4**. Of these 20 well/piezometer locations, 4 were completed in the saprolite horizon, 11 were completed in the partially weathered rock (PWR) horizon, and 5 were completed into bedrock. Geologic logs and well construction details for all of the wells installed in Phase II are located in **Appendix B**.

The bedrock wells were installed into competent bedrock using air-drilling techniques. The wells were set as specified in the Phase I Technical Memorandum and Phase II Work Plan (CDM, October 2006) for bedrock wells, and are conventional monitor wells (2"-PVC casing/screen, silica sand pack, bentonite seal, and cement

grout annular fill). Piezometer well RIPZ-2 was installed the same as the conventional monitor wells except 1"-PVC casing/screen was used instead of 2" PVC.

The saprolite and PWR wells were installed using auger or air rotary techniques. These wells were set as specified in the Phase I Technical Memorandum and Phase II Work Plan (CDM, October 2006) for shallow wells, and are conventional monitor wells (2"-PVC casing/screen, silica sand pack, bentonite seal, and cement grout annular fill). Piezometer well RIPZ-1 was installed the same as the conventional monitor wells except 1"-PVC casing/screen was used instead of 2" PVC.

In addition to standard installation procedures; rock coring, packer testing, and geophysical logging were performed on select wells to establish depth intervals for well installation.

Rock coring was performed for wells RIMW-18 and RIMW-19. These cores were evaluated to determine fracture zones and orientations to assist in the decision process when setting screen intervals for bedrock wells. Photos of rock cores are provided in **Appendix C**.

Packer tests were used when installing bedrock wells to determine the most appropriate interval to set screens. Groundwater samples were collected using packer tests for RIMW-18 at depth intervals of 44-56 ft bls and 56-68 ft bls and for RIMW-19 at depth intervals of 63-75 ft bls and 76-88 ft bls. Split samples were collected for each interval: one split was analyzed onsite for chlorinated ethenes using the Color-Tec method and the other split was sent to ASI for laboratory analysis of VOCs by EPA Method 8260B.

The results from the Color-Tec analysis were used to determine if additional depth intervals needed to be sampled. The laboratory data were used to confirm the Color-Tec data before setting the wells. Laboratory results from the packer tests are provided in **Table 3-4**. Color-Tec data for these two wells are presented in Appendix D, Table D-4.

Geophysical logging services were provided by Dr. James Ursic of the Environmental Protection Agency (EPA). A summary of the geophysical tools used and analysis conducted is presented in **Appendix C**. The Appendix C report includes geophysical logs and photographs of rock cores.

3.2.3 Site-Wide Groundwater Sampling

Two weeks following well installation, a site-wide groundwater monitoring event was conducted. This event included sampling the newly installed wells as well as several existing wells, as identified on Table 3-3. This table also includes the analysis parameters for each sampled well. All samples were sent to ASI for analysis as shown in Table 3-3. In addition to sampling, site-wide water level measurements were recorded.

3.2.4 Engineering Data Collection

Additional data were collected during Phase II to support remedial technology engineering evaluations for the FS. Activities performed included the following:

- Aquifer Hydraulics Tests
- Dual Phase Extraction Pilot Tests
- Biochemical and Geochemical Data Collection

3.2.4.1 Aquifer Hydraulics Tests

CDM performed several tests to assist in the evaluation of aquifer hydraulics of the bedrock and regolith hydrogeologic zones. Prior to the testing, CDM collected site-wide groundwater levels for comparison purposes.

To allow the aquifer to approach equilibrium without any extraction well operation influences, the extraction wells and trench pumps were stopped. The aquifer was allowed to stabilize for two weeks while collecting water levels from 14 locations as shown on **Figure 3-5** (eight manually and five using automated water level recorders). Following two weeks of aquifer stabilization, site-wide water levels were collected again.

Once all the data were obtained from the aquifer equilibration period, aquifer performance tests were performed on wells EW-2 and EW-3. These tests consisted of a six-hour step test. Pumping rates used were approximately 2 gallons per minute (gpm), 3 gpm, and 3.5 gpm for both EW-2 and EW-3. The work plan indicated that four steps would be performed, but only three were performed because the maximum yield was reached during the third step, making the third step the maximum pumping rate step. The step tests were followed by a 72-hour aquifer constant rate performance test (APT). The pumping rates for the APT tests were 2.7 gpm and 3 gpm for EW-2 and EW-3, respectively. Figure 3-5 shows the locations of wells EW-2 and EW-3 and also shows the location of observation wells used to monitor water levels during the tests.

3.2.4.2 Multi-Phase Extraction Tests

Multi-phase extraction (MPE) tests were performed by Kemron Environmental Services, Inc. to evaluate potential remediation technologies for source area chlorinated VOCs and the fuel oil area. The system extracts both subsurface vapor and liquid from a monitoring or recovery well through the application of varying levels of vacuum pressure. To control the liquid level and prevent groundwater mounding, a drop tube is inserted in the well to the static water level depth. The vacuum and airflow are conveyed through the drop tube. As the water table begins to rise from the vacuum, both free product and groundwater are extracted through the drop tube as the drop tube maintains the water level.

The first MPE test was conducted in the solvent ditch area as shown in **Figure 3-6**, and RIMW-8 was used as the extraction well. Surrounding wells were used to monitor pressure changes at varying distances from RIMW-8: MW-110A (56 feet), P-1 (105 feet), RIMW-4 (119 feet), RIMW-5 (112 feet), and OB-8A (50 feet). The pilot study was conducted at two induced vacuum pressures (6.5 in Hg and 17 in Hg), and measurements were taken until pressure readings stabilized during each test.

The second MPE test was conducted in the fuel oil area as shown in Figure 3-6, and PW-2A was used as the extraction well. The following surrounding wells were used to monitor pressure changes at varying distances from PW-2A: P-2 (20 ft), OB-900 (20 ft), OB-21 (6 ft), OB-22 (11 ft), and OB-23 (20 ft). The pilot study was conducted at induced vacuum pressures of 8 in Hg and 16.5 in Hg, and measurements were taken until subsurface conditions stabilized for each induced pressure. Following the first two induced pressure extractions, the vacuum pressure was increased to 23 in Hg to maximize fluid recovery.

3.2.4.3 Biochemical and Geochemical Data Collection

The biochemical and geochemical data were collected to evaluate in situ remedial technologies for source control and groundwater remediation. Bio- and geochemical data were collected from 12 wells as shown in Table 3-3 during the Phase II groundwater sampling event. Results are presented in Section 4.

3.3 Phase III Activities

Phase III activities were conducted based on additional data gaps discovered during analysis of the groundwater data following Phase II activities. The Phase III approach was outlined in the Phase II Sampling Results and Hydrogeologic Findings Interim Report (CDM, May 2007), and the work performed during Phase III included the following activities:

- Installing 11 additional wells and abandoning 11 wells.
- Geophysical logging by EPA on selected wells during construction.
- Conducting groundwater sampling on the newly installed wells and selected existing wells to confirm findings in Phase II.

Correspondence with SCDHEC prior to Phase III activities resulted in some changes to the scope of work originally outlined in the Phase II Interim Report. These changes included:

- Recording soil lithology during well construction
- Adding one saprolite monitor well (RIMW-24)

- Installing diffusion bag samplers in RIMW-15 and collecting samples from these diffusion bags for onsite screening and laboratory analysis
- Adding three existing wells (RIMW-15, MW-121B, and MW-122B) to the groundwater sampling event
- Revising the well abandonment plan to cover the following 11 wells: MW-123B, MW-116, MW-117, OB-12, OB-13, OB-21, OB-23, OB-900, OB-901, OB-902, and PW-2A. Although PW-1 and RIMW-15 were initially selected to be abandoned by SCDHEC, they were not abandoned based on SCDHEC direction in the field. PW-1 was not abandoned because a pump was encountered in the well that could not be readily removed and RIMW-15 was not abandoned because diffusion sample results indicated that the well is not screened in multiple zones as previously suspected.

3.3.1 Well Installation and Abandonment

Eight bedrock groundwater monitor wells (RIMW-20, -21, -22, -23, -25, -26, -28, and -29) and three saprolite/PWR monitor wells (RIMW-24, -27, and -30) were installed to further refine the extent of contaminants in groundwater and to support FS evaluations. These monitor well locations are shown on **Figure 3-7**.

The bedrock wells were installed into competent bedrock using sonic drilling techniques. These wells were set as specified in the Phase II Work Plan for bedrock wells, and are conventional monitor wells (2"-PVC casing/screen, silica sand pack, bentonite seal, and cement grout annular fill).

Although monitor well RIMW-27 was intended to be installed as a bedrock well, it was not screened in bedrock. After setting steel casing into competent rock, it became apparent that the casing was set in "false rock". The casing was likely set in a rock ledge or boulder. At the direction of SCDHEC, the well was installed at the total depth achieved in this location.

The saprolite wells (RIMW-24 and RIMW-30) were installed to the top of PWR using sonic drilling techniques. These wells were set as specified in the Phase II Work Plan for shallow wells, and are conventional monitor wells (2"-PVC casing/screen, silica sand pack, bentonite seal, and cement grout annular fill).

Boring logs for these wells are provided in Appendix A, and construction well diagrams are provided in Appendix B.

Eleven well locations were also abandoned as shown in Figure 3-7. These locations were abandoned for the following reasons:

- Multiple Zone Wells – select wells with sand pack interval that connects the bedrock zone with a higher hydrogeologic zone (PWR, saprolite, etc.) or are screened across the bedrock zone and a higher hydrogeologic zone were

abandoned. This is because the data (e.g., water quality and water levels) from such wells are not likely representative of any single hydrogeologic zone.

- Redundancy – select wells that are screened in the same hydrogeologic zone as another well, are screened within five vertical feet of that well, and are in relative proximity to the well are considered to be redundant. These wells were also recommended for abandonment. When comparing wells, the well with the least amount of information available (e.g., boring logs, well construction details, etc.) was abandoned over wells with more complete information.
- Insufficient data – select wells that do not have sufficient information to know if they are screened in multiple hydrogeologic zones were abandoned.

At SCDHEC's request, CDM performed diffusion sampling in four equal intervals (70-77.5 ft bls, 77.5-85 ft bls, 85-92.5 ft bls, and 92.5-100 ft bls) of the 30-foot screen of RIMW-15. Each diffusion sampler was screened on site using Color-Tec methods. Two diffusion samples were selected for offsite laboratory analysis. The results of this analysis are shown in **Table 3-5**. Color-Tec data for the diffusion samplers are presented in Appendix D, Table D-4.

3.3.2 Groundwater Sampling

Two weeks following well installation, groundwater sampling was conducted for the wells identified in **Table 3-6**. This event included sampling the newly installed wells as well as three existing wells (RIMW-15, MW-121B, and MW-122B). This table also includes the analysis parameters for each sampled well. All samples were sent to ASI for analysis of TCL VOCs. In addition to sampling, site-wide water level measurements were recorded.

Section 4

Remedial Investigation Results

This section summarizes the results of the Remedial Investigation (RI). The RI was completed in three phases and included a hydrogeologic evaluation; soil (surface and subsurface), sediment, and groundwater investigations; hydraulic testing; MPE testing; and biochemical and geochemical data collection.

The RI design and investigation procedures, Phase I results, and partial Phase II results were presented in the Work Plan, Phase I Report, and the Phase II Report.

The summary of findings presented below includes a comparison of detections against regulatory criteria. The regulatory criteria, including EPA Region 9 Preliminary Remediation Goals (PRGs), EPA Region 9 Soil Screening Levels (SSLs), EPA Region 4 Ecological Screening Values (ESVs), and EPA Maximum Contaminant Levels (MCLs), are presented in **Table 4-1**.

The tables and figures in the following sections show the detected compounds only. Summary tables of all the laboratory results are presented in **Appendix D**. The complete laboratory reports for the RI data are included on the enclosed CD-ROM. Hard copy laboratory reports with raw data are on file at CDM.

4.1 Site-Specific Hydrogeology

4.1.1 Geology

The site-specific hydrogeology was found to be consistent with expectations developed during work plan preparation. In descending order, three hydrogeologic zones were identified that include the regolith zone (shallow), the transition zone between bedrock and the regolith (intermediate), and the bedrock zone (deep).

The regolith zone at the site consists of two primary types of unconsolidated formation materials. Saprolite is the dominant type and is the unconsolidated weathering product of the underlying parent rock that retains the relic structure of the parent rock. The saprolite consisted of a wide range of grain sizes ranging from clay to silt to sand. Generally, the grain size is smaller near land surface and increases in size with depth down to the transition zone where rock fragments (gravel-sized grains) are common. The saprolite thickness is typically about 20 to 30 feet.

The regolith zone also includes the recent stream alluvium deposits associated with Fishing Creek and Wildcat Creek. **Figure 4-1** shows the estimated area underlain by alluvial deposits. Based on the recent borings, the alluvium consists primarily of sand with sand and gravel deposits found in closer proximity to Wildcat Creek. The alluvium typically occurs to a depth of about 20 feet and was observed to be the thickest at location RIMW-23, where medium- to coarse-grained sand and gravel was encountered to a depth of almost 35 feet.

The saprolite and the alluvium are fully connected hydraulically and behave as a single groundwater zone under water table conditions. Based on the geologic descriptions, the permeability of the alluvium is much higher than the permeability of the saprolite. The depth to groundwater in the regolith measured at the site ranges from 5 feet near the streams to over 20 feet at the higher elevations. In the west portion of the site, the water table may be deeper than the regolith zone, and the water table is located in the transition zone.

The transition zone between the regolith and bedrock zones consists of partially weathered bedrock and primarily of rock fragments, boulder-size rocks, and fractured bedrock that is in full hydraulic connection with the overlying regolith zone. The observed transition zone consisting of partially weathered rock (PWR) typically ranged from about 5 feet to about 25 feet. One exception in the PWR thickness was discovered at the location of RIMW-22 where the PWR was found to be about 85 feet thick.

Bedrock samples were obtained from the bedrock formation during the RI. The rock types encountered primarily included diorite, granodiorite, gabbro, norite, and diabase. Granodiorite and diorite were the most frequently encountered rock types. The mineral assemblages associated with these rock types include feldspar, hornblende, biotite, and chlorite. These rocks were medium to coarsely crystalline and tended to weather to friable PWR and sand-sized particles. The gabbro mineralogy primarily included pyroxene, hornblende, and chlorite. Diabase intrusions were also observed in the gabbro that demonstrated contact metamorphism as feldspar deposits.

The primary rock type observed at the northern portion of the PSC site was norite, which contains mostly plagioclase with some pyroxene. In the central and southern portions of the site, the feldspar content decreases, the pyroxene content increases, and the rock type becomes gabbro. The rock type on the western portion of the site has enough pyroxene that it could be considered a pyroxenite.

Other geologic observations included the presence of a diabase dike and minerals indicative of weathering of feldspars such as laumontite, chlorite, and epidote within fracture zones. Iron staining was also observed in selected fracture zones indicating that water had been present within the fracture zone. In a few locations, siderite and/or pyrite was observed in fracture zones. The foundational fracturing of the rock appeared to be the result of the intrusive activities, which created steeply dipping stress fractures trending northwest/southeast and northeast/southwest. Additional fracturing occurred as the result of the intrusion of two diabase dikes (elevations 430-420 ft and 388 ft), which were noted in three of the bedrock wells (RIMW-21, RIMW-22, and RIMW-26).

The effects of the fracturing were enhanced in portions of the site where elevated feldspar content was observed. The fracturing increased permeability, allowing water

to move within the fractured zones. Where the fracturing occurred within zones containing higher feldspar content, the enhanced permeability in combination with the susceptibility of feldspars to weathering allowed significant enhancement of the fracture zones and alteration of the feldspars to laumontite, epidote, and chlorite. Chemical alteration also occurred as the intrusive diabase dike reacted with the norite parent rock. From a depth of approximately five feet below the diabase dike and greater, the degree of fracturing and alteration is much less significant.

The highest degree of weathering/fracturing and the highest percentage of feldspar were observed at RIMW-20, 21, and 22, which are also the locations at the site where the depth to bedrock was significantly greater and where the diabase dikes were observed. Depth to bedrock at RIMW-26 was similar to RIMW-21; a diabase dike was also noted in RIMW-26. A zone of high fracturing and gravel was observed in the central portion of the site at elevations 470-460 ft at wells RIMW-25, RIMW-27, RIMW-28, and RIMW-29. This zone of gravel/relict fracturing may also be present in RIMW-22, RIMW-26 and RIMW-27, which contained PWR at elevation 470-460 ft. Another zone of gravel and high fracturing was observed at elevation 420-410 ft in the northern part of the site at RIMW-20, RIMW-21, and RIMW-22.

4.1.2 Hydrogeology

Potentiometric surface maps were developed for the regolith (saprolite, alluvium, and PWR) and bedrock hydrogeologic zones from data collected in September 2007. The regolith/PWR potentiometric surface is shown on Figure 4-1, and the bedrock potentiometric surface is shown on **Figure 4-2**. The associated groundwater elevations are also summarized in **Table 4-2**. Calculated vertical gradients for select well pairs are presented in **Table 4-3**.

The regolith/PWR groundwater elevations decrease east-southeast toward Wildcat Creek. The hydraulic gradient is steeper in the west portion of the site that is underlain by saprolite and decreases in the vicinity of the creek where the regolith consists of alluvium. This difference in hydraulic gradient is believed to be associated with the alluvium being more transmissive than the saprolite. Regolith/PWR groundwater flows from the saprolite into the alluvium and then into Wildcat Creek. However, it is possible for the regolith/PWR groundwater to flow beneath Wildcat Creek in the alluvium for some distance downstream before effectively discharging into the active stream channel.

Bedrock groundwater elevations also generally decrease east-southeast towards the creek. However, in the area surrounding Wildcat Creek where stream alluvium is present, the groundwater flow pattern appears to be controlled more so by the alluvial valley rather than the current location of the stream channel. This actually is not very surprising because the bedrock groundwater discharge is more efficient where the alluvial valley is the deepest and the alluvium is most permeable. This area is expressed on the potentiometric surface map as a trough formed by the 507-foot contour.

4.1.3 Cross Sections

CDM has prepared hydrogeologic cross sections based on data obtained during the RI and previously existing data. Boring logs and well construction logs were recorded during the RI and are presented in Appendix A and B, respectively. Five cross sections were prepared, and the locations are shown in **Figure 4-3**. These cross sections were developed to correlate the hydrogeologic zones (shallow – saprolite, intermediate – PWR, and deep – bedrock). **Table 4-4** presents a well summary for all pre-RI and RI wells on site.

Cross Section 1 (CS1) was used to evaluate the north-central portion of the groundwater plume and to evaluate the relationship with extraction well EW-2 and surrounding wells. CS2 was used to evaluate the incinerator area and the south-central portion of the groundwater plume. CS3 was used to evaluate central portion of the plume. CS4 was used to evaluate conditions perpendicular to the groundwater flow direction. CS5 was used to evaluate the relationship between extraction well EW-2 and surrounding wells. Cross sections CS1, CS2, CS3, and CS5 generally proceed in the direction of groundwater flow, from the east toward Wildcat Creek.

The cross sections are generalized to show the three major hydrogeologic zones identified above. Data were taken from the newly installed wells and borings, and from historic boring logs, as available. Elevations for the top of bedrock, the top of PWR, and groundwater were each processed using Kriging interpolation methods to develop elevation contours across the site for these features. The cross sections were then prepared from the resulting elevations. **Appendix I** includes the elevation contour maps used to prepare the cross-sections. Each cross section was separated into two figures, one containing chlorinated ethenes/ethanes (CEE) concentrations and one containing BTEX/chlorinated benzenes (CB) concentrations. These concentrations are discussed in later subsections. The observed hydrogeology is discussed below.

Cross Section 1

CS1 is shown in **Figures 4-4** and **4-5**. This section extends from west to east on the north end of the warehouse, crossing through the Drum Processing, Drum Packaging, and former Burn Pits areas before crossing Wildcat Creek to the east. Just east of the warehouse building, the bedrock elevation decreases sharply to RIMW-22, then increases again towards Wildcat Creek. It should be recognized that the interpretation depicted of the bedrock surface associated with RIMW-22 could be exaggerated. This low point in the bedrock surface may not be as laterally extensive as shown in the cross sections. Groundwater flow along this section is toward Wildcat Creek. It should be noted that the water table surface is in the PWR in the west portion and in the regolith in the east portion.

Cross Section 2

CS2 (**Figure 4-6** and **Figure 4-7**) extends from west to east and crosses the Drum Storage/Solvent Recovery, Blend Tanks Overflow, Solvent Ditch, and Fuel Oil areas

before crossing Wildcat Creek. CS2 has a bedrock surface depression similar to that in CS1, although not as drastic. Just east of the warehouse building, the bedrock elevation decreases to RIMW-26, then increases again towards Wildcat Creek. The groundwater flow direction is toward Wildcat Creek in this section. The saprolite layer appears to be thicker in CS-2 than in CS-1 and the water table surface resides entirely in the regolith rather than having portions in PWR.

Cross Section 3

CS3 is shown in **Figures 4-8** and **4-9**. This section extends from northwest to southeast and crosses the Drum Repackaging and Fire, Incinerator, and the Fuel Oil areas before crossing Wildcat Creek. CS3 indicates that the bedrock surface decreases downgradient of the warehouse building and increases towards Wildcat Creek. Surface elevation decreases approximately 20 feet from the west boundary to the creek. The groundwater flow in this section is toward Wildcat Creek.

Cross Section 4

CS4 runs from south to north as shown in **Figures 4-10** and **4-11**. This section is generally drawn perpendicular to the direction of groundwater flow and extends through the Fuel Oil and Drum Storage and Management areas. The hydrogeology indicates that the wells on this section are screened in either PWR or bedrock. Bedrock elevation decreases slightly near EW-2 then increases slightly before dropping dramatically just east of the north end of the warehouse.

Cross Section 5

CS5, which is shown in **Figures 4-12** and **4-13**, runs from west-northwest to east-southeast. This section crosses through the Drum Repackaging and Fire Area and extends just south of the former Incinerator location and Fuel Oil area. Similar to CS1 and, CS2, and CS3, the bedrock surface elevation decreases east of the warehouse before increasing towards Wildcat Creek. The groundwater flow in this section is toward Wildcat Creek.

4.2 Environmental Media Sampling

This section presents the analytical results for sampling conducted during the RI for soil, groundwater, and sediment. As discussed further below, the data for soil and groundwater are presented based on potential areas of concern developed using historical reports, historical data, and data collected during the RI.

4.2.1 Soil

This subsection presents the results of soil sampling activities, which were conducted during Phase I and Phase II of the RI. **Table 4-5** presents a summary of the compounds detected in soil above screening criteria. The sampling locations are shown in Figure 3-1. All soil analytical results are presented in **Appendix D**, Table D-1.

Soil sampling results for semi-volatile organic compounds (SVOCs) and metals are also provided in Table 4-5. The SVOC results show that only one location (RISB-49) had concentrations detected above SSLs, and no locations with concentrations detected above PRGs. Four metals (arsenic, chromium, nickel, and thallium) were detected above PRGs and SSLs at several locations in soil. No locations had detections of metals above both criteria.

The sample locations with VOC detections above either the industrial soil PRGs or SSLs with a dilution attenuation factor (DAF) of 20 are presented in **Figure 4-14** for surface soil and **Figure 4-15** for subsurface soil, with total organic concentrations (separated by class of VOC) shown for each of these locations. Three classes of VOCs and their typical degradation products were identified as having the highest concentrations in both soil and groundwater site wide:

- BTEX – Benzene, toluene, ethylbenzene, and toluene.
- Chlorinated ethenes and ethanes (CEE)– Chloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; cis-1,2-dichloroethene; 1,1,2,2-tetrachloroethane; tetrachloroethene; 1,1,1-trichloroethane; trichloroethene; 1,1,2-trichloroethane; and vinyl chloride.
- Chlorinated benzenes (CB)– Chlorobenzene; 1,2-dichlorobenzene; 1,3-dichlorobenzene; 1,4-dichlorobenzene; 1,2,3-trichlorobenzene; and 1,2,4-trichlorobenzene.

Although other compounds were detected on site, they were generally coupled with higher concentrations of compounds from one of the three identified classes. It is also anticipated that remedial alternatives will be focused on these three classes of compounds.

In addition to segregation of VOC results by class, soil results were grouped into four areas of concern based on observed concentrations and historical information about releases. These areas are shown on Figure 4-15 and summarized below:

- Soil Area #1 – Warehouse (Drum Storage and Management) Area. This area is located on the northern end of the warehouse and contains the former East Drum Storage, Drum Receiving, and Drum Packaging areas.
- Soil Area #2 – Incinerator /Drum Repackaging Area. This area contains both the southern end of the warehouse (Drum Repackaging and Fire area) and the former incinerator area southeast of the warehouse.
- Soil Area #3 – Solvent Ditch Area. This area contains the former solvent ditch area. This area is also located southeast of the former Blend Tanks Overflow area.

- Soil Area #4 - South Drum Storage Area. This area is the furthest southeast on the site and although this area does not include any previously identified SWMUs, it is adjacent to the former storm water pond and a former drum storage area.

The soil results for each VOC class and area of concern are discussed below.

4.2.1.1 Soil Area #1 - Warehouse (Drum Management and Storage) Area

Soil samples collected in this area include RISB-16, -20, -21, -30, -66 and RIMW-6 and -19. Additional locations near this area include RISB-9, -17, -31, -32, -38, and -67.

Surface soil (0-1 ft or 0-5 ft bls) samples had detections above criteria for CEE at RISB-16 and RIMW-6 in this area. These locations each had over 1 mg/kg total CEE, with cis-1,2-dichloroethene (DCE) being predominant at RIMW-6 (3.4 mg/kg) and tetrachloroethene at RISB-16 (2.8 mg/kg). Neither BTEX nor CB was detected in this area.

Subsurface soil samples had detections above screening criteria for CEE in 5 of 12 subsurface sampling locations. BTEX and CB were not detected above screening criteria in subsurface samples from this area. The highest concentrations of CEE (30.4 mg/kg) were detected at RIMW-6 from 4-6 feet bls.

4.2.1.2 Soil Area #2 - Incinerator / Drum Repackaging Area

Soil samples collected in this area include RISB-6, -11, -12, -13, -18, -19, -23, -26, -45, -46, -52, -61, -62, -63, -64, and -65 and RIMW-1. Additional locations near this area include RISB-7 and RISB-51.

Surface soil samples (0-1 and 0-5 ft bls) had detections above soil criteria for BTEX in four locations, for CEE in seven locations, and for CB in one location. The highest concentrations of CEE and BTEX were detected in RISB-64 (17 mg/kg) and RISB-65 (65 mg/kg), respectively. Both of these locations were in the drum storage area of the warehouse. The highest concentration of CB was detected in RISB-46 (32 mg/kg). CB were only detected in the incinerator area and not in the warehouse storage area.

Subsurface soil samples had detections above screening criteria for BTEX in four locations, for CEE in 12 locations, and for CB in one location. The highest concentrations were detected at RISB-64 for CEE (291 mg/kg), RISB-12 for BTEX (2,700 mg/kg), and at RISB-18 for CB (27 mg/kg). The BTEX and CB concentrations were detected at these levels from 1-5 feet bls, and CEE were detected at their highest levels in this area from 5-10 feet bls. BTEX and CEE were detected above screening levels at depths up to 20 feet bls. The estimated depth to groundwater in regolith is between 17 and 20 feet bls in this area. Site wide, the highest concentrations were detected in this area for all three VOC classes.

4.2.1.3 Soil Area #3 - Solvent Ditch Area

Soil samples collected in the Solvent Ditch area include RISB-28, 29, -50, -59, and RIMW-8. Additional locations near this area include RISB-27 and RIMW-5.

No concentrations were detected above soil criteria for surface soil samples (0-1 ft bls) collected from this area. Subsurface soil samples had detections above screening criteria for BTEX in one location and for CEE in five locations. CB were not detected above screening criteria in this area. The highest concentrations were detected at RISB-29 for BTEX (590 mg/kg) and RIMW-8 for CEE (6 mg/kg). CEE were detected above criteria at depths up to 20 feet bls (RIMW-5). The estimated depth to groundwater in RIMW-5 is approximately 20 feet bls.

4.2.1.4 Soil Area #4 - South Drum Storage Area

The South Drum Storage area includes soil locations RISB-2, -25, -47, and -57. Surrounding locations RISB-4, -24, -39, -48, and -58 are also being evaluated for this area.

In surface soils (0-1 feet bls), CEE was detected above soil criteria at RISB-2. The total CEE concentration at this location was 0.14 mg/kg. BTEX and CB were not detected above screening criteria in surface soil samples from this area.

Subsurface soil samples had detections above screening criteria for BTEX in one location and for CEE in four locations. CB were not detected above screening criteria in this area. The highest concentration observed for total CEE was 50 mg/kg at RISB-25 from 17-20 feet bls. BTEX was detected at RISB-2 (5.9 mg/kg) from 9-13 feet bls and was also detected from 17-21 feet bls at 4.2 mg/kg. The depth to groundwater is approximately 20-21 feet bls in this area.

4.2.2 Groundwater

Table 4-6 presents the compounds detected in groundwater above screening criteria during the RI. Groundwater sample (monitor well) locations are shown in Figure 3-1. All groundwater analytical results are presented in Appendix D, Table D-2.

Groundwater samples were collected for analysis of SVOCs and metals on select wells installed during Phase II (RIMW-1, RIMW-3 through RIMW-16, RIMW-18, RIMW-19, and RIPZ-3). These analyses were performed to validate whether or not the groundwater plume of concern is associated with VOCs only. Additional groundwater monitor wells were installed in Phase III based solely on VOC detections, and therefore only VOC analyses were performed on Phase III wells (RIMW-20 through RIMW-30). Groundwater sampling results for SVOCs and metals are provided in Table 4-6. The SVOC results show that only one location (RIMW-8) had detections of SVOCs at reportable concentrations.

VOC concentration contours in groundwater were estimated for the three VOC classes (BTEX, chlorinated ethenes/ethanes, and chlorinated benzenes) in both

regolith/PWR and bedrock. These concentration contour maps are shown in **Figures 4-16 through 4-21**.

Based on information derived from the cross sections in Section 4-1 and the concentration contours, groundwater areas of concern were identified. These areas of concern are shown on **Figure 4-22** and include the following:

- **GW Area #1 - Incinerator / Drum Repackaging Area** – The incinerator area was chosen because this is the area in regolith (shallow) groundwater and soil with the highest concentrations of chlorinated benzenes (6.9 mg/L in MW-123A). This area also includes the southern end of the warehouse where soil concentrations of BTEX exceed 1,000 mg/kg and CEE soil concentrations are close to 300 mg/kg.
- **GW Area #2 - Solvent Ditch Area** – Groundwater in the solvent ditch area contains the highest concentrations of chlorinated ethenes in regolith, and the highest concentrations of all three VOC classes were detected in bedrock in this area. This area also appears to contribute high concentrations of VOCs to bedrock groundwater (refer to cross sections). This area extends into the North Drum Storage location because detected compounds in groundwater there are consistent with concentrations in the solvent area, possibly indicating one source or contiguous sources.
- **GW Area #3 - Burn Pits** – Although a removal action previously occurred in this area in 1983, groundwater concentrations in this area do not suggest that VOCs in this area are a result of migration from other areas.
- **GW Area #4 - Fuel Oil Area** – The fuel oil area remains an area of concern because free product is still present in this location.

The groundwater results for each VOC class and area of concern are discussed below. Please note that when reviewing the bedrock groundwater data, some bedrock wells installed during Phase III in September 2007 may not have been fully equilibrated when they were sampled. Bedrock wells RIMW-21, -23, -26, and -28 did not recharge adequately during development of the wells. In addition, when sampling these wells, they became dry before purging three well volumes.

4.2.2.1 GW Area #1 - Incinerator / Drum Repackaging Area

Shallow Horizon

The shallow wells that are in the Incinerator Area include RIMW-1, RIMW-3, RIMW-11, MW-123A, and OB-109. All wells except RIMW-11 and OB-109 had detections of benzene above MCLs but total BTEX did not exceed 150 ug/L for any well.

CEE concentrations were detected above MCLs for all wells in this area. RIMW-11 had over 680 ug/L of CEE, which consisted primarily of tetrachloroethene (PCE) and trichloroethane (TCA) degradation product dichloroethane (DCA). On the southeast

side of the warehouse, RIMW-1 had 21,000 ug/L of CEE, which consisted mainly of trichloroethene (TCE), PCE, and DCE. Also on the southeast side of the warehouse, OB-109 had 68 ug/L of CEE, which consisted mainly of 1,2-DCE. On the north end of the drum repackaging area at RIMW-3, the total concentration of CEE was 14,000 ug/L and contained 13,000 ug/L of 1,2-DCA. Near the former incinerator, MW-123A had a total CEE concentration of 6,250 ug/L and contained 4,900 ug/L of 1,2-DCA and 1,100 ug/L of 1,2-DCE. PCE was not detected in this well, unlike the three up gradient wells.

None of the wells in the drum repackaging area (RIMW-1, RIMW-3, and RIMW-11) had concentrations of chlorinated benzenes exceeding MCLs. MW-123A had over 6,900 ug/L of CB, with concentrations over 1,000 ug/L for 1,2-dichlorobenzene, 1,4-dichlorobenzene, and chlorobenzene.

Bedrock Horizon

The bedrock wells in the Incinerator and Drum Repackaging Area include RIMW-18, OB-109B, and RIMW-28. MCLs were not exceeded for BTEX in any of these wells.

CEE concentrations exceeded MCLs for at least one constituent in all three wells. Total CEE in OB-109B was 347 ug/L and consisted mainly of PCE (210 ug/L). RIMW-18 has a total CEE concentration of 33.5 ug/L and consisted primarily of PCE. RIMW-28 had a total CEE concentration of 78 ug/L and contained mainly 1,2-DCA and 1,2-DCE.

4.2.2.2 GW Area #2 - Solvent Ditch Area

Shallow Horizon

The wells near this area that are screened in regolith are RIMW-4, -5, -6, -8, -16, OB-110A, OB-8A, P-1, and P-3. BTEX concentrations are highest on site in this area (with exception to the fuel oil area where free product is present), with total BTEX concentrations in the mg/L range for RIMW-8, OB-8A, and OB-110A. Benzene was also above MCLs for RIMW-4, -5, -6, and -16, but overall BTEX concentrations in these wells were below 0.1 mg/L. All BTEX compounds were below MCLs for P-1 and P-3.

CEE concentrations in the Solvent Ditch Area were higher than BTEX, and total CEE concentrations were above 1 mg/L for all wells. The highest concentrations of CEE were 53 mg/L and 89 mg/L at RIMW-5 and RIMW-8, respectively. CEE concentrations included parent compounds 1,1,1-TCA, PCE, and TCE in all wells, indicating that multiple parent compounds (PCE and 1,1,1-TCA) are present in this area.

Chlorinated benzene concentrations were detected in all of the wells in this area except RIMW-6. Chlorobenzene was the only chlorinated benzene detected above MCLs (in wells RIMW-4, RIMW-8, and OB-8A).

Bedrock Horizon

Bedrock wells in this area include RIMW-25 (located just south of the solvent ditch), OB-110B (also south of the solvent ditch), RIMW-19 (just north of the ditch), and

RIMW-22 (northeast of RIMW-19). The top of bedrock for these wells are 495 ft, 492 ft, 479 ft, and 412 ft for RIMW-25, OB-110B, RIMW-19, and RIMW-22, respectively. Although a cross section was not made for this specific area, top of bedrock elevations noted above indicate that there is a steep gradient in bedrock elevation from RIMW-25 to RIMW-22.

BTEX concentrations were detected 14 mg/L at RIMW-25, the highest concentrations in bedrock. However, BTEX were not detected above MCLs in the three other wells. CEE concentrations were also the highest on site in bedrock at RIMW-25 (11 mg/L). CEE were detected above MCLs in the other three wells as well. CB concentrations follow a similar trend with CB concentrations the highest on site in bedrock at RIMW-25 (2.3 mg/L). CB were not detected in the other three wells.

4.2.2.3 GW Area #3 - Burn Pits Area

Shallow Horizon

The shallow wells that are near the former Burn Pit Area include BP-1A, MW-103, and RIMW-24. TCE was detected above its MCL in BP-1A but no CEE compounds were detected above MCLs in upgradient well MW-103. RIMW-24 had concentrations of PCE, TCE, 1,2-DCE, and 1,1-DCE above MCLs, and in general, these concentrations were at least ten times higher than the concentrations in BP-1A.

Bedrock elevations shown in Cross Section CS1 (Figure 4-4) indicate that depth to bedrock rises sharply from RIMW-16 to BP-1A although the depth to bedrock in RIMW-24 (Figure 4-6) is similar to BP-1A. The concentrations detected in BP-1A appear to indicate that either a source exists in this area or that chlorinated ethenes have a preferential flow path in a cross gradient direction from RIMW-24 to BP-1A. Neither BTEX nor chlorinated benzenes were detected above MCLs in this area.

Bedrock Horizon

The bedrock wells near the Burn Pit Area include EW-3 (extraction well), BP-1B (screened in PWR and bedrock), and RIW-23. PCE, TCE, 1,2-DCE, and 1,2-DCA were detected above MCLs in EW-3 (Figure 4-5), and similarly 1,1-DCE, PCE, TCE, 1,2-DCE, and vinyl chloride (VC) were all detected above MCLs for adjacent well BP-1B. The concentrations in EW-3 and BP-1B detected are also similar in magnitude. No VOC concentrations exceeded MCLs in RIMW-23. Neither BTEX nor chlorinated benzenes were detected above MCLs in this area.

Downgradient of the burn pit area, similar CEEs (PCE, TCE, 1,2-DCE) were detected in bedrock well MW-121B across the creek. This is the only location where MCLs are exceeded across the creek as TCE was detected at 7.5 ug/L.

4.2.2.4 GW Area #4 - Fuel Oil Area

Shallow Horizon

The shallow monitor wells in the Free Product Area include MW-104, MW-118, MW-119, RIMW-27, RIPZ-3, OB-11, OB-12, OB-13, OB-21, OB-22, OB-23, OB-900, OB-901, OB-902, and P-2.

Product thickness data collected in January 2007 (shown in **Table 4-7**) indicate that the greatest thickness of oil product in the fuel oil area is around wells OB-12, -13, -22, and -900. These are also the areas with the highest concentrations of BTEX. BTEX concentrations do not appear to extend very far in the downgradient direction, as concentrations are orders of magnitude lower at MW-118, and are below MCLs at MW-119 and RIMW-27.

Concentrations in CEE are below MCLs in the area of highest fuel oil thickness. Significant degradation may be occurring at this location because of the abundance of electron donor (as BTEX). The closest bedrock well, RIMW-26, also is below MCLs for all CEE compounds, indicating that either the CEE observed in the upgradient wells is not “sinking” to the bedrock horizon, degradation is occurring at this well, or preferential flow paths do not transmit water from the fuel oil area to this well. MCLs are exceeded for CEE only in downgradient well RIMW-27. Chlorinated benzene concentrations are also below MCLs in regolith in this area.

Bedrock Horizon

Only RIMW-26 is screened in bedrock in the immediate vicinity of the fuel oil area. Concentrations of all VOCs were below MCLs in this well. RIMW-29, located southeast of the fuel oil area, contained 1,2-DCA, 1,2-DCE, PCE, TCE, and VC above MCLs.

4.2.3 Surface Soil Sampling across Wildcat Creek

The surface soil sampling locations in the undeveloped portion of the site across Wildcat Creek are shown in Figure 3-2. The only constituent detected above soil screening criteria was arsenic. This compound was detected in all ten locations at approximately the same concentration as that detected in background sample RI-BCK1. The highest arsenic concentration detected was 2.5 mg/kg at RISS-4, and the arsenic concentration at RI-BCK1 was 1.6 mg/kg.

4.2.4 Sediment Sampling

Sediment samples were collected as described in Section 3. Sediment sample detections above ESVs are shown in **Table 4-8**. Complete analytical results are provided in Appendix D, Table D-3.

4.2.4.1 Catch Basin/Water Collection Area Sampling

One catch basin was sampled on site at RICB-3. This location was upgradient of stormwater outflow No. 2, as shown in Figure 3-2. RICB-3 was sampled for VOC,

SVOC, and metals analyses. Bis(2-ethylhexyl)phthalate and several metals were detected above ESVs at this location.

An additional sediment sample (RI-WASTE) was obtained from a water collection area within the warehouse building at the direction of SCDHEC. The sample was also analyzed for VOCs, SVOCs, and metals. Several SVOCs and metals were detected above ESVs at this location, as shown in Table 4-8.

4.2.4.2 Creek Sediment Sampling

Five sediment samples were collected along the two creeks that border the main area of the site, and one background sample was collected from each creek. The locations of each sample correspond to a stormwater outflow from the site, as shown in Figure 3-2. Some polycyclic aromatic hydrocarbons (PAHs) were detected above screening criteria at these locations. However, the highest observed concentrations of PAHs were detected in the background sample (RISD-WCBK) collected from Wildcat Creek. Three metals (copper, lead, and mercury) were also detected above ESVs at a few creek sediment locations. These metals were not detected in the background sampling locations above ESVs.

4.3 Hydraulic Analysis

This section presents the results of the hydraulic analysis conducted during Phase II of the RI. The objective of the hydraulic analysis of the aquifer was to provide engineering data to evaluate groundwater remediation technologies. To do this, the extraction system was turned off for two weeks so that the aquifer could return to static (non-pumping) equilibrium. Site-wide groundwater elevations were collected prior to and following the equilibration period.

Once post-equilibration groundwater levels were recorded, a series of aquifer tests were conducted at wells EW-2 and EW-3. Based on analysis of the potentiometric surface data and pumping data, information was derived to estimate extraction well capacities and aquifer transmissivity. Regolith and bedrock potentiometric surfaces were also prepared from the data.

4.3.1 Potentiometric Surface

As stated above, site-wide groundwater elevations were collected before and after aquifer equilibrium occurred. **Figures 4-23 and 4-24** show the potentiometric surfaces in regolith pre- and post-equilibrium, respectively. The groundwater elevations in Figure 4-23 indicate that pumping at EW-2 has an effect on regolith groundwater, but the large variations between MW-119/RIPZ-3 and MW-113A and MW-114 indicate that the system is not in equilibrium because of inconsistent pumping that preceded the data collection event.

Immediately prior to the equilibrium period, the extraction wells were operating intermittently, with the pumps running at a flow rate greater than the aquifer could

supply. Therefore, the pumps would cavitate, with flow rates varying between 0 and 6 gpm. This caused the groundwater elevations in the aquifer to be in a constant state of flux. The pre-equilibration groundwater potentiometric surface maps were not evaluated in detail for these reasons. The September 2007 potentiometric surface maps (Figures 4-1 and 4-2) are used to describe groundwater flow patterns during pumping conditions.

Post-equilibrium groundwater maps are shown in **Figures 4-25** and **4-26**. In the regolith, it appears that equilibrium still had not been reached based on the variations in groundwater levels between MW-119/RIPZ-3 and MW-113A and MW-114. However, it is noteworthy that the hydraulic gradient is lower in this area than in the rest of the site, which may indicate an area of higher transmissivity. Post-equilibrium bedrock elevations show a similar pattern to regolith, with groundwater elevations relatively flat between MW-110B, MW-113B, and MW-120B.

4.3.2 Aquifer Performance Tests

Aquifer performance test (APT) results for EW-2 and EW-3 are shown in Tables 4-9 and 4-10, respectively. APT results are also included in **Appendix E**. The aquifer performance tests were performed as described in Section 3 and resulted in estimated aquifer transmissivities for different wells surrounding the extraction wells. The aquifer test data were analyzed according to the Theis method. Data curves were also prepared for qualitative comparisons to other type curves for leaky, delayed yield, and fractured rock aquifers. However, the magnitude of the “noise” in the water level data generally masked the transient effects of these aquifer variations, if such variations were present at all.

The well capacity test for EW-2 shown in **Figure 4-27** indicates a flow rate of about 3 gpm is sustainable. The APT at EW-2 was conducted at a flow rate of 2.7 gpm. EW-2 APT results indicate that EW-2 pumping has an influence on wells that are over 200 feet away, indicating that hydraulic conductivity in the area is moderately high. However, it appears that preferential flow paths are present because PWR well RIPZ-3 has an estimated transmissivity that is almost ten times higher than MW-118, which is located approximately between EW-2 and RIPZ-3. This indicates that although there is hydraulic communication between saprolite and PWR, they differ in transmissivity, and preferential pathways may be present in this area. The transmissivity observed at RIMW-14 also indicates that there is communication between PWR and bedrock in this area.

The well capacity test results for EW-3 presented in **Figure 4-28** indicate that a flow rate of about 3.5 gpm is sustainable. The APT at EW-3 was conducted at a flow rate of 3 gpm. EW-3 APT results yielded similar results to EW-2, except that two of the wells did not appear to have significant effects from the pump tests. One of these wells was RIMW-15, which is screened in bedrock, is lower than any other well in the test, and was over 200 feet away. The other well that did not respond to the test was MW-120B, located across the creek and approximately 300 feet away from EW-3.

These results indicate that pumping of EW-3 does not have a radius of influence over 225 feet. Pumping at EW-3 does appear to be influencing wells in the shallow zone that are within 100 feet. The data also indicate communication between regolith and bedrock in this area.

4.4 MPE Pilot Test

This section presents the results of two short term MPE pilot tests performed during Phase II activities by KEMRON Environmental Services, Inc. (KEMRON). The MPE tests are described in Section 3. One test was performed in a chlorinated VOC source area (solvent ditch area) and another was performed in the fuel oil source area as shown in Figure 3-6. KEMRON's full MPE report is provided as **Appendix F**.

4.4.1 Solvent Ditch Area

The results from the first pilot test indicate that MPE in this area may capture VOCs in the vadose zone within a 50-foot radius. Approximately 580 gallons of water were extracted during the 6-hour pilot test. However, less than 0.01 lb of VOCs were captured in the vapor phase during this time.

4.4.2 Fuel Oil Area

The results from this pilot study indicated that MPE in this area would have a radius of influence of 50-75 feet from the extraction well in the vadose zone. Approximately 900 gallons of water were extracted during the eight hour test. Additionally, the VOC extraction rate from the vapor was approximately 3.8 lbs/day at the higher induced vacuum pressure.

4.5 Biochemical and Geochemical Data

Biogeochemical and geochemical data were collected during Phase II activities to support the evaluation of remedial alternatives during the FS. The results from the biochemical and geochemical data analysis are presented in **Table 4-11**.

The biochemical and geochemical data collected indicate that methane reducing conditions exist on the site in regolith in the Incinerator (MW-123A), Solvent Ditch (OB-110A), and Fuel Oil (OB-11) Areas.

Wells in all other areas, including bedrock wells in the Incinerator, Solvent Ditch, and Fuel Oil Areas, did not appear to be methane reducing.

4.6 Monitor Well Inventory

The results of the well inventorying task are shown on Table 4-4. This table includes well construction details, free product information, and groundwater levels from September 2007. The table also identifies whether certain parameter classes (e.g., VOCs) were historically detected in each well. Some of the well construction data could not be verified because documentation could not be found and/or conflicting

data existed between two different sets of records. Some of the data presented in the table cannot be verified without additional field verification, such as using a downhole camera.

The wells in Table 4-4 are shown to be in one of three geologic zones: regolith, PWR, and bedrock. As previously mentioned, the regolith and PWR zones are believed to be within the same hydrogeologic zone (i.e., in full hydraulic connection), and these two zones are referred to collectively as the shallow zone.

Some wells were reclassified during this task based on information found in available boring logs, geophysical logs, and/or well construction details. For example, MW-113B and MW-115B were reclassified from bedrock wells to PWR-Bedrock (or transition) wells. MW-113B includes saprolite, fractures, and one weathered rock layer to a depth of about 42 feet based on its geophysical log. The boring log contains insufficient detail to otherwise make a determination. The well sand pack is from 30.5 feet to 48 feet, placing it apparently in the PWR. Similarly, drilling for MW-115B encountered dense gabbro at a depth of about 29 feet based on the geophysical log and 32 feet based on the drilling notes. The boring log contains insufficient detail to otherwise make a determination. The well sand pack is from 19 feet to 34 feet, placing it apparently in the PWR.

4.7 Data Validation and Quality Control Summary

As part of the RI, CDM performed data validation on the data received from Analytical Services, Inc. The validation activities were conducted in accordance with the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review (October 1999) (organic guidelines) and USEPA CLP National Functional Guidelines for Inorganic Data Review (July 2002) (inorganic guidelines), and any applicable specific analytical method guidelines.

As required by the Quality Assurance Project Plan (CDM, December 2006), 90% of the data were evaluated (Level III) and one of the CLP data packages (approximately 10% of the data) was validated (Level IV) following the organic guidelines.

4.7.1 Data Usability Summary

As a result of the data evaluation performed by CDM on the analytical data, some results were qualified as estimated "J" or "UJ", or rejected "R" because of one or more field or laboratory quality control (QC) outliers. The qualified data should be considered estimated and used with caution. The rejected data are not usable for project objectives. However, these data represent a very small population of the total data set, and all other RI analytical data are considered usable.

The data presented in Tables 4-5, 4-6, 4-8, and Appendix D are as reported by the laboratory. The qualifiers to be applied to these data based on the data validation are summarized below. Rejected data were not carried forward into the risk assessment.

4.7.2 Evaluation Procedure

The following quality control items were evaluated according to the applicable organic and inorganic guidelines to determine the quality of analytical data provided during the investigation. The non-CLP laboratory data packages were summary only (Level III), so not all quality control items could be evaluated for those data packages. The items evaluated include:

- Holding times
- Method detection limits
- Laboratory blanks
- Laboratory control samples
- Matrix spikes/matrix spike duplicates
- Inductively Coupled Plasma (ICP) Serial Dilution
- Laboratory duplicates/precision
- Surrogate recoveries
- Calibrations (organic only)
- Preservation criteria
- Internal standards
- ICP Interference Check Samples

In addition to the above items, CDM also evaluated the results of field duplicate samples, trip blanks, and equipment blanks. The individual data evaluation reports are included in **Appendix G**. The qualified Form I's are included on the enclosed CD-ROM.

4.7.3 Data Quality Indicators

The items identified for evaluation were grouped in terms of the quantitative data quality indicators (DQIs). These include precision, accuracy, completeness, and sensitivity. In addition, qualitative DQIs including representativeness and comparability were also evaluated, as summarized below.

4.7.3.1 Precision

The precision of a measurement is an expression of mutual agreement among individual measurements taken under prescribed similar conditions. Precision is quantitative and most often expressed in terms of relative percent difference (RPD). Precision of reported results is a function of inherent field-related variability plus laboratory analytical variability. The acceptable RPD limit for water field duplicates for this project is less than 20% and less than 30% for soil samples.

Field Duplicate Precision

Field duplicate samples were collected to provide a measure of the contribution to overall variability of field-related sources. During the RI, 22 field duplicate samples were collected:

| <u>Duplicate</u> | <u>Parent Sample</u> |
|----------------------------|----------------------|
| <i>Groundwater Samples</i> | |
| MW-1175 | MW-117 |
| RIMW-54 | RIMW-4 |
| RIMW-55 | RIMW-5 |
| RIMW-58 | RIMW-8 |

| | |
|-------------------------|--------------------|
| RIMW-59 | RIMW-9 |
| RIMW-515 | RIMW-15 |
| DUP-01 | RIMW-25 |
| DUP-02 | RIMW-27 |
| RIPZ-53 | RIPZ-3 |
| <i>Soil Samples</i> | |
| RIMW-51:12-14 | RIMW-1 (12-14 ft) |
| RIMW-58:10-12 | RIMW-8 (10-12 ft) |
| RISB-92 | RISB-2 (0-1 ft) |
| RISB913 | RISB-13 (5-9 ft) |
| RISB914 | RISB-14 (5-9 ft) |
| RISB-533 | RISB-33 (17-20 ft) |
| RISB935 | RISB-35 (5-9 ft) |
| RISB-946 | RISB-46 (0-1 ft) |
| RISB-951 | RISB-51 (9-13 ft) |
| RISB-559:12-14 | RISB-59 (12-14 ft) |
| RISB-562:12-14 | RISB-62 (12-14 ft) |
| RISS-510 | RISS-10 (0-1 ft) |
| <i>Sediment Samples</i> | |
| RISD-54 | RISD-4 |

According to the guidelines, the field duplicate criteria between the sample pair results for water samples is a RPD < 20, and for soil samples < 35. If the parent sample or duplicate sample result is less than 5 times the Contract Required Quantitation Limit (CRQL) for waters and less than 2 times the CRQL for soils, then the control limit becomes the absolute difference of the CRQL. If the difference between the parent sample and the duplicate sample results is less than the CRQL (waters) or less than 2 times the CRQL (soils), then no qualifications are required. An RPD is not calculated if one sample result for either the duplicate or the parent sample is non-detect. **Table 4-12** shows the RPDs outside of appropriate control limits.

Laboratory Duplicate Precision

Contribution of laboratory-related sources to overall variability was measured by calculating the RPD between matrix spike and matrix spike duplicate (MS/MSD) results, laboratory duplicate results, and laboratory control sample and laboratory control sample duplicate (LCS/LCSD) results, where available.

Table 4-13 contains a summary of laboratory precision outliers. All samples of similar matrix were qualified estimated "J" or "UJ" based on laboratory precision results. Individual qualified sample results are on the enclosed CD-ROM.

4.7.3.2 Accuracy

Accuracy is defined as the degree of agreement between a measurement and an accepted reference or true value and is a measure of bias in a system. Use of the specified analytical methods, evaluation of blank contamination, verification of acceptable instrument calibration, and adherence to the required sample holding

times and chain-of-custody procedures also help ensure the accuracy of the resultant data.

Each analytical data package included either the original signed and executed chain-of-custody forms or a copy, indicating that custody of the samples was maintained as required from sample collection to receipt at the laboratory and during sample analysis.

4.7.3.2.1 Evaluation of Blanks

Trip Blanks

Trip blanks were prepared by the laboratory, transported to the field with the VOC sample containers, and returned to the laboratory with the VOC samples for analysis. Analysis of trip blanks is performed to assess whether cross-over contamination is occurring between samples during handling and transport. Detected concentrations of toluene, acetone, methylene chloride, 1,2-dichloroethane, trichloroethene, and vinyl chloride were present in some of the trip blanks. Sample results were qualified when the sample result was less than 5 times the value detected in the trip blank. **Table 4-14** summarizes the sample result qualified on the basis of a trip blank.

Trip blanks were not included with samples in SDG 229401, SDG 237552, SDG 238041, SDG 238119, SDG 238907, and SDG 239396.

Method, Calibration, and Equipment Blanks

Analysis of method blanks ensures that no carryover of contaminants between samples exists because of residual contamination on the instrument or from contaminants introduced in the laboratory. At least one method blank was prepared and analyzed with each batch of samples analyzed using each analytical method.

Several metals and VOCs were detected in the method blanks. Analyses were all method compliant in that target analytes were not detected in the method blanks or calibration blanks at levels greater than the reporting limits. Sample results were qualified when the sample result was less than 5 times the value detected in the blank.

The highest concentration detected in an applicable blank is used to determine this reportable concentration. This practice decreases the possibility of false positives, particularly at levels near the reporting limits. Calibration blanks for inorganic analyses were not provided with the data packages and hence were not evaluated. Equipment rinse blank results were all non-detect.

Table 4-15 summarizes the qualifiers applied on the basis of laboratory blanks.

4.7.3.2.2 Laboratory Control Sample, Matrix Spike/Matrix Spike Duplicate, and Surrogate Recoveries

LCSs and MSs were prepared and analyzed with all applicable methods. System monitoring compounds, or surrogates, were also added to the organic analyses. Recoveries of these QC samples are discussed below.

Accuracy is quantitative and usually expressed as the percent recovery (%R) of a sample result. Acceptable QC limits are 80 to 120 percent for LCS recoveries and 75 to 125 percent for MS/MSD analyses for the inorganic methods. Organic method acceptable ranges are laboratory-defined based on past statistics maintained to document method performance.

Laboratory Control Sample Recoveries

LCSs were prepared for all sample analyses to evaluate the ability of the analytical process to recover a known concentration of an analyte. All LCS recoveries were within QC limits.

Matrix Spike/ Matrix Spike Duplicate Recoveries

MS and, for specific methods, MSDs were prepared for all applicable sample analyses to evaluate matrix interference effects. **Table 4-16** summarizes the MS/MSD outliers. Results listed in this table required qualification as estimated "J" or "UJ" as a result of recoveries outside the QC criteria. Undetected results were not qualified when MS/MSD recoveries were above the QC limit.

Organic analyses guidelines do not qualify sample results based on matrix spike recoveries. Some of the organic matrix spike recoveries were outside of appropriate criteria but no qualification is required.

For the inorganic analyses, qualifiers are applied to the appropriate associated samples for matrix spike recoveries that are outside of appropriate criteria. Qualifiers are not added when the sample concentration is greater than 4 times the matrix spike concentration. Table 4-16 identifies the SDG and the affected analytes. Specific qualified samples are identified on the evaluation reports in Appendix G.

Surrogate Recoveries

Surrogate recoveries met accuracy criteria for all samples except for those listed in **Table 4-17**. Qualified sample results are included in Appendix G and on the enclosed CD-ROM.

The non-detect results for analytes associated with the surrogate tetrachloro-m-xylene in sample RISB-946 were rejected "R" and are not usable. The positive detected results were estimated "J" and are usable.

4.7.3.2.3 Internal Standard Areas and Retention Times

Retention times and recoveries for the internal standards for SDG 249441 were within the acceptance limits. No internal standard information was provided with the other data packages for review.

4.7.3.2.4 Instrument Calibration

Calibration criteria are method-defined. The laboratory followed the prescribed calibration techniques. Relative Response Factor (RRF) and Relative Standard Deviation or Percent Difference (%D) criteria were met for VOC and SVOC sample analyses except for those listed in **Table 4-18**. Qualified associated sample results are identified in Appendix G and on the enclosed CD-ROM. Calibration information was not provided for inorganic analyses; thus, no evaluation was performed. Specific calibration qualification details are included in Appendix G.

Some of the non-detect sample results for methyl acetate, bromomethane, and chloroethane were rejected "R" due to initial and continuing calibration. These results are not usable for project goals.

4.7.3.2.5 Inductively Coupled Plasma Serial Dilution

An ICP serial dilution is to be performed for each batch of metal samples analyzed. The method limit of 10 percent difference between the sample and the serial dilution is defined as acceptable. This criterion is only applied to analytes greater than 50 times the instrument detection limit (IDL). All serial dilutions met required criteria for SDG 239401. No other serial dilution information was provided for the other data packages.

4.7.3.3 Completeness

Completeness is a measure of the amount of usable data that are obtained compared to the amount that was expected to be obtained during project planning. Evaluating the precision and accuracy parameters (above) assessed the usability of the data. Those data that were evaluated and needed no qualification, or were qualified as estimated "J" or "UJ," are considered usable. Rejected data are not considered usable. The rejected non-detect results for methyl acetate, bromomethane, chloroethane, and the associated PCB sample results for RISB-946 are considered not usable. All other data are considered usable for its intended purposes.

4.7.3.4 Sensitivity

Sensitivity is related to the ability to compare analytical results with project-specific levels of interest, such as cleanup levels or action levels. Analytical practical quantitation limits (PQLs) for the various sample analytes should be below the level of interest to allow an effective comparison. Required method detection limits are presented in the QAPP. The laboratory met the required sensitivity levels.

4.7.3.5 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent: (1) a characteristic of a population, (2) parameter variations at a sampling point, and/or (3) an environmental condition. Representativeness is a qualitative parameter that addresses the proper design of the sampling plan and the absence of cross contamination. Good representativeness was achieved through:

- Careful, informed selection of sampling sites
- Selection of analytical parameters and methods that adequately define and characterize the extent of possible contamination and provide the required sensitivity
- Proper gathering and handling of samples to avoid interference and prevent contamination and loss
- Collection of a sufficient number of samples to allow representative characterization of the site

Representativeness is a consideration that was employed during data collection design, and the data that were collected during the field investigation are believed to be representative of actual field conditions. All data collected except for the rejected results are considered representative of the actual field conditions at the time of collection.

4.7.4 Conclusion

In the course of data review, some “J” and “UJ” qualifiers were added to the results, indicating these data are estimated and should be used with caution. A small fraction of results was also rejected (“R”) and is not usable for project objectives.

Appendix G presents the individual data evaluation reports. Qualified Form I’s are included on the enclosed CD-ROM. Overall, the majority of the data were determined to be of acceptable quality for determining that data quality objectives (DQOs) were met and are representative of environmental conditions at the time of collection. The additional qualifiers added and the inability to use the rejected data are not expected to affect the evaluation of the nature and extent of contamination, the risk assessment, or the evaluation of remedial alternatives in the feasibility study.

Section 5

Human Health Risk Assessment

5.1 Introduction

This section presents the human health risk assessment (HHRA) for the PSC site. The assessment is based on concentrations of contaminants detected in soil and groundwater at the site, exposure assumptions, and toxicity information, which together are used to characterize risks to human receptors. Risks are estimated based on existing (baseline) conditions in the absence of any further remedial action or institutional controls.

The objective of the HHRA is to assess potential current and foreseeable future risks associated with exposures to potential human receptors including workers, residents, trespassers, and recreational receptors at the site. Specifically, the objectives of the HHRA are to:

- Identify chemicals of potential concern (COPCs).
- Identify human receptors of concern.
- Evaluate all potentially complete exposure pathways.
- Determine the extent and likelihood of actual or potential risks/hazards to human health.
- Describe the uncertainty associated with the risk and hazard estimates.
- Help determine chemicals of concern (COCs) and whether additional response actions are necessary.

Exposures to soils and groundwater were evaluated quantitatively for relevant receptors. This HHRA estimates cancer and noncancer risks for all potentially complete exposure pathways. This HHRA is consistent with EPA's Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part A) (RAGS, EPA 1989) and is organized as follows:

- Section 5.2 - Data Summary;
- Section 5.3 - Selection of COPCs;
- Section 5.4 - Exposure Assessment;
- Section 5.5 - Toxicity Assessment;
- Section 5.6 - Risk Characterization;
- Section 5.7 - Uncertainty Assessment; and

- Section 5.8 – Summary and Conclusions.

5.2 Data Summary

Phase I, Phase II, and Phase III investigations included collection and analysis of samples from surface soil, subsurface soil, and groundwater. A small number of sediment samples were also collected but because of generally low detections, they were not used in the risk assessment. Details of the investigations and sample analyses are summarized and discussed in Sections 3 and 4. A summary of data used in this risk assessment is discussed below.

5.2.1 Surface Soil

Surface soil samples were collected at 71 locations (RISB-1 through -52, RISB-56 through -59 and RISB-61 through -67, RIMW-1, -5 through 8, -13, -19, and RIPZ-3) from varying depth intervals. For purposes of this characterization, all samples with a sampling depth beginning at ground surface (zero inches) to one foot below ground surface (bgs) were included in the surface soil data set. In general, each of the surface samples was sent to Analytical Services Inc. (ASI) for analysis of EPA's Target Compound List (TCL) of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), and EPA's Target Analyte List (TAL) for metals. Two offsite locations (RI-BCK1 and RI-BCK2) were used as background samples and analyzed for TCL VOCs, SVOCs, and TAL metals. Three duplicate samples were collected from surface soil locations RISB-2, RISB-46, and RISS-10. Where duplicate samples were collected, the average concentration of the parent and duplicate sample was used as a representative concentration for that location.

Surface soil data are divided into two data sets to address current and future land uses. The dataset for assessing current land-use scenarios does not include sample locations RISB-11 through RISB-17, RISB-20, RISB-21, RISB-45, RISB-62 and RISB-64 through RISB-67. These locations are currently under a concrete foundation, precluding exposure. The dataset for assessing future land-use scenarios includes all surface soil samples, assuming the concrete foundation might not be maintained or could be removed in the future. Sampling locations are shown on Figures 3-1 through 3-4.

5.2.2 Subsurface Soil

Subsurface soil samples at 71 locations (RISB-1 through -52, RISB-56 through -59 and RISB-61 through -67, RIMW-1, -5 through 8, -13, -19, and RIPZ-3) were collected from varying depth intervals (one foot through a maximum depth of 27 feet bgs). Any sample with a beginning depth greater than one foot bgs was considered subsurface soil. However, samples collected from locations RISB- RISB-64, RISB-65, RISB-66, and RISB-67 were collected from zero to five feet bgs and were classified as subsurface soil. In general, each of the subsurface samples was sent to ASI for analysis of TCL VOCs, SVOCs, and TAL Metals. Some samples were also analyzed for PCBs. Two offsite locations (RI-BCK1 and RI-BCK2) were used as background samples and

analyzed for TCL VOCs, SVOCs, and TAL Metals. Nine duplicate samples were collected from subsurface soil locations RISB-13, RISB-14, RISB-33, RISB-35, RISB-51, RISB-59, RISB-62, RIMW-1, and RIMW-8. Where duplicate samples were collected, the average concentration of the parent and duplicate sample was used as a representative concentration for that location.

Surface soil and subsurface soil datasets are combined into one current/future dataset for evaluating risks to excavation workers who may come into contact with soil both at the surface and subsurface regardless of the presence of a concrete foundation. If construction work were to take place either currently or in the future, the foundation would be removed, exposing the construction worker to all soil. In addition, the current/future surface and subsurface dataset was used for the future resident scenario. If homes were to be erected, subsurface soil could be brought to the surface. The list of the surface and subsurface soil samples used in the risk assessment is provided in Appendix D tables, and sampling locations are shown on Figures 3-1 through 3-4.

Surface soil and subsurface soil datasets are combined and collectively referred to as “subsurface soil” for the remainder of the document for construction workers and residents who may come into contact with soil both at the surface and at depth.

5.2.3 Groundwater

The groundwater data set consists of analytical results from samples from 60 monitoring wells, including temporary wells. These wells are classified by various hydrologic units (i.e., saprolite, partially weathered rock (PWR), or bedrock) and are shown on Figure 3-1. All samples were analyzed for VOCs. Additional analyses of SVOCs and metals were also performed on a subset of these wells. Eight duplicate samples were collected from monitoring wells RIMW-4, RIMW-5, RIMW-8, RIMW-9, RIMW-15, RIMW-27, MW-117, and RIPZ-3. Where duplicate samples were collected, the average concentration of the parent and duplicate sample was used as a representative concentration for that location.

For the evaluation of potable water, data from all hydrologic units were used. However, for the vapor intrusion evaluation, groundwater data collected from “bedrock” wells were excluded. This dataset is referred to as “shallow groundwater” for the remainder of the characterization. It should be noted that three wells (BP-1B, MW-116, and PW-2A) were screened in both PWR and bedrock and therefore, the data from these wells were included in the both the potable water evaluation and the vapor intrusion evaluation.

Data excluded from the risk assessment includes samples associated with packer tests at RIMW-18 and RIMW-19. In addition, a sample collected from OB-13 was also excluded because it contained predominantly product and was analyzed on a per weight basis.

The list of the groundwater samples used in the risk assessment is provided in Appendix D tables. Well locations are shown in Figures 3-1, 3-4, and 3-5.

5.2.4 Quality Control

All data were subjected to the data validation process, as previously discussed in Section 4.7. Considering laboratory and field QA/QC, data employed in the risk characterization are considered of sufficient quality to support quantitative risk characterization.

5.3 Selection of COPCs

Tables presented in **Appendix H-1** summarize analytical data by medium and identify COPCs for the risk assessment. The range of detected concentrations, detection frequency, and the range of reporting limits presented in these tables were evaluated using sitewide datasets. These datasets are identified as current surface soil, future surface soil, subsurface soil, shallow (excluding bedrock) groundwater, and all groundwater data, as described above in Section 5.2.3.

Maximum detected concentrations of chemicals were compared, by medium, to risk-based screening levels to identify COPCs for each medium. Screening levels were taken from EPA Region 9 PRGs for residential soil and tap water (EPA 2004b), using a target cancer risk of 10^{-6} (one in one million) and a target hazard quotient of 0.1. Chemicals were considered COPCs if their maximum detected concentration exceeded their respective screening levels. It should be noted that while Region IV EPA recommends the use of industrial PRGs for subsurface soil screening, residential PRGs were used based on the conservative assumption the property could be redeveloped for future residential use.

Risk-based screening levels were not available for the following chemicals: calcium, lead (groundwater only), magnesium, potassium, sodium, 2-chloronaphthalene, 2-methylnaphthalene, 2-nitrophenol, 3+4-methylphenol (soil only), 4-bromophenyl phenyl ether, 4 chlorophenyl phenyl ether, 4-nitrophenol, acenaphthylene, acetophenone, benzo(g,h,i)perylene, bis(2-chloroethoxy)methane, di-n-butylphthalate, p-chloro-m-cresol, phenanthrene, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,2,3-trichlorobenzene, 2-hexanone, bromochloromethane, cis-1,3-dichloropropene, and trans-1,3-dichloropropene.

Calcium, magnesium, potassium, and sodium are essential metals and were not selected as COPCs. Di-n-butylphthalate and 1,1,2-trichloro-1,2,2-trifluoroethane were not selected as COPCs because no toxicity information is available for assessment.

Local ambient levels (background) of inorganic constituents were also considered in the selection of COPCs. Per Region IV guidance, twice the average background results were used to screen metals. Two background samples were available for this analysis (RI-BCK1 and RI-BCK2), and twice the average detected concentrations are presented in the COPC selection tables.

5.3.1 Exposure Units

To address potential soils exposures, a hot spot analysis was conducted and the site was divided into the following exposure units (EUs):

Current Surface Soil (0 to 1 ft bgs):

- All soil, excluding samples collected beneath structures and hot spots;
- Hot Spot 1 (sampling locations RISB-6, RISB-19, RISB-26 and RISB-46); and
- Hot Spot 2 (sampling location RIMW-6).

Future Surface Soil (0 to 1 ft bgs)

- All soil, excluding samples collected from hot spots;
- Hot Spot 1 (sampling locations RISB-6, RISB-19, RISB-26 and RISB-46);
- Hot Spot 2 (sampling location RIMW-6); and
- Hot Spot 3 (sampling location RISB-16).

It should be noted that Hot Spot 3 was only evaluated as a future exposure unit, as it is currently under a structure.

Subsurface Soil

- All soil, excluding samples collected from hot spots;
- Hot Spot RIMW-6;
- Hot Spot RISB-12;
- Hot Spot RISB-18;
- Hot Spot RISB-25; and
- Hot Spot RISB-64.

The results of the hot spot evaluation are presented in **Table 5-1**.

Groundwater

- Sitewide shallow groundwater; and
- Sitewide all groundwater.

5.4 Exposure Assessment

Exposure assessment involves the selection of receptor populations, exposure pathways for quantitative evaluation, and exposure point concentrations for selected COPCs for all relevant media. The methods and assumptions used to calculate exposure intake values for use in quantifying cancer risk and noncancer hazard are presented here. Environmental media that were addressed in exposure and risk/hazard calculations include surface soils (0 to 1 foot below ground surface or bgs), subsurface soils (all soil below ground surface), and groundwater. A site conceptual exposure model is presented in **Figure 5-1** and is summarized below.

5.4.1 Receptors

The following receptors and corresponding exposure pathways are relevant to the risk assessment and were addressed in either a quantitative or qualitative manner.

Known and Potential Current Receptors

O&M Worker – The O&M worker is an individual that currently operates and maintains the groundwater treatment system on the PSC site. His/her work involves running the treatment system from inside a building, administrative work from an office inside the building, and site maintenance outdoors (e.g., mowing the grass). The O&M worker is on site 3 days per week, 8 hours per day, and may be exposed to constituents in the surface soil through volatilization, fugitive dust generation, ingestion, and dermal contact. He/she may inhale constituents from volatilization of chemicals in groundwater to indoor air. It is assumed that he/she will not be exposed, via direct contact, to soils contained underneath the current concrete foundation of the existing buildings, or subsurface soils elsewhere on the site.

Trespasser – The trespasser is a hypothetical adolescent individual who could obtain access to the site without permission. This individual would be unsupervised and unaware of the potential exposure pathways of chemicals in the surface soil and groundwater. The trespasser may be on the site at anytime, but most likely not for long periods of time, and is assumed to trespass only in outside areas at the site with no potential for indoor exposure. The trespasser may potentially be exposed to constituents in the surface soil through volatilization, inhalation of fugitive dust, incidental ingestion, and dermal contact. It is assumed that he/she will not be exposed to soils, via direct contact, contained underneath the current concrete foundation of the existing buildings, or subsurface soils anywhere on the site. It is also assumed that since the current buildings on the site are either open air (i.e., no doors, no walls) or secured by an alarm, a trespasser will not be exposed to volatilization of chemicals in soil and groundwater to indoor air.

Potential Future Receptors

Potential Future Excavation Worker – Excavation workers are individuals who may be involved in the razing of buildings on the site and excavation or moving of surface and subsurface soil. Potential exposures associated with excavating soil on this site

include the inhalation of chemicals through volatilization and fugitive dust generation, and the incidental ingestion of and dermal contact with both surface and subsurface soils on the property. While working in a trench, a construction worker may also be exposed to constituents in groundwater that volatilize into ambient air.

Potential Future Industrial Worker - Industrial workers are individuals who may be working in a manufacturing or industrial facility, both indoors and out, on the site. He/she may inhale chemicals through volatilization and fugitive dust generation, and incidentally ingest and have dermal contact with soils on the property. Soil exposure may be to soils that are currently at the surface or with soils that are currently at the subsurface but may be brought to the surface during construction if a new facility is built on the site. The industrial worker may also inhale constituents from volatilization of chemicals in groundwater that migrate into indoor air. It is assumed that the industrial facility operating on the site may be using groundwater for drinking and hand washing.

Potential Future Recreational User - Recreational users are individuals who may perform activities such as baseball, walking or hiking, and picnicking. Potential exposures associated with performing recreational activities on this site include the inhalation of chemicals through volatilization and fugitive dust generation, and the ingestion of and dermal contact with surface soils on the property. Even if there is some type of clubhouse or restroom facilities on the property, exposure to constituents in groundwater through either ingestion of drinking water and via dermal absorption while washing hands or the inhalation of constituents from volatilization of chemicals in groundwater to indoor air would be insignificant based on low exposure potential. In addition, it is assumed that he/she will not be exposed to subsurface soils on the site.

Potential Future Trespasser - The trespasser is an adolescent individual who obtains access to site without permission. This individual would be unsupervised and unaware of the potential exposure pathways of chemicals in the surface soil and groundwater. He may inhale chemicals through volatilization and fugitive dust generation, and ingest and have dermal contact with surface soils on the property. It is assumed that the trespasser will not be able to access future buildings on the site and therefore, will not be exposed to volatilization of chemicals in soil and groundwater to indoor air. It is also assumed that a trespasser will not be exposed to subsurface soils anywhere on the site.

Potential Future Residents - Potential future residential receptors are assumed to have their primary place of residence on the site. Potential exposures associated with living on this site include the inhalation of contaminants through volatilization, incidental ingestion of and dermal contact with soils, and inhalation of fugitive dust generated from soils on the property. Soil exposure may be to soils that are currently at the surface or with soils that are currently at the subsurface that may be brought to the surface during construction of a new home with a basement.

In the event that residential receptors use groundwater at the site, they have potential to ingest groundwater contaminants through drinking water and experience dermal contact through hand washing. Other potential exposures include both dermal contact and inhalation of volatile groundwater contaminants while showering (relating to dermal absorption and inhalation of volatiles in shower air, but assessed as being equivalent to ingestion of 2 L of water per day, consistent with EPA Region 4 guidance (EPA 2000)).

5.4.2 Exposure Scenarios

Appendix H-2 summarizes the exposure factors used in exposure intake and risk/hazard calculations for each of the receptors at the site. Each exposure scenario is discussed below.

5.4.2.1 Current O&M Worker Exposure Assumptions

The current O&M workers at the site are assumed to be exposed to surface soil via incidental ingestion, dermal contact, inhalation of soil vapor and inhalation of fugitive dust, and to groundwater via inhalation of vapors in indoor air.

An incidental ingestion rate for soil for an O&M worker is assumed to be 50 mg/day (EPA 1997a). For dermal contact with soil, the O&M worker is assumed to wear a short-sleeved shirt, pants, and shoes; therefore, the exposed skin surface is limited to the face, forearms and hands. The exposed skin surface area for an O&M worker is 3,300 cm², the average of the 50th percentile for adult males and females (EPA 2002). A dermal adherence factor of 0.2 mg/cm² per event was assumed for the O&M worker (EPA 2004a).

An inhalation rate of soil vapors of 1 m³/hour was assumed for the O&M worker (EPA 1997a). O&M workers are assumed to be exposed to soil at the PSC site for 250 days/year over 25 years (EPA 2002).

A life expectancy of 25,550 days (70 years) (EPA 1989) was used for outdoor workers as the averaging time for exposure to carcinogenic contaminants. The averaging time for noncarcinogenic effects is equal to the exposure duration, or 9,125 days (25 years) for this scenario. A body weight of 70 kg for adults was used (EPA 1991, 2002) based on the mean 50th percentile body weight for the age group.

5.4.2.2 Trespasser/Recreational Visitor Exposure Assumptions

Current and future trespassers and future recreational visitors at the site are assumed to be exposed to surface soil during recreational activities, such as playing, via incidental ingestion, dermal contact, and inhalation of soil dust and vapors.

A teen/adolescent (ages 6 to 18 years old) was evaluated for both carcinogenic and noncarcinogenic hazards. For the assessment of soil for teen/adolescent recreational visitors/trespassers, an incidental ingestion rate for soil was assumed to be 100 mg/day (EPA 1997a). For dermal contact with soil, the teen/adolescent recreational

visitors/trespasser was assumed to wear a short-sleeved shirt and shorts; therefore, the exposed skin surface is limited to the face, forearms, hands, lower legs and feet. The exposed skin surface area for children is 7,605 square centimeters (cm²), (mean surface area for children 6-16 (head, arms, hands, legs); (EPA 1997a). A dermal adherence factor of 0.2 mg/cm² per event was also employed (EPA 2004a).

Teen/adolescent recreational visitors/trespassers were assumed to be exposed for 144 days per year. One hundred and forty-four days is the equivalent of about 12 days per month, year round (Professional Judgment). Exposure is expected to occur over 12 years (Professional Judgment). The averaging time for noncarcinogenic effects is equal to the exposure duration, 4,380 days. A body weight of 42 kg was employed (EPA 2007a).

For the assessment of cancer risks, a 12 year exposure scenario was employed. Mutagenic compounds, such as 1,2-DCA, were assessed following the approach in EPA's *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens* (EPA, 2005a). The default risk approach was modified for mutagenic compounds to incorporate differential risk of early lifestage exposure.

5.4.2.3 Future Excavation Worker Exposure Assumptions

Future excavation workers are assumed to be exposed to surface and subsurface soils for the duration of a single project involving excavation. If multiple non-concurrent construction projects are anticipated, different workers are assumed to be employed for each project. Activities for this receptor typically involve substantial, though short-term, exposures to soils via incidental ingestion, dermal contact, inhalation of fugitive dust and vapors, and the inhalation of vapors from shallow groundwater to the ambient air.

A soil incidental ingestion rate for a construction worker is assumed to be 330 mg/day (EPA 2002), appropriate for short-term but intense contact with soil. For dermal contact with soil, construction workers are assumed to wear a short-sleeved shirts, pants, and shoes; therefore, the exposed skin surface is limited to the head, hands and forearms. The exposed skin surface area for construction workers is 3,300 cm², the average of the 50th percentile for adult males and females (EPA 2002). A dermal adherence factor of 0.2 mg/cm² per event was assumed (EPA 2004a).

An inhalation rate of 20 m³/day was assumed for the construction worker for the inhalation of soil and groundwater vapors and inhalation of fugitive dust (EPA 2004a). The derivation of volatilization factors for excavation worker groundwater inhalation risks are included in the applicable risk calculations. The frequency with which construction workers were assumed to be exposed to soil at the site was 250 days with an exposure duration of one year.

A life expectancy of 25,550 days (70 years) (EPA 2004a) was used for excavation workers as the averaging time for exposure to carcinogenic contaminants. The

averaging time for noncarcinogenic effects is equal to the subchronic exposure duration, or 365 days. A body weight of 70 kg for adults was employed (EPA 1991a, 2002a) based on the mean 50th percentile body weight for the age group.

5.4.2.4 Future Industrial Worker Exposure Assumptions

Future industrial workers at the site are assumed to be exposed to surface soil via incidental ingestion, dermal contact, inhalation of soil vapor and inhalation of fugitive dust. In addition, it is assumed that they would be exposed to groundwater through ingestion and dermal contact through future potable use of groundwater as well as through inhalation of vapors in indoor air.

An incidental ingestion rate for soil for an industrial worker is assumed to be 50 mg/day (EPA 1997a). For dermal contact with soil, an outdoor worker is assumed to wear a short-sleeved shirt, pants, and shoes; therefore, the exposed skin surface is limited to the face, forearms and hands. The exposed skin surface area for an outdoor worker is 3,300 cm², the average of the 50th percentile for adult males and females (EPA 2002). A dermal adherence factor of 0.2 mg/cm² per event was assumed for the industrial worker (EPA 2004a).

An inhalation rate of soil vapors of 1 m³/hour was assumed for the industrial worker (EPA 1997a). Outdoor industrial workers are assumed to be exposed to soil at the site for 250 days/year over 25 years (EPA, 2002).

A life expectancy of 25,550 days (70 years) (EPA 2004a) was used for industrial workers as the averaging time for exposure to carcinogenic contaminants. The averaging time for noncarcinogenic effects is equal to the exposure duration, or 9,125 days (25 years) for this scenario. A body weight of 70 kg for adults was used (EPA 1991, 2002) based on the mean 50th percentile body weight for the age group.

5.4.2.5 Future Residential Exposure Assumptions

Future residents are assumed to be exposed to soil during recreational activities such as playing or gardening via incidental ingestion, dermal contact, inhalation of soil vapors and dust. If the home is built on a slab, it is assumed that the residents would only have exposure to surface soils; however, if a home is constructed with a basement, then exposure to subsurface soils would be possible. It is also assumed that future residents would be exposed to groundwater through ingestion and dermal contact and inhalation of vapors in indoor air.

For noncarcinogenic hazards, children receive the highest daily exposures because of lower body weight and higher contact rates, particularly for incidental soil ingestion. Only young children, therefore, are quantitatively assessed for exposure to noncarcinogens.

Cancer risks for nonmutagenic chemicals were evaluated employing a 30-year cumulative scenario that calculated risks for children and adults ages 1-31 years old.

Cancer risks for mutagenic chemicals were evaluated employing a 30-year cumulative scenario that calculated risks for four age groups: children ages 0-2 years old; children 2-6 years old; older children 6-15 years old; and adults ages 15-30 years old. Cancer risks are evaluated over long time periods because cancer risks are proportional to cumulative exposure.

For the assessment soil, an incidental ingestion rate for soil was assumed to be 200 mg/day (EPA 2007a) for young children. The soil ingestion rate for adults was assumed to be 50 mg/day (EPA, 1997a). For dermal contact with soil, the child resident was assumed to wear a short-sleeved shirt and shorts; therefore, the exposed skin surface is limited to the face, forearms, hands, lower legs and feet. The exposed skin surface area for children is 2,800 square centimeters (cm²), the average of the 50th percentile for males and females between the ages of one and six (EPA 2002). For adult dermal contact with soil, the exposed skin surface area was calculated based on the average of the 50th percentile for males and females assuming exposure to the face, forearms, hands and lower legs. A dermal adherence factor of 0.2 mg/cm² per event was assumed (EPA 2004a) for both children and adults.

For groundwater related noncancer hazards, an ingestion rate for water was assumed to be 2 L/day for adults and 1 L/day for young children (EPA 2007a). For dermal contact and inhalation of vapors while showering, the risk was assumed to be equivalent to ingestion risk (EPA 2007a).

Child and adult residents were assumed to be exposed for 350 days per year. The exposure duration was six years (EPA 2002) for young children and 30 years for child/adult carcinogenic exposure. The averaging time for noncarcinogenic effects was equal to the exposure duration, 2,190 days (six years). Averaging time for carcinogenic effects was over a life expectancy of 25,550 days (70 years). A body weight of 15 kg was employed for young children and 70 kg for child/adults (EPA 2002).

5.4.3 Exposure Point Concentrations

An EPC is an estimate of the concentration of a COPC at points of exposure for different groups of receptors. This concentration term is calculated as the lower of the maximum detected concentration or the 95 percent upper confidence limit (UCL) of the arithmetic mean. This approach provides a conservative (protective) estimate of average COPC concentrations to account for uncertainties in the risk assessment dataset (EPA 1989). EPCs may be estimated by (1) using environmental data alone, or (2) using a combination of environmental data and environmental fate and transport models. In this assessment, EPCs for soil and groundwater were estimated using environmental data only.

5.4.3.1 Calculation of Exposure Point Concentrations

EPCs represent concentrations of COPCs to which receptors may be exposed. EPCs serve as input into risk calculations and are derived for all COPCs for each area of

concern. EPCs can be used, along with appropriate exposure assumptions, to reflect a range of potential exposures (average, reasonable upper range, worst case). Most often where data quantity allow, single EPCs are used to represent possible exposure concentrations. Typically, EPCs are estimated as the lower concentration of the maximum detected concentration or the upper one-sided 95% confidence limit of the arithmetic mean concentration (95% UCL) to help ensure the actual average concentration is not underestimated. The choice of the arithmetic mean as an appropriate statistic for characterizing exposure at an exposure point is based on the assumption of random exposure within the exposure area (EPA 1989).

For each chemical with 10 or more samples, a 95%UCL on the arithmetic mean concentration was calculated and compared to the maximum detected concentration for that chemical. The lower value of the UCL and the maximum detected value was then selected as the EPC, as recommended by EPA (EPA 1992). For chemicals with less than 10 samples, the maximum detected concentration was used.

Different statistical methods can be used to estimate the 95% UCL of a data set, depending upon the data distribution. Therefore, two key steps are required to estimate the 95% UCL of a data set:

- Determine the distribution of the data (i.e., normal, lognormal, gamma or other).
- Compute the 95% UCL using the appropriate procedure for the data distribution.

In this assessment, both steps were performed with the ProUCL statistical software Version 4.0 developed for EPA (2007b). The ProUCL program contains rigorous parametric and nonparametric (including bootstrap methods) statistical methods (instead of simple *ad hoc* or substitution methods) that can be used on full data sets without nondetects (NDs) and on data sets with below reporting limit (RL) or ND observations.

ProUCL computes the 95%UCL using state-of-the-art parametric and nonparametric methods that can be used on full-uncensored data sets without NDs and also on data sets with below RL observations. ProUCL also provides goodness-of-fit tests for normal, lognormal, and gamma distributions where the ND values can be extrapolated (estimated) based upon normal regression on statistics (ROS), gamma ROS, and lognormal ROS (robust ROS) methods.

For highly censored datasets (i.e., if the percentage of NDs within a data set is greater than 80%), the maximum RL for ND data is compared to the maximum detected concentration. If the maximum RL for the NDs is greater or equal to the maximum concentration, then all NDs with RLs greater than the maximum concentration are excluded from the data set. Otherwise, the RL is used as the substitute for ND values.

Using the data set generated from the ND evaluation, percentiles of the data set are determined, and the 95th percentile is selected as the EPC.

Tables presented in **Appendix H-3** provide EPC summaries for each COPC in each medium and identify the statistical procedure used to calculate UCLs. ProUCL Version 4.0 output tables are provided in **Appendix H-4**.

5.4.4 Modeling Techniques Used to Estimate EPCs

Modeling was used to estimate exposure point concentrations and/or risk estimates that involve the transfer of contaminants from one medium to another: soil particulates released into ambient air, contaminants in groundwater that volatilize into ambient air in a trench, and contaminants from groundwater that volatilize into indoor air.

Soil Particulates

In order to evaluate the inhalation of fugitive dust for the various surface and subsurface data sets, a particulate emission factor (PEF) was derived employing soil modeling equations provided in *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (EPA 2002). A standard PEF is developed based on physical features of the soil and site that affect the resuspension of soil particulates as well as local climatic conditions that influence dispersion of particulates. EPA default values were used in the calculation of the PEF with the exception the Q/C variable that was adjusted for a 50 acre site. The resulting PEF factor for the site was calculated as 6.8E+08. Fugitive dust EPCs were calculated by dividing soil concentrations by the PEF.

Vapors in Excavation

In order to evaluate the inhalation of vapors from groundwater in a trench for construction workers, a volatilization factor (VF) was calculated for each shallow groundwater COPC. The equations used to estimate the groundwater-to-air VF for each COPC are presented Appendix H-5. The equation is a simple vadose zone model used to estimate volatilization of vapors from contaminated groundwater in a trench and dispersion of the contaminants into ambient trench air. Chemical specific properties for each chemical such as Henry's Law Constant, carbon-to-water sorption coefficient (Koc), diffusion coefficient in air and diffusion coefficient in water used in the calculations and were obtained from *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings* (EPA 2004c). The VF for each COPC was multiplied the concentration in shallow groundwater to obtain the construction worker EPC in ambient air.

Vapor Intrusion Modeling

The Johnson and Ettinger model for subsurface vapor intrusion into buildings was used to evaluate potential worker and residential inhalation exposures to VOCs in indoor air originating from shallow groundwater contamination.

EPCs for the shallow groundwater plume were inserted into the model to yield risk/hazard estimates for a current O&M worker, future industrial worker and future resident. The model defaults were used for all parameters except the following site-specific parameters:

- Depth below grade to water table – 15 feet
- Depth below grade to bottom of enclosed floor space – 200 cm
- Depth below grade to top of contamination – 200 cm
- Soil type directly above water table – typically clayey silt, silt and sandy silt and silty clay (Silt Loam specified in the model runs)
- Average soil/groundwater temperature – 61°F (16°C)

5.5 Toxicity Assessment

A toxicity assessment identifies chemical specific criteria that reflect the intrinsic toxicity of COPCs to humans. These criteria are used, along with estimates of exposure, to estimate potential cancer risks and noncancer hazards for receptors identified in Section 5.4. Risk and hazard estimates are provided in Section 5.7.

Toxicity criteria used in this risk assessment were obtained from a variety of sources according to a hierarchy established in the Office of Solid Waste and Emergency Response (OSWER) Directive 9285.7-53 (EPA 2003). The toxicity value hierarchy is as follows:

- Tier 1 – EPA’s Integrated Risk Information System (IRIS) (EPA 2007c).
- Tier 2 – EPA’s Provisional Peer Reviewed Toxicity Values (PPRTVs): The Office of Research and Development/NCEA/Superfund Health Risk Technical Support Center (STSC) develops PPRTVs on a chemical-specific basis when requested by EPA’s Superfund program (EPA 2007d).
- Tier 3 – Other Toxicity Values: Tier 3 includes additional EPA and non-EPA sources of toxicity information. Priority should be given to those sources of information that are the most current, the basis for which is transparent and publicly available, and which have been peer-reviewed.

5.5.1 Health Effects Criteria for Non-carcinogens

For chemicals that exhibit non-carcinogenic (e.g., systemic) effects, organisms have repair and detoxification capabilities that must be exceeded by some critical concentration (threshold) before the health effect is manifested. This threshold view holds that a range of exposures from just above zero to some finite value can be tolerated by the organism without an appreciable hazard of adverse effects.

Health criteria for chemicals exhibiting non-carcinogenic effects for use in risk assessment are generally EPA-derived reference doses (RfDs) and reference concentrations (RfCs). The RfD or RfC is an estimate of average daily exposure to an individual (including sensitive individuals) that is likely to be without appreciable risk of deleterious effects during a lifetime. The RfD is expressed in units of milligram (mg) chemical per kilogram (kg) body weight per day (mg/kg-day); while the RfC is expressed in units of mg chemical per cubic meter (m³) of air (mg/m³). RfDs and RfCs are usually derived either from human studies involving work-place exposures or from animal studies, and are adjusted using uncertainty factors to ensure that they are unlikely to underestimate the potential for adverse non-carcinogenic effects to occur.

Uncertainty factors reflect scientific judgment regarding the various types of data used to estimate the RfD/RfC and generally consist of multiples of factors ranging from 1 to 10. For example, a factor of 10 may be introduced to account for possible differences in response between humans and animals in prolonged exposure studies. Other factors may be used to account for variation in susceptibility among individuals in the human population, use of data from a study with less-than-lifetime exposure, and/or use of data from a study that did not identify a no-observed-adverse-effect level (NOAEL).

RfDs and RfCs provide benchmarks against which estimated doses (i.e., those projected from human exposures to various environmental conditions) are compared. Doses that are significantly higher than the RfD/RfC may indicate an increased potential of hazard from the exposure, while doses that are less than the RfD/RfC are not likely to be associated with adverse health effects. It should be noted that an exceedance of the RfD/RfC does not provide an estimate of the likelihood of adverse effects. It only reflects an increased potential hazard for noncancer health effects.

5.5.2 Health Effects Criteria for Potential Carcinogens

For chemicals that exhibit carcinogenic effects, EPA recognizes that more than one molecular event must occur to transform a cell from its normal state into a cancerous one. However, EPA regulates carcinogens using a non-threshold concept that assumes that a single change to the genome of a cell can initiate the carcinogenesis process. This non-threshold theory of carcinogenesis therefore assumes that any level of exposure to a carcinogen is associated with some finite possibility of causing cancer. Generally, regulatory agencies assume that the non-threshold hypothesis for carcinogens holds regardless of information concerning mechanisms of carcinogenic action for the chemical.

The carcinogenic potential of a chemical is expressed as a cancer slope factor (CSF) [in units of (mg/kg body weight-day)⁻¹], which estimates the risk of cancer per unit dose. When a slope factor is multiplied by an estimate of lifetime average daily dose (ADD) of a potential carcinogen (in mg/kg body weight-day), the result is an estimate of the lifetime excess cancer risk associated with exposure at that dose. EPA develops CSFs in a conservative manner, and risk estimates using slope factors are considered to be

upper bound estimates of those possible. Risks estimated using slope factors are considered unlikely to underestimate actual risks and may substantially overestimate risks for a given exposure.

Excess lifetime cancer risks (ELCRs) are generally expressed in scientific notation and are probabilities. An ELCR of 1×10^{-6} (one in one million), for example, represents the incremental probability that an individual will develop cancer as a result of exposure to a carcinogenic chemical over a 70-year lifetime under specified exposure conditions. In addition, CSFs are developed for a specific route of exposure, either oral or inhalation, and ELCRs are estimated separately for these two routes of exposure.

In practice, CSF estimates are derived from the results of human epidemiology studies or chronic animal bioassays. The animal studies are conducted for a range of doses, including a high dose, in order to detect possible adverse effects. Since humans are expected to be exposed at lower doses than those used in animal studies, the data are adjusted via mathematical models. The data from animal studies are typically fitted to the linearized multistage model to obtain a dose-response curve. EPA evaluates a range of possible models based on the available data before conducting the extrapolation. The most appropriate model to reflect the data is selected based on an analysis of the data set.

The 95% UCL slope of the dose-response curve, subject to various adjustments and an inter-species scaling factor, is applied to derive the health protective CSF estimate for humans. Dose-response data from human epidemiological studies are fitted to dose-time-response curves. These models provide rough, but reasonable, estimates of the upper limits on lifetime risk. CSF estimates based on human epidemiological data are also derived using health protective assumptions and, as such, they too are considered unlikely to underestimate risks. Therefore, while actual risks associated with exposures to potential carcinogens are unlikely to be higher than the risks calculated using a slope factor estimate, they could be considerably lower.

In addition, there are varying degrees of confidence in the weight of evidence for carcinogenicity of a given chemical. EPA (1989) has proposed a system for characterizing the overall weight of evidence based on the availability of animal, human, and other supportive data. The weight-of-evidence classification is an attempt to determine the likelihood that an agent is a human carcinogen and thus qualitatively affects the estimation of potential health risks.

Three major factors are considered in characterizing the overall weight of evidence for human carcinogenicity: (1) the availability and quality of evidence from human studies, (2) the availability and quality of evidence from animal studies, and (3) other supportive information which is assessed to determine whether the overall weight of evidence should be modified. Carcinogens have often been grouped into the following five categories based on strength of this evidence:

- human Carcinogen: There is at least sufficient evidence from human epidemiological studies to support a causal association between an agent and cancer;
- probable Human Carcinogen: There is at least limited evidence from epidemiological studies of carcinogenicity in humans (Group B1) or, in the absence of adequate data in humans, there is sufficient evidence of carcinogenicity in animals (Group B2);
- possible Human Carcinogen: There is inadequate evidence of carcinogenicity in humans;
- not Classified: There is inadequate data or no existing data for the chemical; and
- no Evidence of Carcinogenicity in Humans: There is no evidence for carcinogenicity in at least two adequate animal tests in different species or in both epidemiological and animal studies.

The EPA 2005 Cancer Guidelines (EPA 2005b) update previous versions and suggest a slightly different approach to categorizing carcinogens. These guidelines emphasize the value of understanding the biological changes a chemical can cause and how these changes might lead to the development of cancer. They also discuss methods to evaluate and use such information, including information about an agent's postulated *mode-of-action*. Mode-of-action data, when available and of sufficient quality, may be useful in drawing conclusions about the potency of an agent, its potential effects at low doses, whether findings in animals are relevant to humans, and which populations or life stages may be particularly susceptible. In the absence of mode-of-action information, default options are available to allow the risk assessment to proceed.

The 2005 Cancer Guidelines (EPA 2005b) recommend an agent's human carcinogenic potential be described in a *weight-of-evidence narrative* rather than the previously identified categories. The narrative summarizes the full range of available evidence and describes any conditions associated with conclusions about an agent's hazard potential. For example, the narrative may explain that an agent appears to be carcinogenic by some routes of exposure but not others (e.g., by inhalation but not ingestion). Similarly, a hazard may be attributed to exposures during sensitive life stages of development but not at other times. The narrative also summarizes uncertainties and key default options that have been invoked.

The following five standard hazard descriptors are still used in the newest guidelines:

- carcinogenic to humans;
- likely to be carcinogenic to humans;

- suggestive evidence of carcinogenic potential;
- inadequate information to assess carcinogenic potential; and
- not likely to be carcinogenic to humans.

However, requirements for in-depth analysis of "mode-of-action data" and other modifying information preclude the use of these descriptors to place chemicals into categories as was done previously.

The 2005 Cancer Guidelines (EPA 2005b) also include Supplemental Guidance (EPA 2005a) on the evaluation of early lifetime exposures. For example, where data are available that indicate a chemical is mutagenic, the Supplemental Guidance recommends either developing age-specific slope factors or generic age dependent adjustment factors. Application of the supplemental guidance for this risk assessment is explained in text of the exposure assessment (Section 5.4), and, where appropriate, was used to adjust cancer risk estimates.

5.5.3 Toxicological Assessment

Tables 5-2 and **5-3** summarize the chronic RfDs and RfCs used to estimate non-carcinogenic effects for the COPCs, and **Tables 5-4** and **5-5** summarize the CSFs used to estimate cancer risks for the COPCs. These criteria are the most current data, obtained from the 2007 on-line version of IRIS and current NCEA recommendations.

5.6 Risk Characterization

In this section of the risk assessment, human health risks potentially associated with complete human exposure pathways identified in Section 5.4 are characterized, integrating toxicity and exposure assessments into quantitative expressions of carcinogenic risk and noncancer hazards. Potential risks due to exposures to soil and groundwater via incidental ingestion, dermal contact, and inhalation were quantitatively evaluated. Cancer risk and noncancer hazard calculations for all COPCs for all scenarios are summarized and presented in **Appendix H-5**. Total cancer risk and noncancer hazard for each dataset and receptor are summarized in **Table 5-6**.

The potential for noncancer health hazards was evaluated by comparing ADDs with reference doses applicable for chronic (long-term) and subchronic (shorter-term) exposure. This ratio of exposure to toxicity is referred to as a hazard quotient (HQ). A hazard index (HI) is the sum of HQs from individual chemicals. An RfD or RfC defines an ADD below which it is unlikely even for sensitive populations to experience adverse health effects. Thus, if an HI exceeds unity (1), the ADD is higher than a "safe" exposure level and some concern for potential noncancer effects exists. An HI is not, however, an expression of probability of noncancer effects occurring. Generally, the greater the HI above unity, the greater the level of concern. HQs are typically only added together to estimate HIs for chemicals that affect the same target organ(s) or tissue(s).

Cancer risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen. The upper-bound ELCR is estimated by multiplying the lifetime average daily dose (LADD) by an appropriate CSF. ELCRs are generally expressed in scientific notation as incremental probabilities. An ELCR of 1×10^{-6} (1 in 1,000,000), for example, represents the incremental probability that an individual will develop cancer as a result of exposure to a carcinogenic chemical over a 70-year lifetime under specified exposure conditions. This increment is in addition to the risk of developing cancer from causes unrelated to the exposure. Typical cancer rates in the United States are in the range of 1 in 4 to 1 in 2.

Generally, EPA uses a target cancer risk range of 10^{-6} to 10^{-4} (1 in 1,000,000 to 1 in 10,000) to evaluate the need for remediation or mitigation at a site (EPA 1991b). Cancer risks below 1 in 1,000,000 are typically assumed to be *de minimis* and would require no remediation or mitigation. Decisions on whether to remediate or mitigate risk for risks that fall in this range are made on a site-specific basis. Risks that exceed 1 in 10,000 often require remediation and/or mitigation; however, no “bright line” has been established at the upper end of the risk range, and, again, risk management decisions are made on a site-by-site basis. The South Carolina Department of Health and Environmental Control’s policy is to use 10^{-6} as the basis for whether a risk is acceptable or unacceptable.

Estimates of cancer risk and hazard indices are compared to the above targets to put the magnitude of cancer risks and noncancer hazards into perspective for the risk manager.

5.6.1 Results of Risk Calculations

Potential risks were estimated for each area of concern for applicable receptors. In some instances, the site was considered as a whole (single exposure unit). Exposure to all groundwater was considered a single exposure unit for future residents and industrial workers, employing EPCs from the most impacted area of the plume. Cancer risks and noncancer health hazards for each receptor in each area under current/future, current, and future land use conditions are discussed in the following sections. Estimates of total cancer and noncancer hazards by exposure route and medium are summarized by receptor in Table 5-6. Risk and Hazard calculations and summaries by receptor and chemical can be found in Appendix H-5.

5.6.2 Risk and Hazard Results

5.6.2.1 Surface Soil (Excluding Hot Spots and Beneath Structures) and Groundwater

Current O&M Worker

The total estimated cancer risk for current O&M workers (9×10^{-5}) is within EPA’s target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to inhalation of volatiles in indoor air from shallow groundwater (99%). Trichloroethene

(TCE), 1,2-dichloroethane (1,2-DCA), tetrachloroethene (PCE), and vinyl chloride (VC) are the primary contributors to risk associated with groundwater exposure.

The total HI for current O&M workers (0.8) is below EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to inhalation of volatiles in indoor air from shallow groundwater (45%), ingestion of surface soil (33%) and dermal contact with surface soil (22%). PCE and xylenes are the primary contributors to groundwater exposure hazard, and thallium is the primary contributor to soil exposure hazards.

Current Teen/Adolescent Trespasser

The total estimated cancer risk for current trespassers (1×10^{-6}) meets the *de minimus* of EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to ingestion of surface soil (67%) and dermal contact with surface soil (32%). Arsenic is the primary contributor to risk associated with soil exposures.

The total HI for current trespassers (1) meets EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to ingestion of surface soil (57%) and dermal contact with surface soil (43%). Thallium is the primary contributor to soil exposure hazards.

5.6.2.2 Surface Soil (Hot Spot 1) and Groundwater

Current O&M Worker

The total estimated cancer risk for current O&M workers (9×10^{-5}) is within EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to inhalation of volatiles in indoor air from shallow groundwater (99%). TCE, 1,2-DCA, PCE, and VC are the primary contributors to risk associated with groundwater exposure.

The total HI for current O&M workers (0.8) is below EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to inhalation of volatiles in indoor air from shallow groundwater (41%), ingestion of surface soil (35%) and dermal contact with surface soil (23%). PCE and xylenes are the primary contributors to groundwater exposure hazard, and thallium is the primary contributor to soil exposure hazards.

Future Industrial Worker

The total estimated cancer risk for future industrial workers (9×10^{-3}) exceeds EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the risk. PCE, 1,2-DCA, and TCE are the primary contributors to risk associated with groundwater exposure.

The total HI for future industrial workers (63) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater.

Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the hazard. TCE, cis-1,2-dichloroethene (cis-1,2-DCE), PCE, and toluene are the primary contributors to risk associated with groundwater exposure.

Future Residents

The total estimated cancer risk for future residents (3×10^{-2}) exceeds the *de maximus* of EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 50% of the risk. TCE, 1,2-DCA, PCE, VC, and benzene are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, inhalation of volatiles in indoor air from shallow groundwater and soil exposures do not significantly impact overall risk, it should be noted that when these media are assessed individually, inhalation of volatiles in indoor air from shallow groundwater exceeds the risk range, with TCE, 1,2-DCA, PCE, VC, and benzene as primary contributors; and soil exposure risk is within EPA's target risk range, with arsenic and PCE as the primary contributors.

The total HI for future residents (409) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 48% of the hazard. TCE, cis-1,2-DCE, PCE, toluene, VC, xylenes, benzene, ethylbenzene, and manganese are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, soil exposures do not significantly impact overall hazard, it should be noted that when assessed by only this medium, hazard exceeds the noncancer threshold of 1. Thallium and vanadium are the primary contributors to risk associated with soil exposures.

Current/Future Teen/Adolescent Trespasser

The total estimated cancer risk for current/future trespassers (1×10^{-6}) meets the *de minimus* of EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to ingestion of surface soil (62%) and dermal contact with surface soil (32%). Arsenic and PCE are the primary contributors to risk.

The total HI for current trespassers (2) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to ingestion of surface soil (57%) and dermal contact with surface soil (43%). Thallium is the primary contributor to soil exposure hazards.

5.6.2.3 Surface Soil (Hot Spot 2) and Groundwater

Current O&M Worker

The total estimated cancer risk for current O&M workers (9×10^{-5}) is within EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to inhalation of volatiles in indoor air from shallow groundwater (100%). TCE, 1,2-DCA, PCE, and VC are the primary contributors to risk associated with groundwater exposure.

The total HI for current O&M workers (0.3) is below EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to inhalation of volatiles in indoor air from shallow groundwater (100%). PCE and xylenes are the primary contributors to groundwater exposure hazard.

Future Industrial Worker

The total estimated cancer risk for future industrial workers (9×10^{-3}) exceeds EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the risk. PCE, 1,2-DCA, and TCE are the primary contributors to risk associated with groundwater exposure.

The total HI for future industrial workers (62) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 50% of the hazard. TCE, cis-1,2-DCE, PCE, and toluene are the primary contributors to risk associated with groundwater exposure.

Future Residents

The total estimated cancer risk for future residents (3×10^{-2}) exceeds the *de maximus* of EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 50% of the risk. TCE, 1,2-DCA, PCE, VC, and benzene are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, inhalation of volatiles in indoor air from shallow groundwater does not significantly impact overall risk, it should be noted that when this medium is assessed individually, inhalation of volatiles in indoor air from shallow groundwater exceeds the risk range, with TCE, 1,2-DCA, PCE, VC, and benzene as primary contributors.

The total HI for future residents (395) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these

pathways contributed 50% of the hazard. TCE, cis-1,2-DCE, PCE, toluene, VC, xylenes, benzene, ethylbenzene, and manganese are the primary contributors to risk associated with groundwater exposure.

Current/Future Teen/Adolescent Trespasser

The total estimated cancer risk for current/future trespassers (2×10^{-7}) is below EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to ingestion of surface soil (46%), dermal contact with surface soil (39%) and inhalation of fugitive dust and vapors from surface soil (15%). Arsenic and PCE are the primary contributors to risk.

The total HI for current trespassers (0.0007) is well below EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to inhalation of fugitive dust and vapors from surface soil (84%) and ingestion of surface soil (10%).

5.6.2.4 Surface Soil (Hot Spot 3) and Groundwater

Future Teen/Adolescent Trespasser

The total estimated cancer risk for future trespassers (1×10^{-6}) meets the *de minimus* of EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to ingestion of surface soil (61%) and dermal contact with surface soil (32%). Arsenic and PCE are the primary contributors to risk associated with soil exposures.

The total HI for future trespassers (4) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to ingestion of surface soil (57%) and dermal contact with surface soil (43%). Thallium is the primary contributor to soil exposure hazards.

Future Industrial Worker

The total estimated cancer risk for future industrial workers (9×10^{-3}) exceeds EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the risk. PCE, 1,2-DCA and TCE are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, inhalation of volatiles in indoor air from shallow groundwater does not significantly impact overall risk, it should be noted that when this medium is assessed individually, inhalation of volatiles in indoor air from shallow groundwater exceeds the risk range, with TCE, 1,2-DCA, PCE, and VC as primary contributors.

The total HI for future industrial workers (63) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the hazard. TCE and cis-1,2-DCE are the primary

contributors to risk associated with groundwater exposure. Although, relatively speaking, soil exposures do not significantly impact overall risk, it should be noted that when this medium is assessed individually, soil exposure hazard exceeds EPA's noncancer threshold, with thallium as the primary contributor.

Future Residents

The total estimated cancer risk for future residents (3×10^{-2}) exceeds the *de maximus* of EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 50% of the risk. TCE, 1,2-DCA, PCE, VC, and benzene are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, inhalation of volatiles in indoor air from shallow groundwater and soil exposures do not significantly impact overall risk, it should be noted that when these media are assessed individually, inhalation of volatiles in indoor air from shallow groundwater exceeds the risk range, with TCE, 1,2-DCA, PCE, VC, and benzene as primary contributors; and soil exposure risk is within EPA's target risk range, with arsenic and PCE as the primary contributors.

The total HI for future residents (419) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 47% of the hazard. TCE, cis-1,2-DCE, PCE, toluene, VC, xylenes, benzene, ethylbenzene, and manganese are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, soil exposures do not significantly impact overall risk, it should be noted that when this medium is assessed individually, soil exposure hazard exceeds EPA's noncancer threshold, with thallium, manganese, and iron as the primary contributors.

5.6.2.5 Surface Soil (Excluding Hot Spots) and Groundwater

Future Industrial Worker

The total estimated cancer risk for future industrial workers (9×10^{-3}) exceeds EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the risk. PCE, 1,2-DCA, and TCE are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, inhalation of volatiles in indoor air from shallow groundwater does not significantly impact overall risk, it should be noted that when this medium is assessed individually, inhalation of volatiles in indoor air from shallow groundwater exceeds the risk range, with TCE, 1,2-DCA, PCE, and VC as primary contributors.

The total HI for future industrial workers (62) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the hazard. TCE, cis-1,2-DCE, PCE, and toluene are the primary contributors to risk associated with groundwater exposure.

Future Teen/Adolescent Trespasser

The total estimated cancer risk for future trespassers (1×10^{-6}) meets the *de minimus* of EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to ingestion of surface soil (62%) and dermal contact with surface soil (32%). Arsenic is the primary contributor to risk associated with soil exposures.

The total HI for future trespassers (1) meets EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to ingestion of surface soil (57%) and dermal contact with surface soil (43%). Thallium is the primary contributor to soil exposure hazards.

Future Residents

The total estimated cancer risk for future residents (3×10^{-2}) exceeds the *de maximus* of EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 50% of the risk. 1,2-DCA, TCE, and VC are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, soil exposures do not significantly impact overall risk, it should be noted that when assessed by only this medium, risk is with EPA's target risk range. Arsenic and 1,2-DCA are the primary contributors to risk associated with soil exposures.

The total HI for future residents (408) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 48% of the hazard. TCE, cis-1,2-DCE, PCE, toluene, VC, xylenes, benzene, ethylbenzene, and manganese are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, soil exposures do not significantly impact overall hazard, it should be noted that when assessed by only this medium, hazard exceeds the noncancer threshold of 1. Thallium and vanadium are the primary contributors to risk associated with soil exposures.

5.6.2.6 Subsurface Soil (Excluding Hot Spots) and Groundwater

Future Industrial Worker

The total estimated cancer risk for future industrial workers (9×10^{-3}) exceeds EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to

potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the risk. PCE, 1,2-DCA, and TCE are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, inhalation of volatiles in indoor air from shallow groundwater does not significantly impact overall risk, it should be noted that when this medium is assessed individually, inhalation of volatiles in indoor air from shallow groundwater exceeds the risk range, with TCE, 1,2-DCA, PCE, and VC as primary contributors.

The total HI for future industrial workers (67) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 46% of the hazard. TCE, cis-1,2-DCE, PCE, and toluene are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, soil exposures do not significantly impact overall risk, it should be noted that when this medium is assessed individually, soil exposure hazard exceeds EPA's noncancer threshold, with vanadium as the primary contributor.

Future Excavation Worker

The total estimated cancer risk for future excavation workers (3×10^{-7}) is below EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to inhalation of ambient air from shallow groundwater (42%), followed by ingestion of surface soil (45%) and inhalation of fugitive dust and vapors from soil (11%).

The total HI for future excavation workers (5) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to ingestion of soil (90%). Vanadium and thallium are the primary contributors to subsurface soil exposure hazard.

Future Residents

The total estimated cancer risk for future residents (3×10^{-2}) exceeds the *de maximus* of EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 50% of the risk. TCE, 1,2-DCA, PCE, VC, and benzene are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, inhalation of volatiles in indoor air from shallow groundwater and soil exposures do not significantly impact overall risk, it should be noted that when these media are assessed individually, inhalation of volatiles in indoor air from shallow groundwater exceeds the risk range, with TCE, 1,2-DCA, PCE, VC, and benzene as primary contributors; and soil exposure risk is within EPA's target risk range, with arsenic, 1,2-DCA, and TCE as the primary contributors.

The total HI for future residents (486) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 41% of the hazard, followed by ingestion of soil (16%). TCE, cis-1,2-DCE, PCE, toluene, VC, xylenes, benzene, ethylbenzene, and manganese are the primary contributors to risk associated with groundwater exposure, while vanadium and thallium are the primary contributors associated with soil exposures.

5.6.2.7 Subsurface Soil (Hot Spot RIMW-6) and Groundwater

Future Industrial Worker

The total estimated cancer risk for future industrial workers (9×10^{-3}) exceeds EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the risk. PCE, 1,2-DCA, and TCE are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, inhalation of volatiles in indoor air from shallow groundwater does not significantly impact overall risk, it should be noted that when this medium is assessed individually, inhalation of volatiles in indoor air from shallow groundwater exceeds the risk range, with TCE, 1,2-DCA, PCE, and VC as primary contributors.

The total HI for future industrial workers (62) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 50% of the hazard. TCE, cis-1,2- DCE, PCE, and toluene are the primary contributors to risk associated with groundwater exposure.

Future Excavation Worker

The total estimated cancer risk for future excavation workers (8×10^{-7}) is below EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to inhalation of fugitive dust and vapors from soil (62%), ingestion of surface soil (22%), and inhalation of ambient air from shallow groundwater (15%).

The total HI for future excavation workers (0.1) is below EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to inhalation of ambient air from shallow groundwater (36%), ingestion of soil (33%), and inhalation of fugitive dust and vapors from soil (29%).

Future Residents

The total estimated cancer risk for future residents (3×10^{-2}) exceeds the *de maximus* of EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was

conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the risk. TCE, 1,2-DCA, PCE, VC, and benzene are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, inhalation of volatiles in indoor air from shallow groundwater and soil exposures do not significantly impact overall risk, it should be noted that when these media are assessed individually, inhalation of volatiles in indoor air from shallow groundwater exceeds the risk range, with TCE, 1,2-DCA, PCE, VC, and benzene as primary contributors; and soil exposure risk is within EPA's target risk range, with TCE, VC, and PCE as the primary contributors.

The total HI for future residents (395) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 50% of the hazard. TCE, cis-1,2-DCE, PCE, toluene, VC, xylenes, benzene, ethylbenzene, and manganese are the primary contributors to risk associated with groundwater exposure.

5.6.2.8 Subsurface Soil (Hot Spot RISB-12) and Groundwater

Future Industrial Worker

The total estimated cancer risk for future industrial workers (9×10^{-3}) exceeds EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the risk. PCE, 1,2-DCA, and TCE are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, inhalation of volatiles in indoor air from shallow groundwater does not significantly impact overall risk, it should be noted that when this medium is assessed individually, inhalation of volatiles in indoor air from shallow groundwater exceeds the risk range, with TCE, 1,2-DCA, PCE, and VC as primary contributors.

The total HI for future industrial workers (63) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the hazard. TCE, cis-1,2-DCE, PCE, and toluene are the primary contributors to risk associated with groundwater exposure.

Future Excavation Worker

The total estimated cancer risk for future excavation workers (3×10^{-7}) is below EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to ingestion of surface soil (37%), inhalation of ambient air from shallow groundwater (33%), and inhalation of fugitive dust and vapors from soil (28%).

The total HI for future excavation workers (3) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to ingestion of soil (81%) and inhalation of fugitive dust and vapors from soil (10%). Thallium is the primary contributor to soil exposure hazards.

Future Residents

The total estimated cancer risk for future residents (3×10^{-2}) exceeds the *de maximus* of EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 50% of the risk. TCE, 1,2-DCA, PCE, VC, and benzene are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, inhalation of volatiles in indoor air from shallow groundwater and soil exposures do not significantly impact overall risk, it should be noted that when these media are assessed individually, inhalation of volatiles in indoor air from shallow groundwater exceeds the risk range, with TCE, 1,2-DCA, PCE, VC, and benzene as primary contributors; and soil exposure risk is within EPA's target risk range, with benzene, arsenic and TCE as the primary contributors.

The total HI for future residents (412) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 48% of the hazard. TCE, cis-1,2-DCE, PCE, toluene, VC, xylenes, benzene, ethylbenzene, and manganese are the primary contributors to risk associated with groundwater exposure,. Although, relatively speaking, soil exposures do not significantly impact overall risk, it should be noted that when this medium is assessed individually, soil exposure hazard exceeds EPA's noncancer threshold, with thallium, vanadium, iron, and xylenes as the primary contributors.

5.6.2.9 Subsurface Soil (Hot Spot RISB-18) and Groundwater

Future Industrial Worker

The total estimated cancer risk for future industrial workers (9×10^{-3}) exceeds EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the risk. PCE, 1,2-DCA, and TCE are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, inhalation of volatiles in indoor air from shallow groundwater does not significantly impact overall risk, it should be noted that when this medium is assessed individually, inhalation of volatiles in indoor air from shallow groundwater exceeds the risk range, with TCE, 1,2-DCA, PCE, and VC as primary contributors.

The total HI for future industrial workers (62) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the hazard. TCE, cis-1,2-DCE, PCE, and toluene are the primary contributors to risk associated with groundwater exposure.

Future Excavation Worker

The total estimated cancer risk for future excavation workers (4×10^{-7}) is below EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to inhalation of fugitive dust and vapors from soil (47%), inhalation of ambient air from shallow groundwater (28%), and ingestion of surface soil (24%).

The total HI for future excavation workers (1) meets EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to ingestion of soil (89%).

Future Residents

The total estimated cancer risk for future residents (3×10^{-2}) exceeds the *de maximus* of EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 50% of the risk. TCE, 1,2-DCA, PCE, VC, and benzene are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, inhalation of volatiles in indoor air from shallow groundwater and soil exposures do not significantly impact overall risk, it should be noted that when these media are assessed individually, inhalation of volatiles in indoor air from shallow groundwater exceeds the risk range, with TCE, 1,2-DCA, PCE, VC, and benzene as primary contributors; and soil exposure risk is within EPA's target risk range, with 1,2-DCA, TCE, and arsenic as the primary contributors.

The total HI for future residents (401) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the hazard. TCE, cis-1,2-DCE, PCE, toluene, VC, xylenes, benzene, ethylbenzene, and manganese are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, soil exposures do not significantly impact overall risk, it should be noted that when this medium is assessed individually, soil exposure hazard exceeds EPA's noncancer threshold, with thallium as the primary contributor.

5.6.2.10 Subsurface Soil (Hot Spot RISB-25) and Groundwater

Future Industrial Worker

The total estimated cancer risk for future industrial workers (9×10^{-3}) exceeds EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the risk. PCE, 1,2-DCA, and TCE are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, inhalation of volatiles in indoor air from shallow groundwater and soil exposures do not significantly impact overall risk, it should be noted that when these media are assessed individually, inhalation of volatiles in indoor air from shallow groundwater exceeds the risk range, with TCE, 1,2-DCA, PCE, VC, and benzene as primary contributors; and soil exposure risk is within EPA's target risk range, with 1,2-DCA, TCE, and arsenic as the primary contributors.

The total HI for future industrial workers (62) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the hazard. TCE, cis-1,2-DCE, PCE, and toluene are the primary contributors to risk associated with groundwater exposure.

Future Excavation Worker

The total estimated cancer risk for future excavation workers (2×10^{-6}) is within EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to inhalation of fugitive dist and vapors from soil (70%) and ingestion of surface soil (22%). 1,2-DCA is the primary contributor to risk associated with soil.

The total HI for future excavation workers (2) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to ingestion of soil (88%). Thallium is the primary contributor to hazard associated with soil.

Future Residents

The total estimated cancer risk for future residents (3×10^{-2}) exceeds the *de maximus* of EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the risk. TCE, 1,2-DCA, PCE, VC, and benzene are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, inhalation of volatiles in indoor air from shallow groundwater and soil exposures do not significantly impact overall risk, it should be noted that when these media are assessed individually, inhalation of volatiles in indoor air from shallow groundwater exceeds the risk range, with TCE, 1,2-DCA, PCE, VC, and benzene as primary contributors; and soil exposure

risk is within EPA's target risk range, with 1,2-DCA, arsenic, TCE, and chloroform as the primary contributors.

The total HI for future residents (402) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the hazard. TCE, cis-1,2-DCE, PCE, toluene, VC, xylenes, benzene, ethylbenzene, and manganese are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, soil exposures do not significantly impact overall risk, it should be noted that when this medium is assessed individually, soil exposure hazard exceeds EPA's noncancer threshold, with thallium, as the primary contributor.

5.6.2.11 Subsurface Soil (Hot Spot RISB-64) and Groundwater

Future Industrial Worker

The total estimated cancer risk for future industrial workers (1×10^{-2}) exceeds EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 46% of the risk. PCE, 1,2-DCA, and TCE are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, inhalation of volatiles in indoor air from shallow groundwater and soil exposures do not significantly impact overall risk, it should be noted that when these media are assessed individually, inhalation of volatiles in indoor air from shallow groundwater exceeds the risk range, with TCE, 1,2-DCA, PCE, VC, and benzene as primary contributors; and soil exposure risk is within EPA's target risk range, with TCE, PCE, and 1,2-DCA as the primary contributors.

The total HI for future industrial workers (63) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the hazard. TCE, cis-1,2-DCE, PCE, and toluene are the primary contributors to risk associated with groundwater exposure.

Future Excavation Worker

The total estimated cancer risk for future excavation workers (3×10^{-5}) is within EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to inhalation of fugitive dust and vapors from soil (81%) and ingestion of surface soil (18%). TCE and PCE are the primary contributors to risk associated with soil.

The total HI for future excavation workers (2) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to ingestion of soil (66%) and

inhalation of fugitive dust and vapors from soil (28%). TCE is the primary contributor to hazard associated with soil.

Future Residents

The total estimated cancer risk for future residents (4×10^{-2}) exceeds the *de maximus* of EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} . The cancer risk is predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 47% of the risk. TCE, 1,2-DCA, PCE, VC, and benzene are the primary contributors to risk associated with groundwater exposure. Although, relatively speaking, inhalation of volatiles in indoor air from shallow groundwater and soil exposures do not significantly impact overall risk, it should be noted that when these media are assessed individually, inhalation of volatiles in indoor air from shallow groundwater exceeds the risk range, with TCE, 1,2-DCA, PCE, VC, and benzene as primary contributors; and soil exposure risk also exceeds EPA's target risk range, with TCE, PCE, 1,2-DCA, VC, benzene, and chloroform as the primary contributors.

The total HI for future residents (405) exceeds EPA's noncancer threshold of 1. Noncancer health hazards are predominately due to potable uses of groundwater. Since dermal contact with potable water was conservatively estimated to be equivalent to the calculated risk for ingestion of all groundwater, each of these pathways contributed 49% of the hazard. TCE, cis-1,2-DCE, PCE, toluene, VC, xylenes, benzene, ethylbenzene, and manganese are the primary contributors to risk associated with groundwater exposure,. Although, relatively speaking, soil exposures do not significantly impact overall risk, it should be noted that when this medium is assessed individually, soil exposure hazard exceeds EPA's noncancer threshold, with TCE as the primary contributor.

5.6.3 Final COCs

The results of the HHRA risk characterization were used to identify the final COCs for the site. In accordance with Region 4 guidance, COCs are those COPCs that either exceed a 1×10^{-4} cumulative cancer risk or exceed a noncarcinogenic hazard quotient of unity. A summary of COCs by exposure medium and receptor are presented below.

Surface Soil Data Sets

Surface Soil Excluding Hot Spots (no soil beneath buildings)

- Current O&M Worker – none selected
- Current Trespasser – none selected

Surface Soil Hot Spot 1

- Current O&M Worker – none selected
- Future Industrial Worker – none selected
- Future Resident - **thallium**

- Current/Future Child Trespasser/Recreational User – **thallium**

Surface Soil Hot Spot 2

- Current O&M Worker – none selected
- Future Industrial Worker – none selected
- Future Resident – none selected
- Current/Future Child Trespasser/Recreational User – none selected

Surface Soil Hot Spot 3

- Future Industrial Worker – none selected
- Future Resident – **iron, manganese, thallium**
- Current/Future Child Trespasser/Recreational User – **thallium**

Subsurface Soil Data Sets

Subsurface Soil Excluding Hot Spots

- Future Industrial Worker – **vanadium**
- Future Excavation Worker – **vanadium, thallium**
- Future Resident – **vanadium, thallium**

Subsurface Soil Hot Spot RIMW-6

- Future Industrial Worker – none selected
- Future Excavation Worker – none selected
- Future Resident – none selected

Subsurface Soil Hot Spot RISB-12

- Future Industrial Worker – none selected
- Future Excavation Worker – **thallium**
- Future Resident – **thallium, vanadium**

Subsurface Soil Hot Spot RISB-18

- Future Industrial Worker – none selected
- Future Excavation Worker – none selected
- Future Resident – **thallium**

Subsurface Soil Hot Spot RISB-25

- Future Industrial Worker – none selected
- Future Excavation Worker – none selected
- Future Resident – **1,2-DCA, thallium**

Subsurface Soil Hot Spot RISB-64

- Future Industrial Worker – **TCE**
- Future Excavation Worker – **TCE**

- Future Resident – PCE, TCE

Groundwater Data Sets

All Groundwater – Shallow and Bedrock

- Future Industrial Worker – 1,2-DCA, cis-1,2-DCE, PCE, TCE, VC
- Future Resident – 1,2-DCA, cis-1,2-DCE, benzene, chloroethane, ethylbenzene, isopropylbenzene, manganese, methylene chloride, PCE, TCE, toluene, VC, xylenes

Shallow Groundwater

- Current O&M Worker – none selected
- Future Industrial Worker – TCE
- Future Resident – TCE

In accordance with EPA Region 4 guidance, in addition to those chemicals that exceed calculated risk levels, any chemicals that exceed applicable or relevant and appropriate requirements (ARARs) are also considered COCs. Any COPC in groundwater that exceeds state or federal MCLs is considered a COC. Per SCDHEC guidance, chemicals that exceed EPA Region 9 Soil Screening Levels (SSLs) are considered COCs. **Table 5-7** presents the final COC list based on these criteria.

Of the VOCs in groundwater that exceed MCLs, six (1,1,1-TCA, 1,1,2-TCA, 1,1-DCE, 1,2,4-TCB, carbon tetrachloride, and 1,2-DCB) were not previously identified as COCs based on calculated risks. Of the chemicals in soil that exceed SSLs, 19 (all but 1,2-DCA, PCE, and TCE) were not previously identified as COCs based on calculated risks.

5.7 Uncertainty Assessment

Uncertainties can arise from several sources in a human health risk assessment including data collection and interpretation, assumptions used to characterize exposures, and toxicity values. To compensate for uncertainty surrounding input variables, conservative assumptions are often made that tend to overestimate rather than underestimate risk. In cases where data are limited, assumptions may be based on professional judgment or subjective estimates that may under or over estimate risks.

5.7.1 Types of Uncertainty

Three primary sources of uncertainty include:

- scenario uncertainty;
- parameter uncertainty; and
- model uncertainty.

Scenario uncertainty results from missing or incomplete information needed to fully define exposure and dose. This uncertainty may include errors or gaps in site characterization, professional judgment, assumptions regarding exposed populations, and steady-state conditions. Sources of parameter uncertainty include measurement and sampling errors, inherent variability in environmental and exposure-related parameters, and the use of generic surrogate data or default assumptions when site-specific data are not available. Parameter uncertainty often leads to model uncertainty. One source of modeling uncertainty is relationship errors, such as errors in correlations among chemical properties or limitations in mathematical expressions used to define environmental processes. Errors due to the use of mathematical or conceptual models as simplified representations of reality are also sources of modeling uncertainty.

Analysis of uncertainties is often divided in "true uncertainty" and "variability." The former is uncertainty due to lack of knowledge of data. Variability is uncertainty due to irresolvable variation in physical, chemical, and biological process, human behavioral patterns, seasonal changes, and data for site characterization. An example of uncertainty in this HHRA involves selection of an exposure frequency for recreational site users. No site-specific information is available and this parameter is based on professional judgment.

These three types of uncertainty have been identified in each of the four parts of this risk assessment: data evaluation, toxicity assessment, exposure assessment, and risk characterization. Uncertainty within each of these components is discussed below.

5.7.2 Data Evaluation

Uncertainty is present in the data before it is even evaluated for risk assessment. This includes potential sampling bias, errors in laboratory extraction and analysis, and the protocol employed to assess contaminants identified as "nondetect." A higher level of confidence is placed on the analytical results. Sampling errors and biases and assumptions for use of nondetect data are almost always more important from uncertainty considerations.

5.7.3 Dose-Response Assessment

The dose-response section involves estimating the toxicological effects of a compound on humans usually based upon laboratory animal studies. A potentially substantial source of uncertainty occurs when dose-response relationships in humans are derived from animal to human extrapolation. These associations often result from high-dose to low-dose extrapolations as well. Health effects criteria are derived with margins of safety relative to the degree of uncertainty in the value.

Another source of uncertainty in the risk assessment is the absence of toxicity criteria for certain chemical constituents. Without numerical toxicity criteria, potential noncancer hazard and/or cancer risk cannot be quantified for a given constituent.

5.7.4 Exposure Assessment

The exposure assessment step involves many assumptions about "typical people" and "typical exposure scenarios" to arrive at an average daily dose. For example, a body weight of 70 kg is used for adult residents. Body weight varies for each individual, so these assumptions likely overestimate or underestimate the true dose that people are likely to receive.

Many exposure factors are chosen to err on the side of protectiveness for human health. Exposure duration, frequency, and time are set at reasonable maximum exposure values. They likely overestimate the exposures that typically occur.

The computation of the EPC for chemicals in a number of media may have resulted in an overestimate or underestimate of risks and hazards. Averages of site data exposure point concentrations may underestimate risks and hazards for some receptors while use of the maximums from site data exposure point concentration may overestimate risks and hazards for some receptors. Risks and hazards from both types of EPCs are provided in this assessment to try to bracket potential site-related impacts.

Uncertainty also exists in the use of toxicity criteria based on oral exposures to assess the risk/hazard associated with dermal exposures. In absence of a thorough understanding of the proportional difference in absorption for oral versus dermal exposures for each COPC, the dermal absorption factor inherent to the dermal exposure equation was used to account for dermal absorption of each COPC.

5.7.5 Risk Characterization

Assumptions are made using best professional judgment and the scientific literature on site risk assessments. In general, assumptions made throughout this risk assessment are conservative in that they tend to overestimate exposure and resultant risk rather than underestimate it. The overall risk to public health attributable to the site is an upper-bound probability of adverse health effects. True health effects may be lower. However, it should be noted that the individual errors from different sources might be propagated into larger errors by mathematical manipulation in the risk assessment.

5.8 Summary and Conclusions

The risk calculations indicate that site-related environmental contamination posing potential cancer risks and noncancer hazard are related to contaminated groundwater, surface soil, and subsurface soils. The pathways of principal concern are exposure to chlorinated VOCs in groundwater through drinking water ingestion, and inhalation of VOCs in indoor air originating from groundwater. COCs in soil based on calculated risk levels are primarily the metals thallium and vanadium, with chlorinated VOCs limited to subsurface soils in hot spot locations RISB-25 and RISB-64. Nineteen additional chemicals were identified as COCs in soil based on SSL exceedances. Sixteen VOCs along with manganese were identified as COCs in

groundwater based on calculated risks as well as a comparison to drinking water standards.

Section 6

Conclusions

6.1 Summary of Findings and Conclusions

6.1.1 Hydrogeology

The hydrogeologic conditions of the PSC site and resulting contaminant migration and fate characteristics are controlled by four dominant hydrogeologic features. These features are summarized below and conclusions are provided for each feature with regard to contaminant migration/fate and implications to the future FS.

Saprolite

This zone includes all identified potential source areas. As a result, the vadose zone of the saprolite is important to contaminant loading to groundwater in addition to direct contact exposures. In western portions of the site, the water table does not reside in saprolite and the vadose zone extends into the underlying PWR. Based on the MPE tests performed in the western portion of the site, the FS will be required to consider technologies applicable to lower permeability materials for these vadose zone conditions.

VOCs occur in groundwater and in the vadose zone, and extraction well performance in this zone exhibits a relatively small area of groundwater capture. Based on visual observation, well performance tests, and monitor well purging, the saprolite zone is relatively low in transmissivity. Groundwater migrating in the saprolite flows toward Wildcat Creek where it is intercepted by the more permeable stream alluvium. Ultimately, this groundwater discharges to Wildcat Creek from the alluvium. Otherwise, groundwater in the saprolite provides localized recharge to the underlying PWR and bedrock zones.

Alluvium

Source areas were not identified in the alluvium with the exception of the fuel oil area. Because the alluvium is more permeable than the saprolite, and likely more permeable than the PWR and bedrock, this feature exerts a high degree of control over the site hydrogeology. In general, groundwater migrates into the alluvium from saprolite, PWR, and bedrock from the west portion of the site. Once in the alluvium, the contaminant concentrations are diluted by the higher flux of groundwater through the alluvium as compared to the adjacent zones. Groundwater in the alluvium ultimately discharges to Wildcat Creek. However, contaminants may spread throughout the alluvium while migrating in the downstream direction before actually discharging to Wildcat Creek.

Based on the water table surface and bedrock surface mapping, and the results of the aquifer performance testing, it is probable that a significant volume of the groundwater being collected by the existing extraction wells may be derived from the alluvium and Wildcat Creek.

Partially Weathered Rock

The configuration of the PWR zone is highly variable, as indicated in the cross sections presented in Section 4. The hydraulic testing also indicates that the transmissivity of the PWR is highly variable. This is to be expected as the degree of fracturing of the parent rock and nature of the weathered by products of the rock is highly variable. The PWR and regolith represent a common hydrogeologic zone with groundwater migrating within each unimpeded, but at different rates. Groundwater in PWR not migrating into the alluvium at the site will recharge the bedrock. This appears to be the case in the western portions of the site.

Bedrock

Groundwater occurrence and migration in the bedrock is controlled by fractures. Small-scale fractures occurred at many investigation locations while very little fracturing was evident at others. The location of RIMW-22 provides an exception to relatively low fracture density at the site. The relatively thick sequence of PWR and frequent fracturing in the bedrock indicate that this location could supply a large quantity of groundwater to an extraction well as compared to the existing extraction wells that produce about 3 gallons per minute. The lateral extent of this fracture zone was not determined in detail during the RI, but if the fracture zone represents a linear feature across the site, it may allow an opportunity to gain a high degree of hydraulic control. Three wells (RIMW-20, RIMW-21, and RIMW-30) in the vicinity of RIMW-22 also revealed significant fracturing and weathering.

The potentiometric surface mapped for bedrock and observation well responses during the APTs indicate the possibility for two preferential flow zones in the bedrock. One of these flow zones exists in the vicinity of EW-2 and extends northeast into the alluvial deposits at RIPZ-3. A second may also exist in a nearly parallel orientation to the north in the vicinity south of RIMW-22 and leading into the alluvium toward MW-121B. However, the evidence for this feature is not as compelling because the APT results did not provide information in this area. Interceding between these two possible preferential flow zones are several bedrock monitor wells that exhibit very low transmissive conditions (as observed during development and purging). In any case, groundwater in the bedrock horizon migrates into the alluvium deposits and subsequently discharges to Wildcat Creek. However, some bedrock groundwater also appears to migrate underneath Wildcat Creek, as evidenced by the concentrations detected in bedrock well MW-121B across the creek.

6.1.2 Environmental Media Sampling Results

The RI sampling results revealed that VOCs were the compounds most prevalently detected above regulatory screening criteria in soil and groundwater at the site. Three classes of VOCs and their typical degradation products were identified as having the highest concentrations in both soil and groundwater site wide: BTEX, chlorinated ethenes/ethanes, and chlorinated benzenes.

Soil Sampling Results

Surface soil sampling results revealed concentrations exceed the EPA Region 9 PRGs for industrial soil and/or EPA Region 9 SSLs for all three of the VOC classes identified above. The highest concentrations of these compounds were primarily confined to four areas of the site: North Drum Storage Area, Solvent Ditch Area, Incinerator/Drum Repackaging Area, and South Drum Storage Area. Within these areas, the Incinerator Area had the highest concentrations of all three classes of compounds. The South Drum Storage Area had the lowest average concentrations in surface soil.

Subsurface soil sampling results revealed that concentrations also exceed industrial soil PRGs and/or SSLs in the subsurface of the four identified areas. The detected concentrations were generally higher than surface soil in all four areas, and in some cases, exceeded surface soil detections by ten times. Subsurface samples also contained detections of the three VOC classes below the water table in each area.

The presence of several VOCs above SSLs in each soil focus area indicates that ongoing sources of groundwater contamination may exist in these areas. These potential sources are likely isolated to portions of each area. The potential sources and their extent will be evaluated further in the FS.

Groundwater Sampling Results

The groundwater sampling results for the RI are consistent with the observed soil sampling results. In the areas with the highest concentrations of VOCs in soil, groundwater concentrations were comparably high. Two additional areas of concern exist for groundwater: the former Burn Pit Area and the Fuel Oil Area. Soil concentrations may not be as high in these areas because soil excavation was previously performed in the burn pit area and because the fuel oil product is in the subsurface. The fuel oil product is associated with a former underground leak, meaning that the oil did not have to migrate through a large depth of soil to reach the groundwater.

Regolith groundwater concentrations are highest in the Solvent Area for BTEX and chlorinated ethenes and ethanes. Concentrations are above EPA MCLs throughout a large part of the site from the warehouse to Wildcat Creek, although no constituents were detected in regolith groundwater on the other side of the creek. Chlorinated benzenes are highest in the Incinerator Area, and this plume is not as large as that for the other two VOC classes.

Bedrock groundwater concentrations for BTEX and chlorinated benzenes are highest in the Solvent Ditch area, but the plume size is smaller than in regolith. The chlorinated ethene and ethane concentrations are also highest in the Solvent Ditch area, but concentrations are also high in the Burn Pit area. Chlorinated ethene/ethane concentrations appear from the west boundary of the site to Wildcat Creek, and concentrations were detected above MCLs in one well across the creek.

Groundwater concentrations are likely to be from the primary areas of concern identified for soil, and it is believed that there are plumes originating from the Solvent Ditch area, Drum Management Area, Incinerator Area, North Drum Storage Area (although co-mingled with the Solvent Ditch area), Burn Pit Area, and Fuel Oil Area. The only soil area of concern that does not correspond to higher concentrations in groundwater is the South Drum Storage Area.

Sediment and Surface Soil (Across Wildcat Creek) Sampling Results

Sediment sample results from Wildcat Creek and Fishing Creek, and surface soil sample results from across Wildcat Creek, revealed that although some compounds were detected above laboratory quantitation limits, the results were either below regulatory criteria or were consistent with concentrations detected in the background samples. In addition, compounds detected were not consistent with compounds identified to be constituents of concern in the industrial portion of the PSC site.

6.1.3 Hydraulic Analysis Results

The results from the hydraulic analysis indicate that the radius of influence for extraction is less than 200 feet in bedrock at EW-3 but is greater than 200 feet in PWR at EW-2. In the southern extraction well (EW-2), there appears to be good communication between the regolith and bedrock zones. The northern extraction well (EW-3) appears to have direct hydraulic communication with the regolith also, even though it is screened in bedrock.

Sustainable pumping rates for the extraction wells are fairly low, at around 3 gallons per minute for both the bedrock and PWR wells. Based on potentiometric surface maps, the extraction wells do not appear to have significant impact on the overall potentiometric surfaces of either regolith or bedrock.

6.1.4 Human Health Risk Assessment

The risk calculations indicate that site-related environmental contamination posing potential cancer risks and noncancer hazard are related to contaminated groundwater, surface soil, and subsurface soils. The pathways of principal concern are exposure to chlorinated VOCs in groundwater through drinking water ingestion, and inhalation of VOCs in indoor air originating from groundwater. The final COCs in soil related to potential human exposure risks are primarily metals (thallium and vanadium), with chlorinated VOCs limited to subsurface soils in hot spot locations RISB-25 and RISB-64. However, 19 additional chemicals were identified as COCs for soil based on SSL exceedances. These compounds are present in soil at concentrations that could act as an ongoing source of groundwater contamination. Sixteen VOCs along with manganese were identified as COCs in groundwater based on calculated risks as well as a comparison to drinking water standards.

6.2 Recommendations for Further Action

The results from the RI will be used to develop remedial alternatives for surface soil, subsurface soil, and groundwater in the FS. Details regarding the evaluation of remedial alternatives based on the RI results will be presented in the FS.

Section 7

References

CDM, 2004. *Summary Report – Initial Site Investigation*. Atlanta, GA. October 2004.

CDM, 2006a. *Quality Assurance Project Plan – PSC Site, Rock Hill, SC*. Atlanta, GA. May 2006.

CDM, 2006b. *Field Sampling Plan – PSC Site, Rock Hill, SC*. Atlanta, GA. May 2006.

CDM, 2006c. *Phase I Technical Memorandum and Phase II Work Plan*. Atlanta, GA. October 2006.

CDM, 2007. *Interim Report – Phase II Sampling Results and Hydrogeologic Findings*. Atlanta, GA. May 2007.

Cleveland, T.G., *Type-Curve Matching Using a Computer Spreadsheet*. 2006. *Ground Water*. Vol. 24, No. 2. pp. 554-562.

Code of Federal Regulations. *National Oil and Hazardous Substances Pollution Contingency Plan*. 40 CFR Part 300.

EPA 1989. United States Environmental Protection Agency. *Risk Assessment Guidance for Superfund (RAGS): Human Health Evaluation Manual Part A*. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington DC. EPA/540/1-89/002. OSWER Directive 9285.701A. NTIS PB90-155581.

EPA 1991. *RAGS Volume I: Human Health Evaluation Manual Supplemental Guidance. Standard Default Exposure Factors*. Office of Solid Waste and Emergency Response Directive 9285.6-03. March 25, 1991.

EPA 1992. *Supplemental Guidance to RAGS; Calculation of the Concentration Term*. Office of Solid Waste and Emergency Response.

EPA 1997a. *Exposure Factors Handbook, Volumes I, II, and III*. Office of Research and Development. EPA/600/P-95/002Fa, -002Fb, and 002Fc.

EPA 1997b. *Health Effects Assessment Summary Tables. FY 1997 Update*. Office of Solid Waste and Emergency Response. EPA-540-R-97-036. July.

EPA, 2001. *Risk Assessment Guidance for Superfund*. Office of Solid Waste and Emergency Response, Washington, D.C. December 2001.

EPA 2002. *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites*. Office of Emergency and Remedial Response. OSWER 9355.4-24. December.

EPA 2004a. *Risk Assessment Guidance For Superfund: Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim*. Office of Emergency and Remedial Response. OSWER 9285.7-02EP. EPA/540/R/99/005. September.

EPA 2004b. Region 9 Preliminary Remediation Goals. Accessed via the INTERNET: <http://www.epa.gov/region09/waste/sfund/prg/index.htm>

EPA 2004c. *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings*. Prepared by Environmental Quality Management, Inc. February.

EPA 2005a. *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens*. Risk Assessment Forum, U.S. Environmental Protection Agency. EPA/630/R-03/003F. March.

EPA 2005b. *Guidelines for Carcinogen Risk Assessment*. Final. NCEA. F-0644A. March.

EPA 2007a. *Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment (Interim Guidance)*. Waste Management Division, Office of Health Assessment.

EPA 2007b. ProUCL Version 4.0. A Statistical Software. National Exposure Research Labs, EPA, Las Vegas Nevada.

EPA 2007c. Integrated Risk Information System (IRIS). Accessed via the INTERNET: <http://www.epa.gov/iris>.

EPA 2007d. EPA-NCEA: USEPA Region III Provisional Peer Reviewed Toxicity Values for Superfund (PPRTV).

Kruseman, G.P, de Ridder, N.A., *Analysis and Evaluation of Pumping Test Data*. International Institute for Land Reclamation and Improvement (ILRI). 1991.

Philip Services Corp. *Petro-Chem SC SCD 044 442 333 RCRA Facility Investigation Part 1 Report*. Columbia, IL. August 23, 1999.

Figures

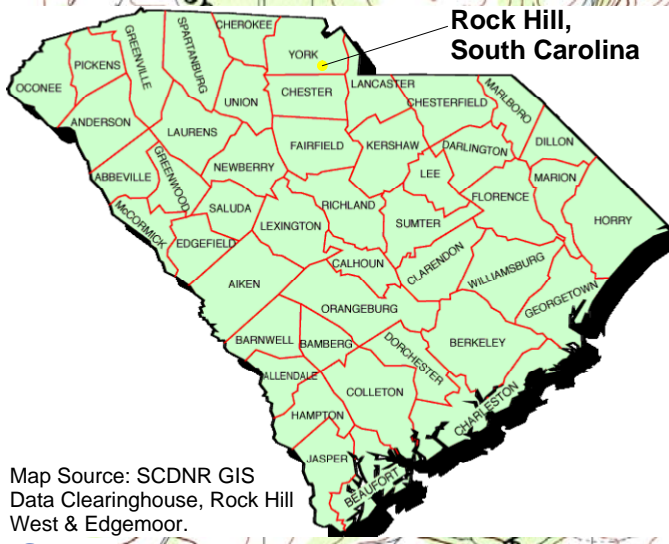
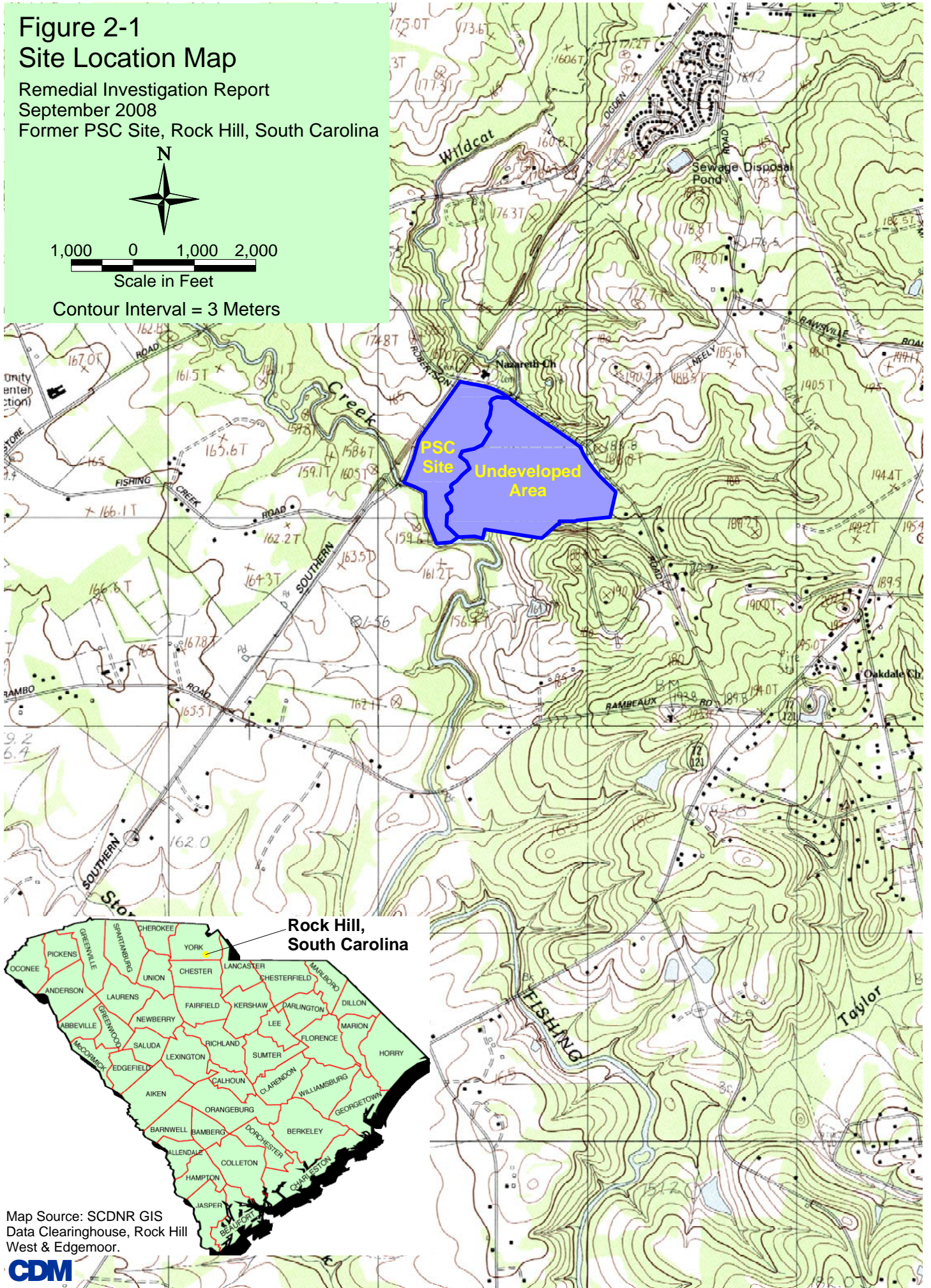
Figure 2-1 Site Location Map

Remedial Investigation Report
September 2008
Former PSC Site, Rock Hill, South Carolina



1,000 0 1,000 2,000
Scale in Feet

Contour Interval = 3 Meters










Rock Hill,
South Carolina

Map Source: SCDNR GIS
Data Clearinghouse, Rock Hill
West & Edgemoor.



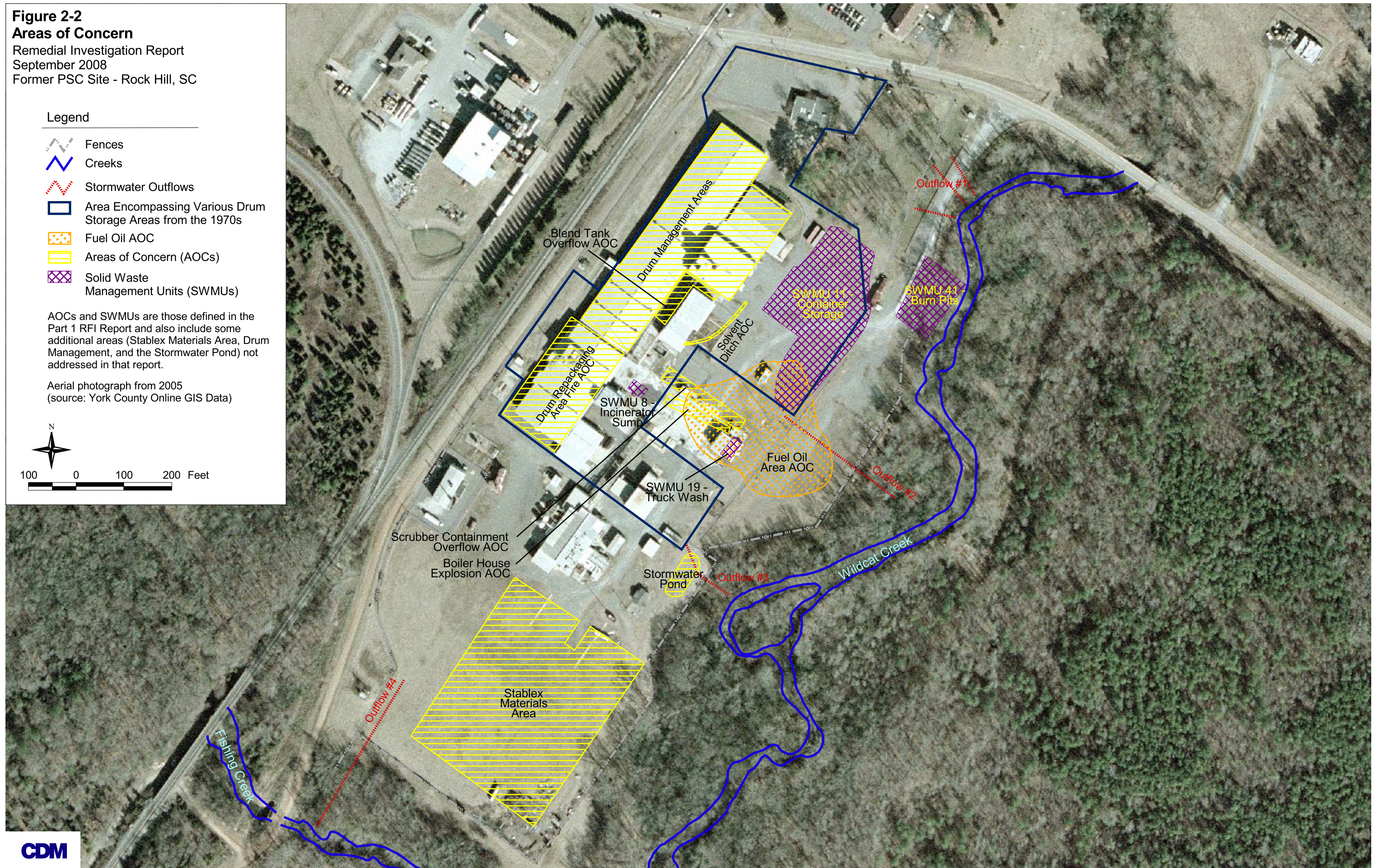
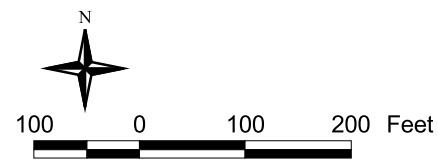
Figure 2-2
Areas of Concern
 Remedial Investigation Report
 September 2008
 Former PSC Site - Rock Hill, SC

Legend

-  Fences
-  Creeks
-  Stormwater Outflows
-  Area Encompassing Various Drum Storage Areas from the 1970s
-  Fuel Oil AOC
-  Areas of Concern (AOCs)
-  Solid Waste Management Units (SWMUs)

AOCs and SWMUs are those defined in the Part 1 RFI Report and also include some additional areas (Stablex Materials Area, Drum Management, and the Stormwater Pond) not addressed in that report.

Aerial photograph from 2005
 (source: York County Online GIS Data)



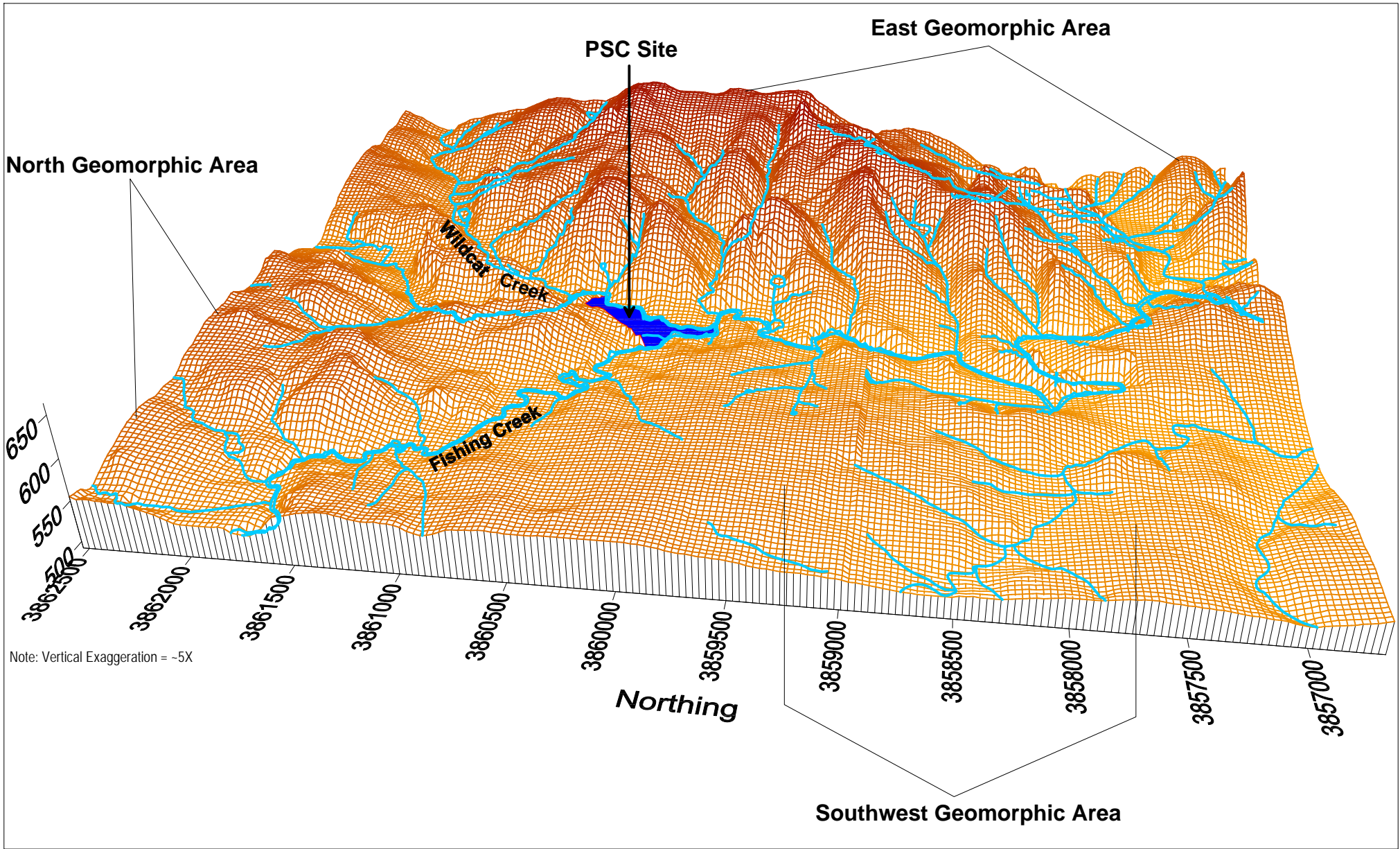


Figure 2-3
Regional Geomorphology



Figure 2-4
1979 USGS Aerial Photograph



Figure 2-5
1984 USGS Aerial Photograph



Figure 2-6
1989 USGS Aerial Photograph

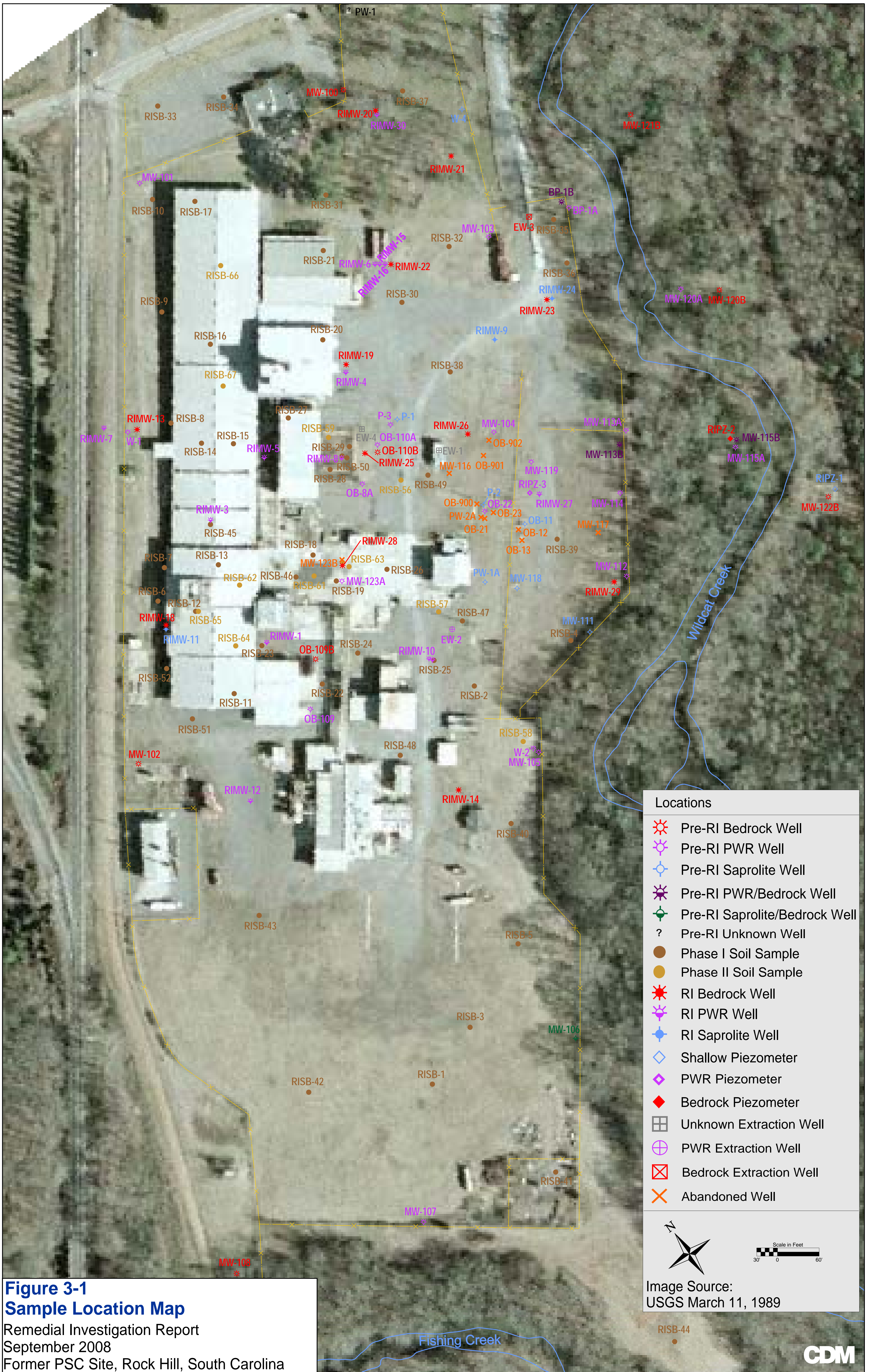


Figure 3-1
Sample Location Map
 Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, South Carolina

Locations

- Pre-RI Bedrock Well
- Pre-RI PWR Well
- Pre-RI Saprolite Well
- Pre-RI PWR/Bedrock Well
- Pre-RI Saprolite/Bedrock Well
- Pre-RI Unknown Well
- Phase I Soil Sample
- Phase II Soil Sample
- RI Bedrock Well
- RI PWR Well
- RI Saprolite Well
- Shallow Piezometer
- PWR Piezometer
- Bedrock Piezometer
- Unknown Extraction Well
- PWR Extraction Well
- Bedrock Extraction Well
- Abandoned Well

Image Source:
 USGS March 11, 1989



**Figure 3-2
Phase I Sample Location Map**

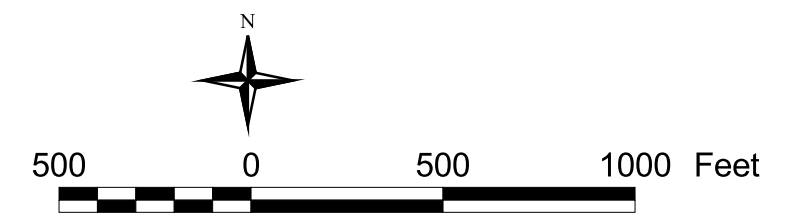
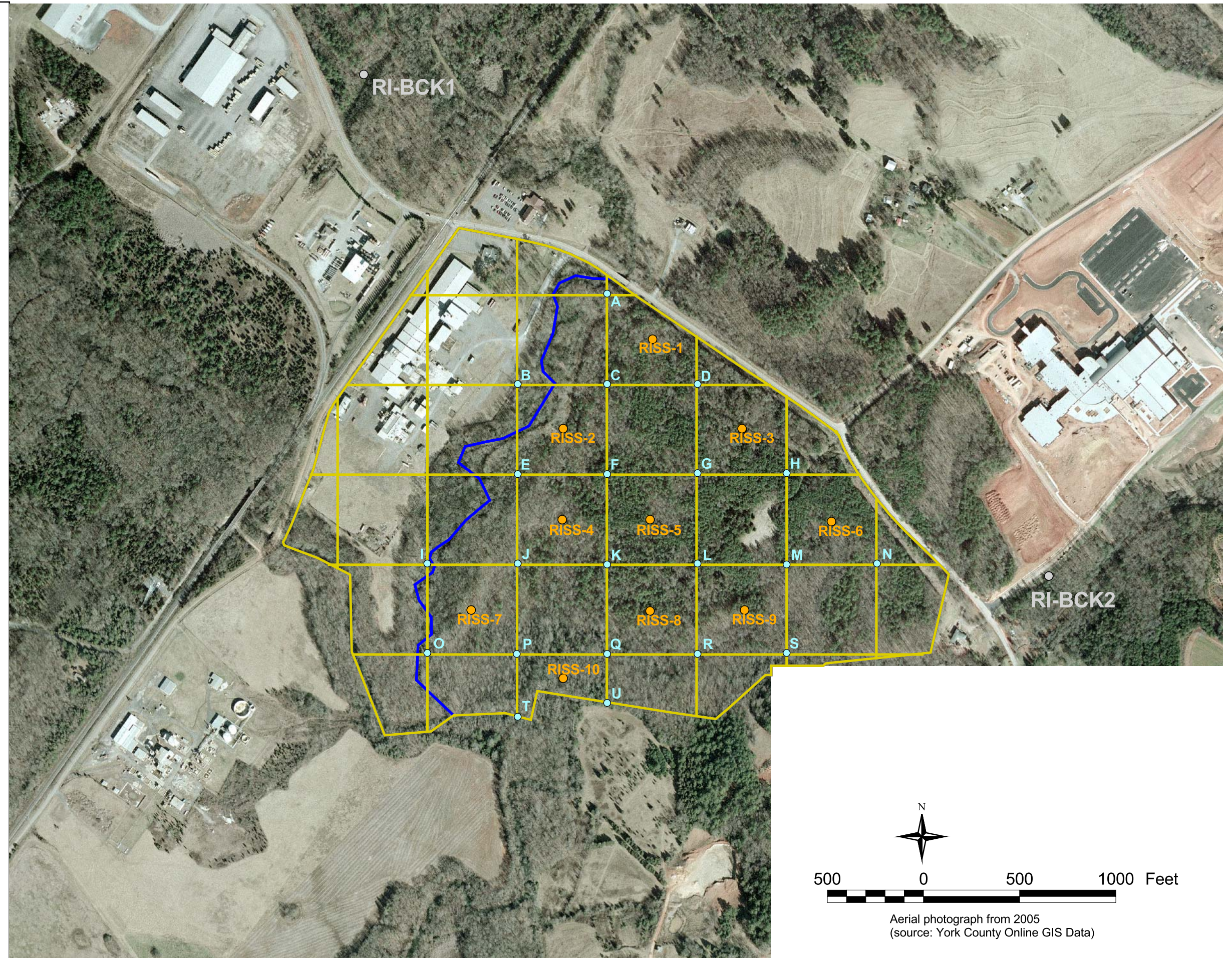
**Figure 3-3
Phase I Sampling Locations
in Undeveloped Area and
Background Sample Locations**

Remedial Investigation Report
September 2008
Former PSC Site,
Rock Hill, South Carolina

Legend

- Background Soil Sample
- Surface Soil Sample Location
(3-point composite across
associated 5-acre grid)
- Coordinate Identification Point
- 5-Acre Grid
- ~ Wildcat Creek Boundary

| ID | Latitude | Longitude |
|----|-----------|------------|
| A | 34.889307 | -81.069522 |
| B | 34.888018 | -81.071070 |
| C | 34.888018 | -81.069522 |
| D | 34.888018 | -81.067956 |
| E | 34.886730 | -81.071070 |
| F | 34.886730 | -81.069522 |
| G | 34.886730 | -81.067956 |
| H | 34.886730 | -81.066405 |
| I | 34.885450 | -81.072633 |
| J | 34.885450 | -81.071070 |
| K | 34.885450 | -81.069522 |
| L | 34.885450 | -81.067956 |
| M | 34.885450 | -81.066405 |
| N | 34.885450 | -81.064840 |
| O | 34.884163 | -81.072633 |
| P | 34.884163 | -81.071070 |
| Q | 34.884163 | -81.069522 |
| R | 34.884163 | -81.067956 |
| S | 34.884163 | -81.066405 |
| T | 34.883262 | -81.071070 |
| U | 34.883459 | -81.069522 |



Aerial photograph from 2005
(source: York County Online GIS Data)

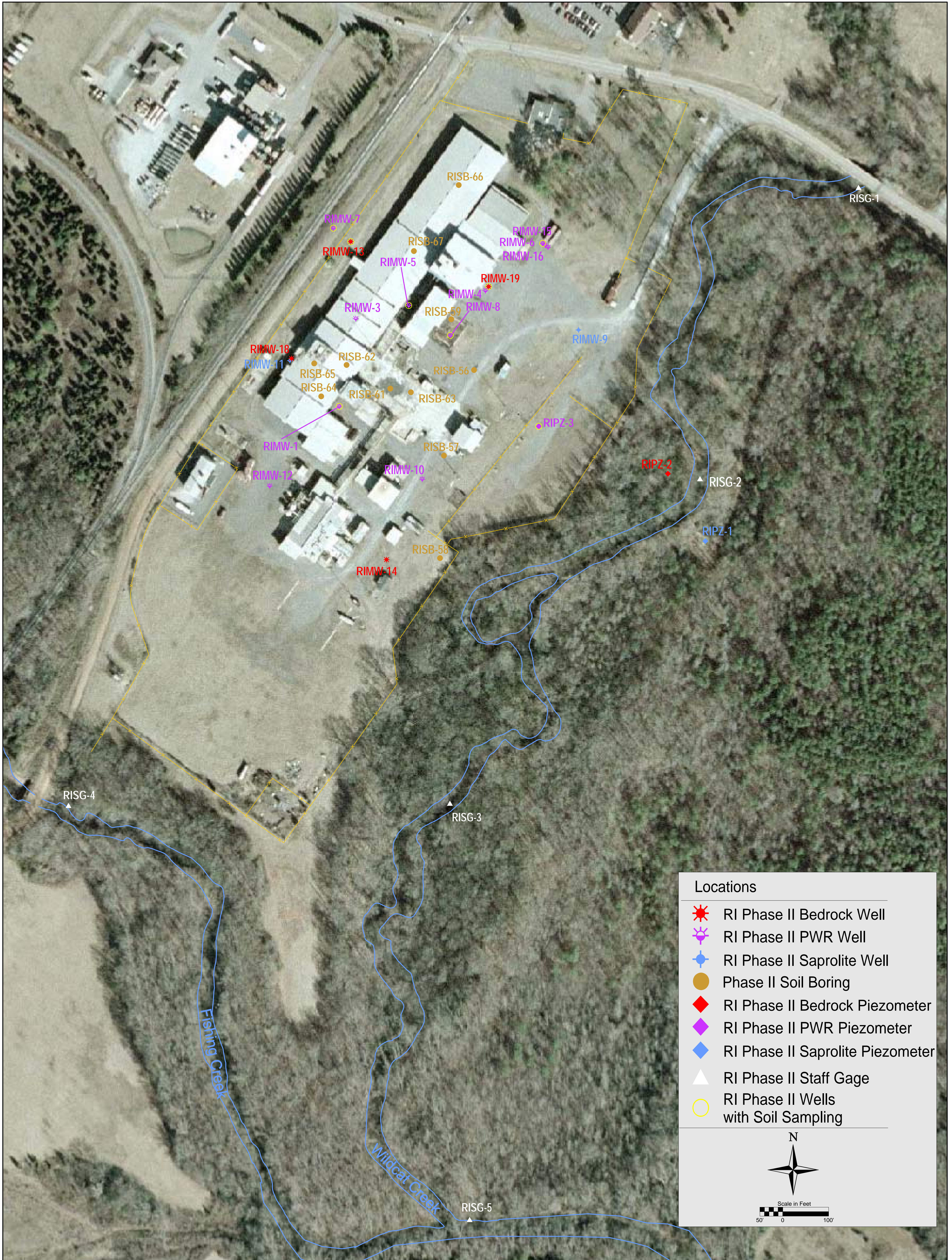
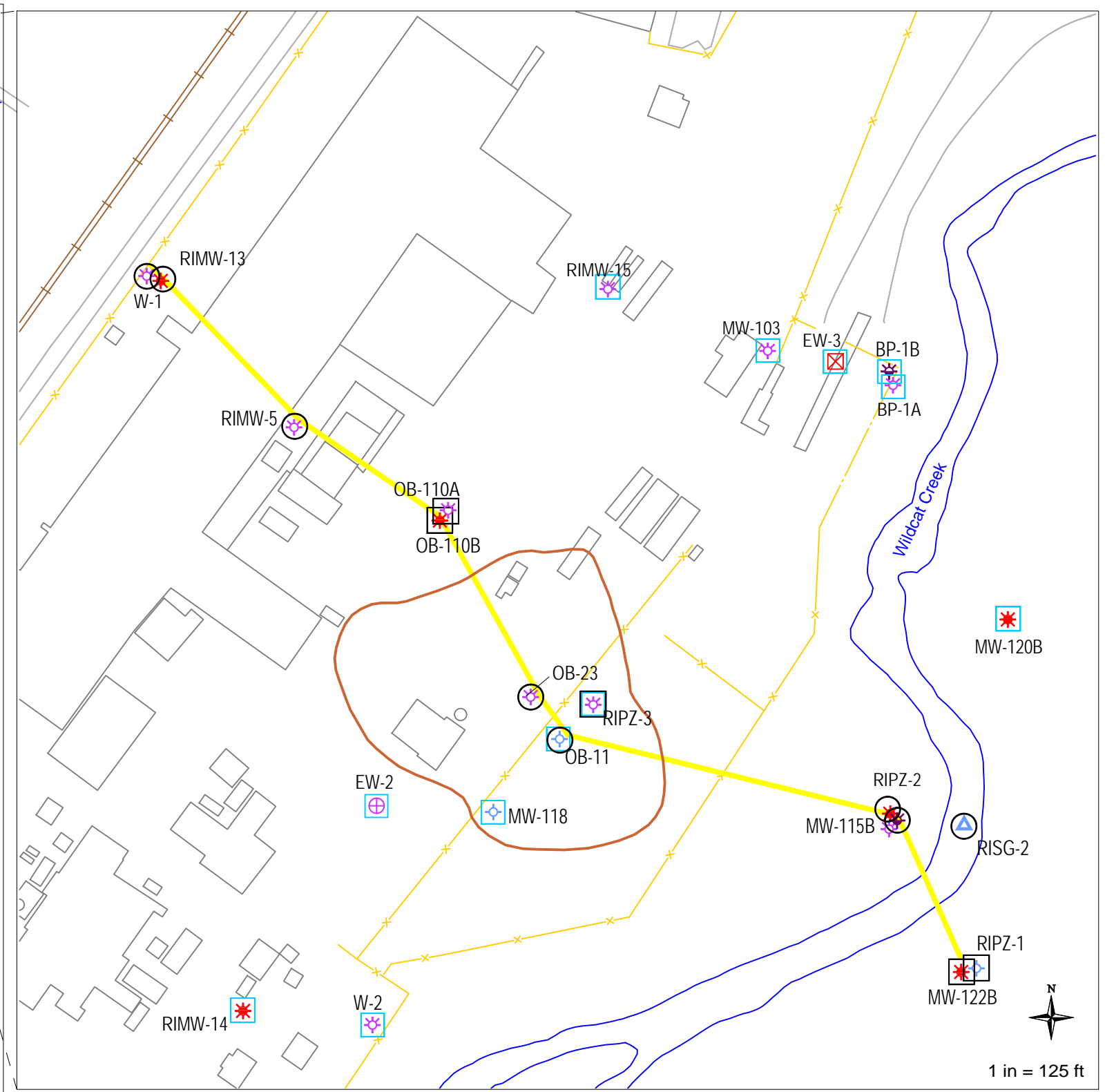
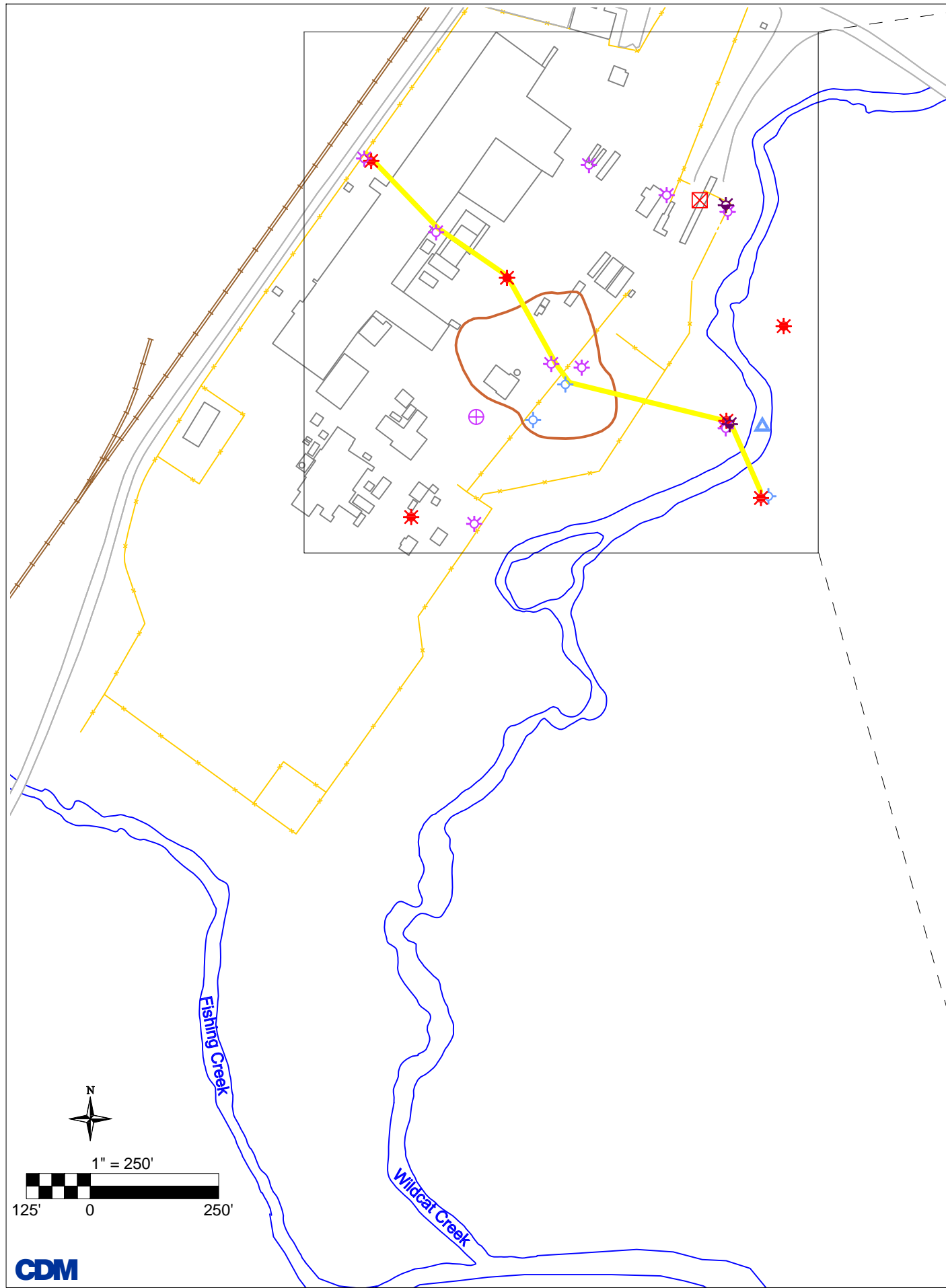


Figure 3-4
Phase II Sample Location Map



Legend

| Monitor Wells / Extraction Wells / Stream Gages | | Hydraulic Analysis Monitoring Details | |
|-------------------------------------------------|-------------------------|---------------------------------------|-------------------------------------------------------|
| | Bedrock Well | | Manual Water Levels - Aquifer Equilibration |
| | PWR/Bedrock Well | | Water Level Recorder - Aquifer Equilibration |
| | PWR Well | | Water Level Recorder - Aquifer Performance Test (APT) |
| | Regolith Well | | Hydraulic Evaluation Profile |
| | Stream Gage | | Approximate Fuel Oil Area |
| | Bedrock Extraction Well | | Manual Water Levels - Aquifer Equilibration |
| | PWR Extraction Well | | Water Level Recorder - Aquifer Equilibration |

**Figure 3-5
Hydraulic
Evaluation Monitoring**
Remedial Investigation Report
September 2008
PSC Site - Rock Hill, South Carolina

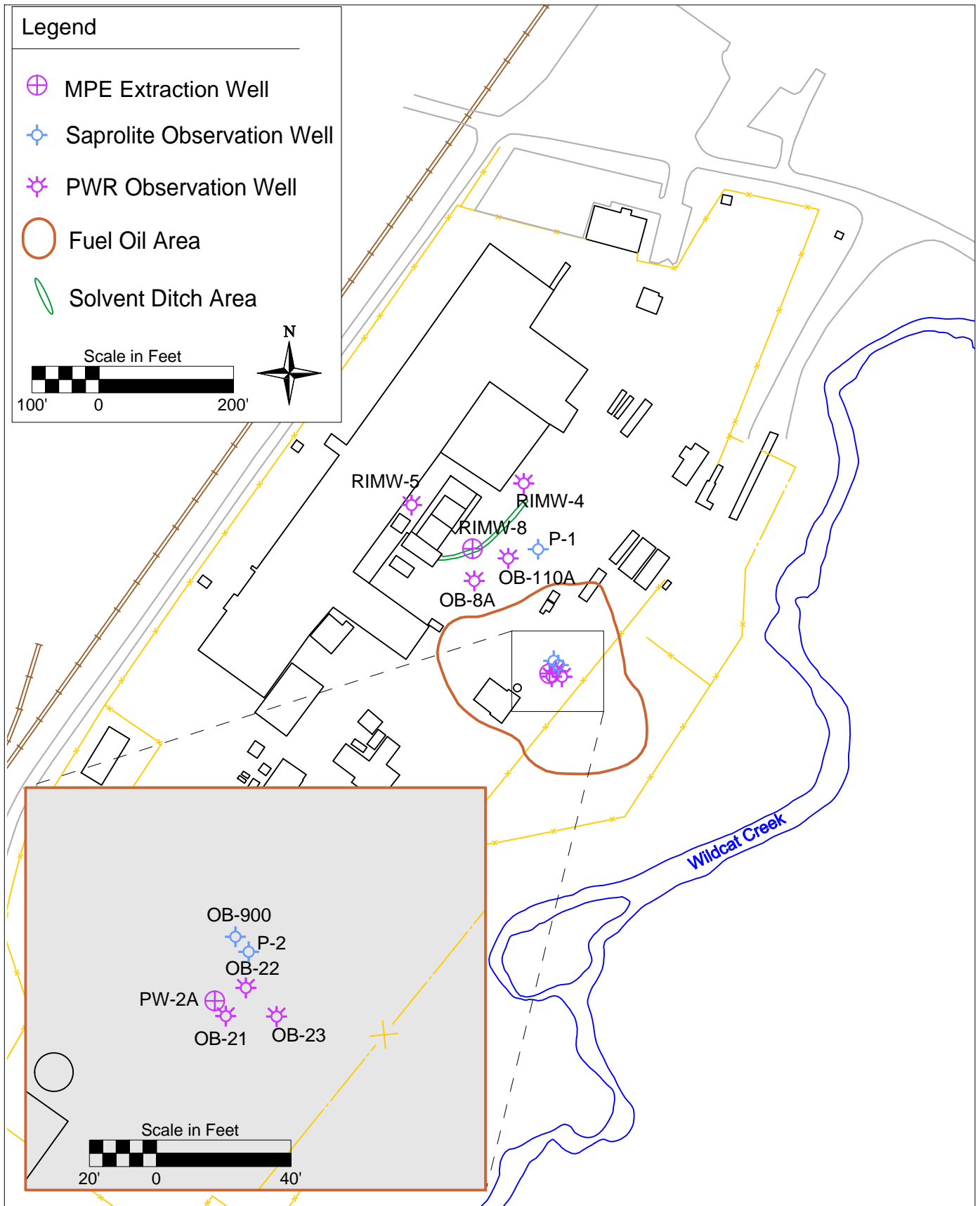


Figure 3-6
MPE Pilot Study Locations

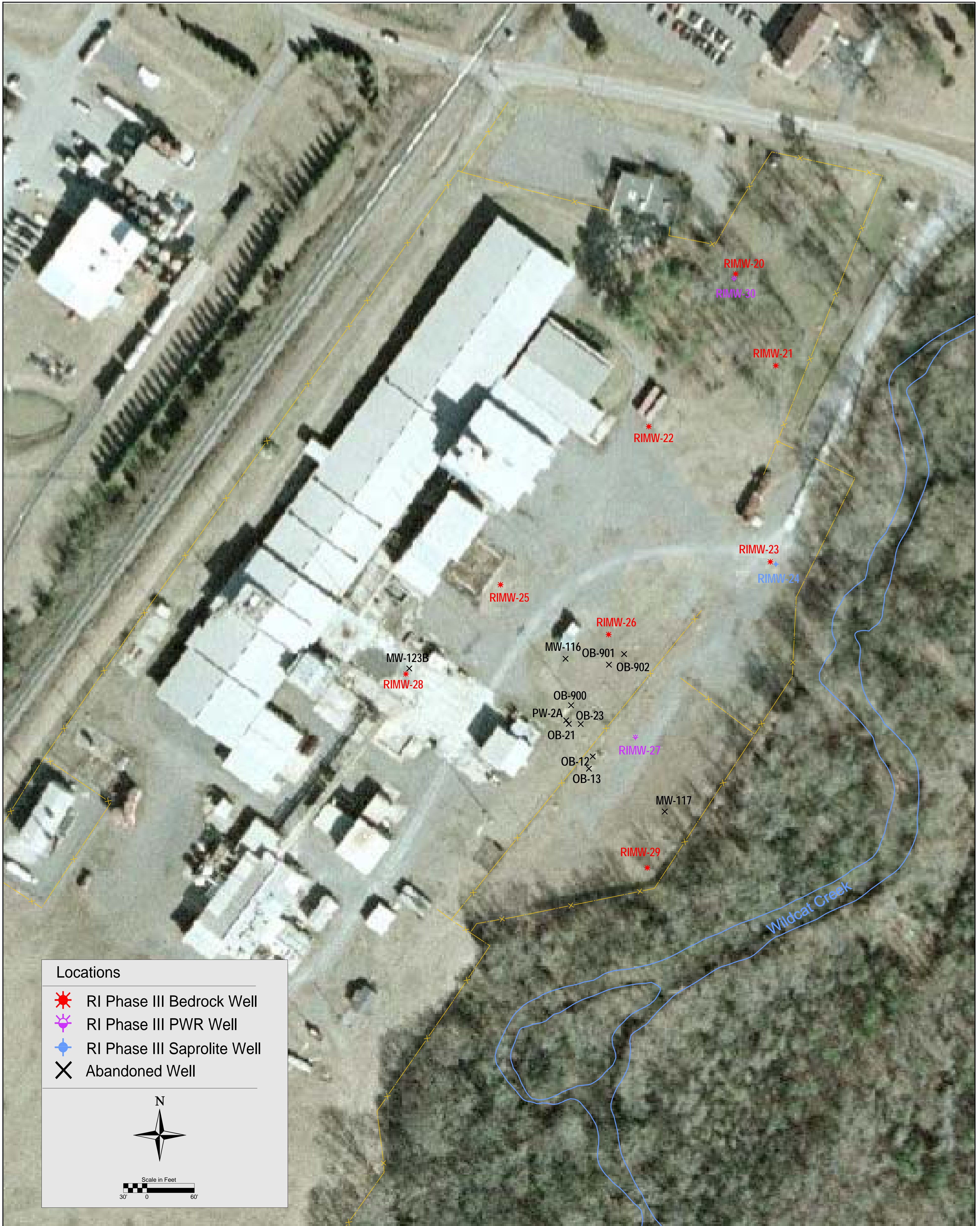


Figure 3-7
Phase III Well Installation Locations

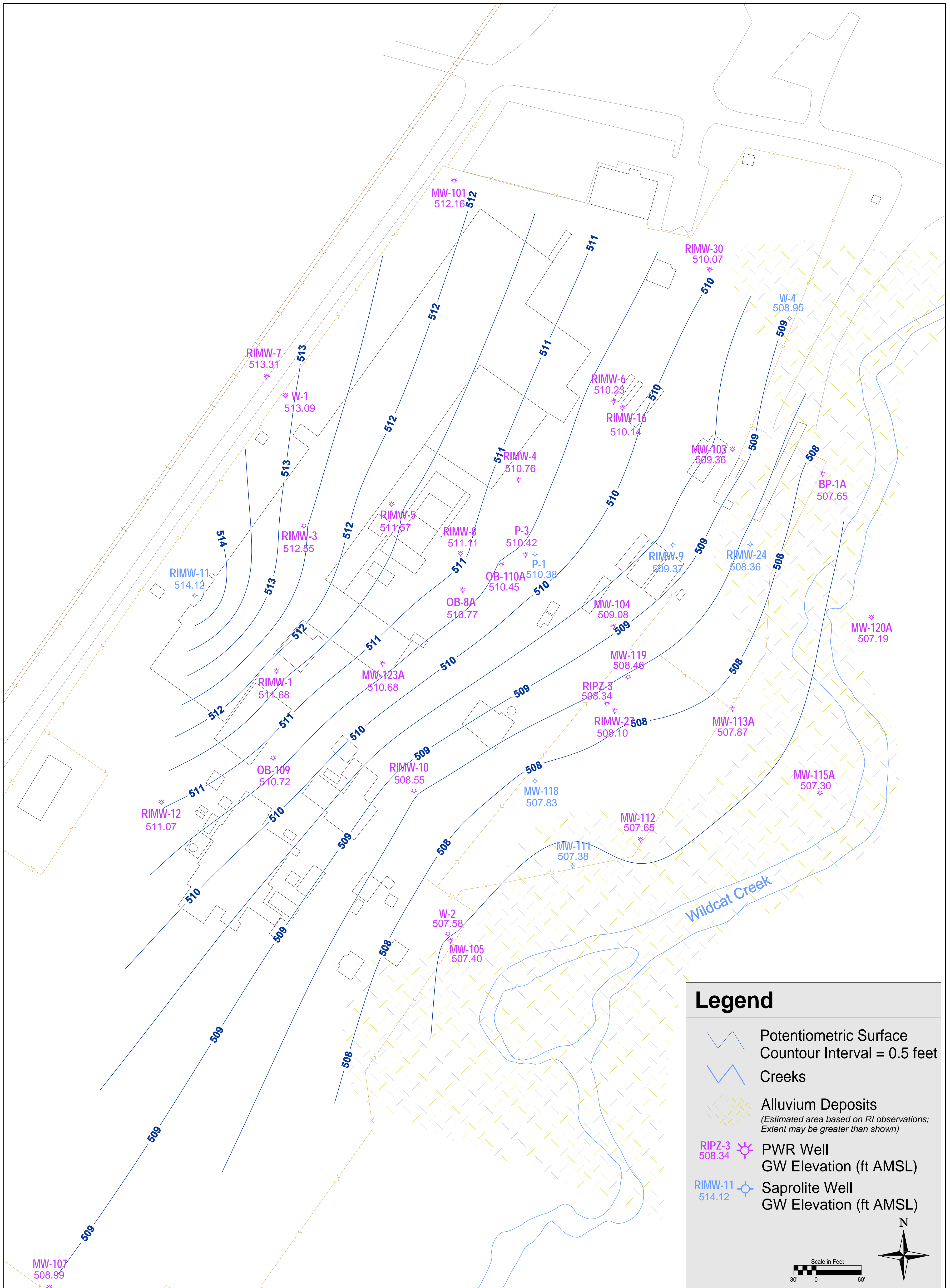


Figure 4-1
Regolith Potentiometric Surface Map

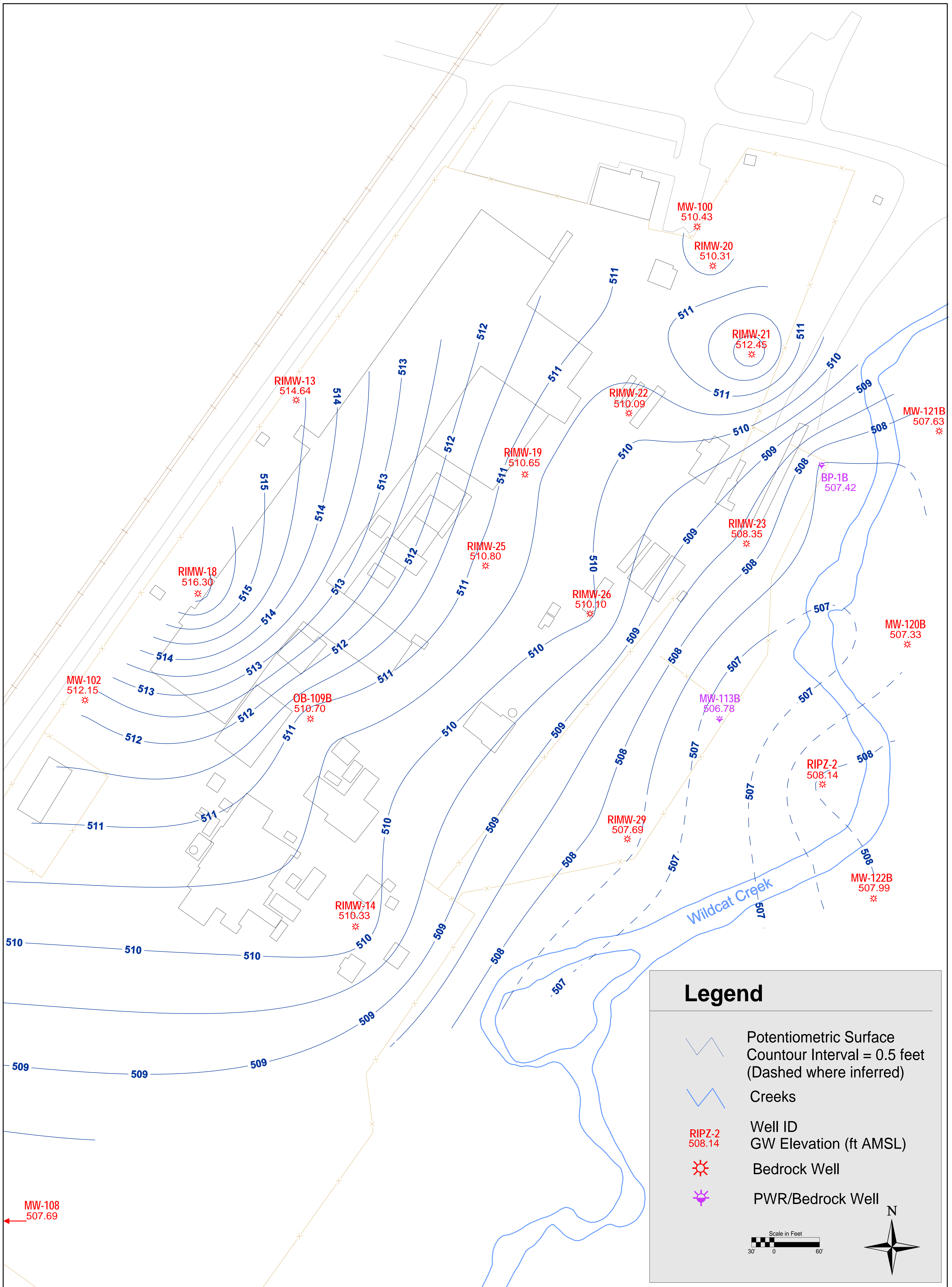


Figure 4-2
Bedrock Potentiometric Surface Map

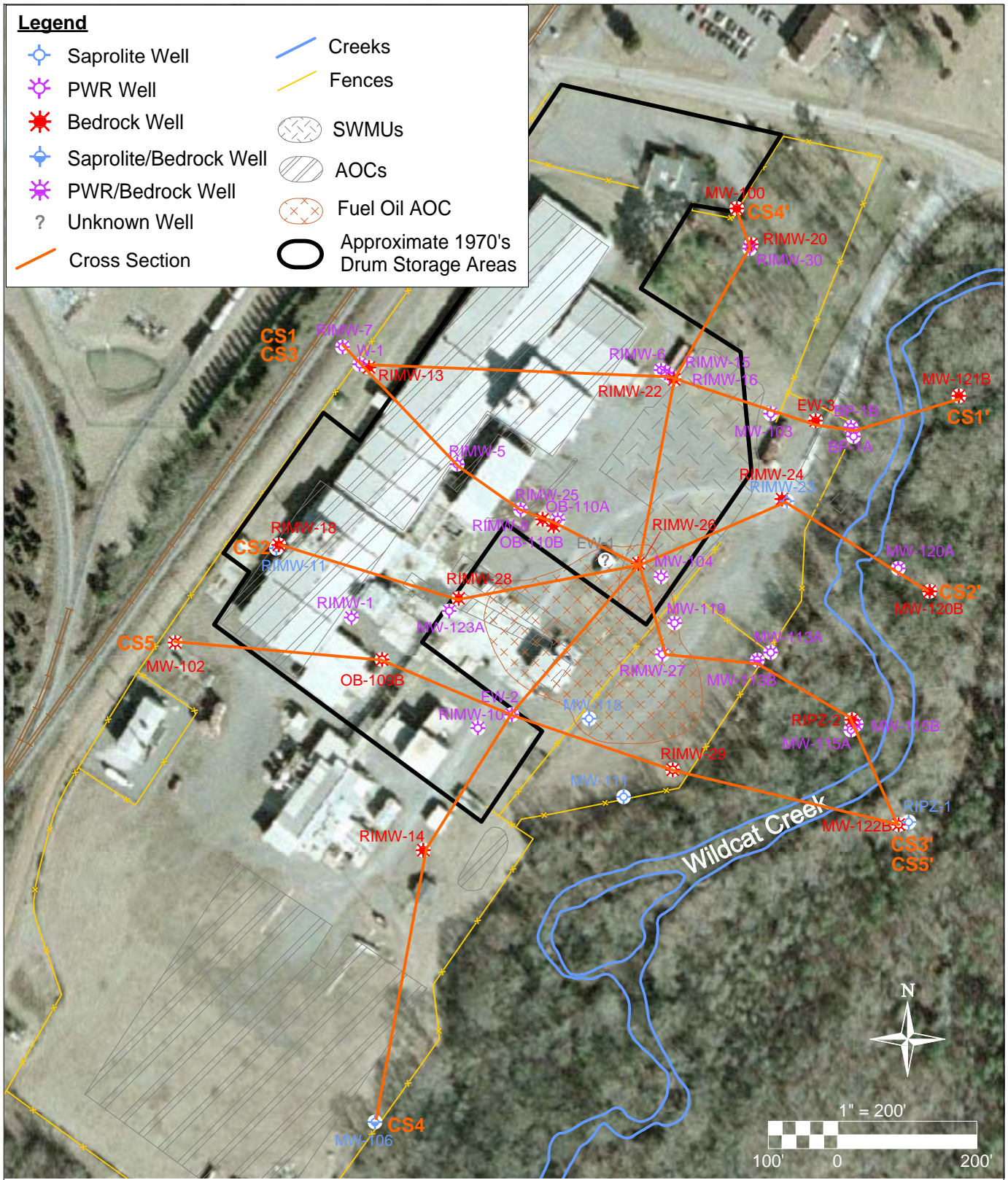
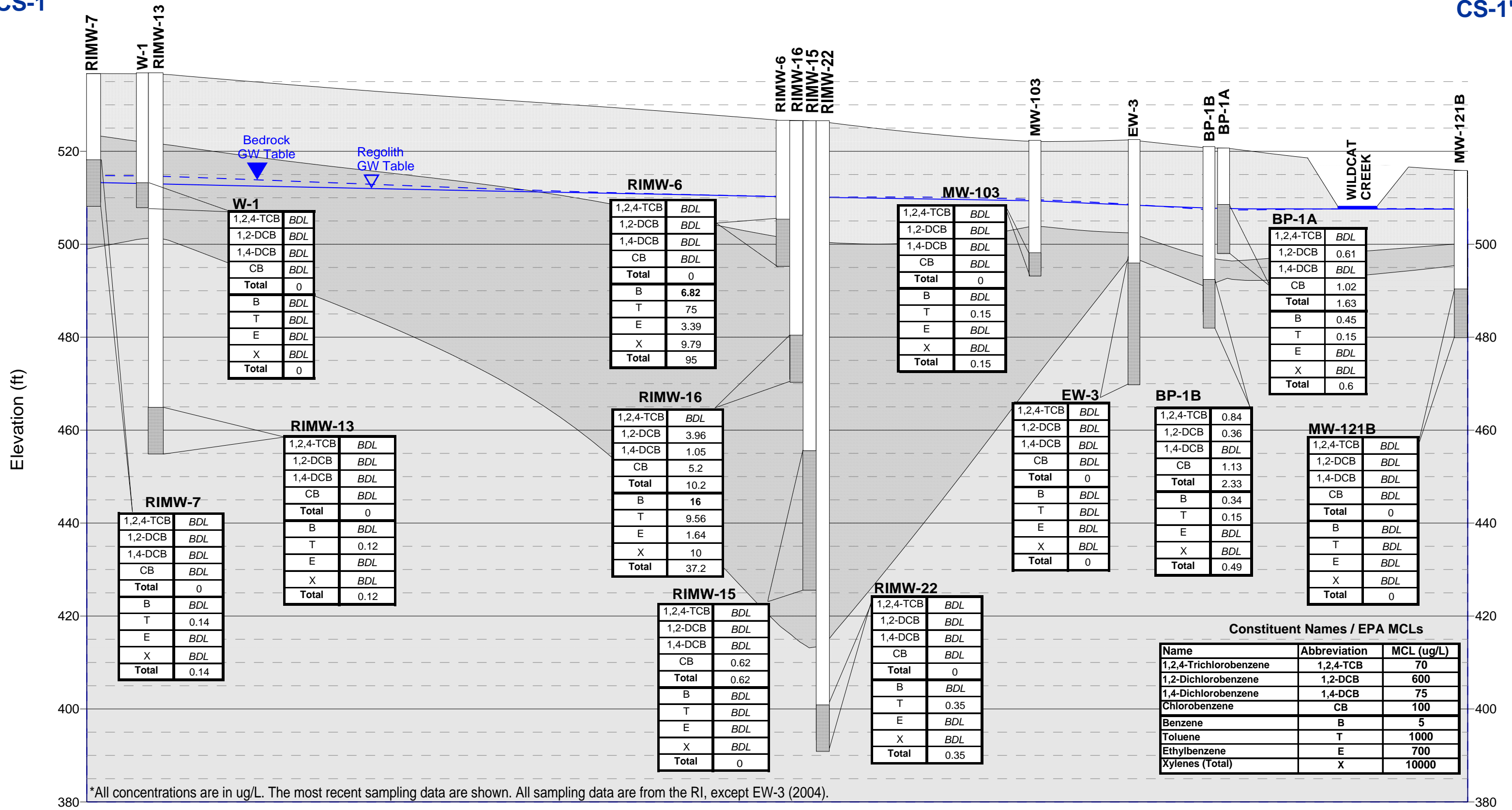
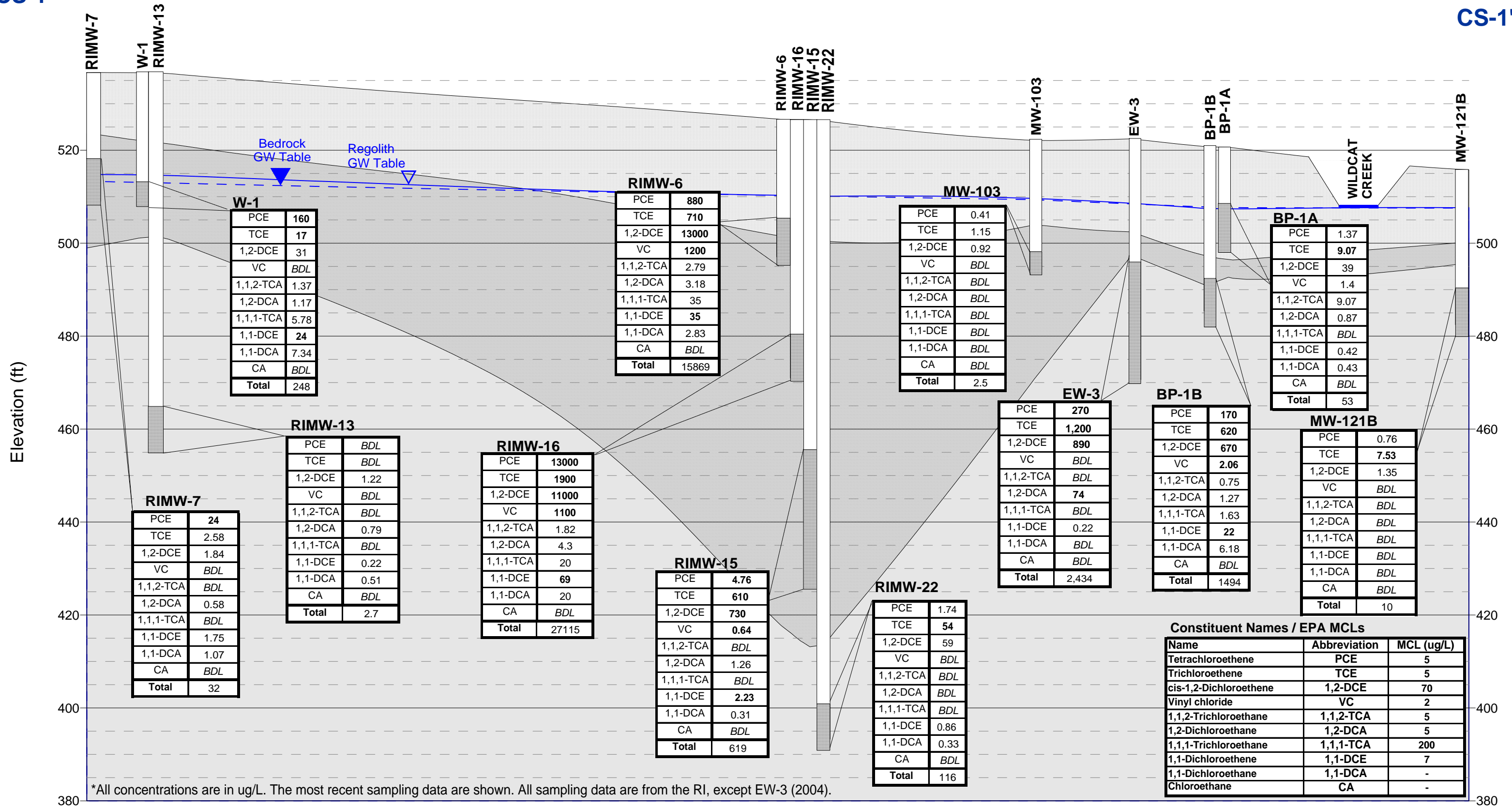
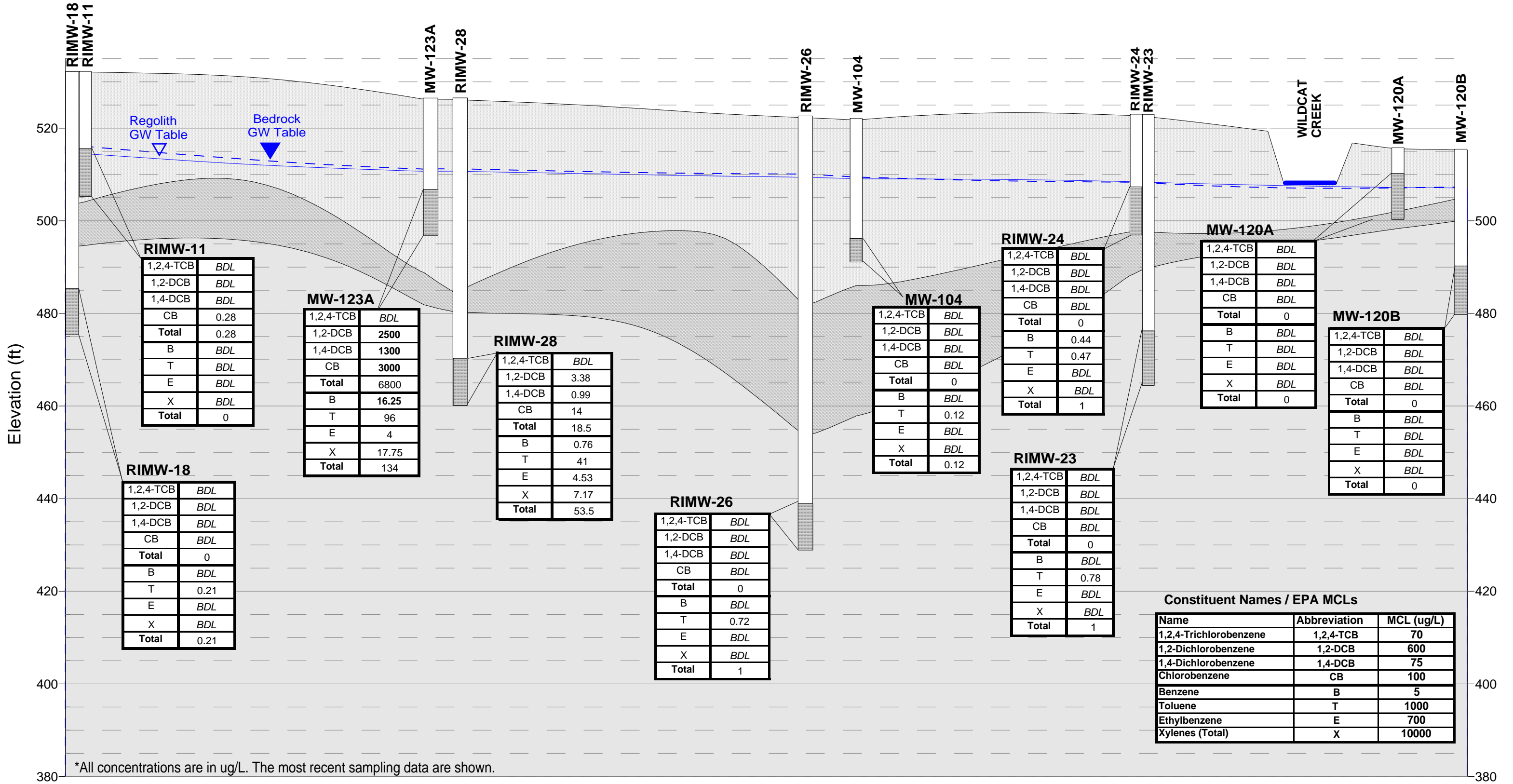


Figure 4-3
Cross Section Location Map
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

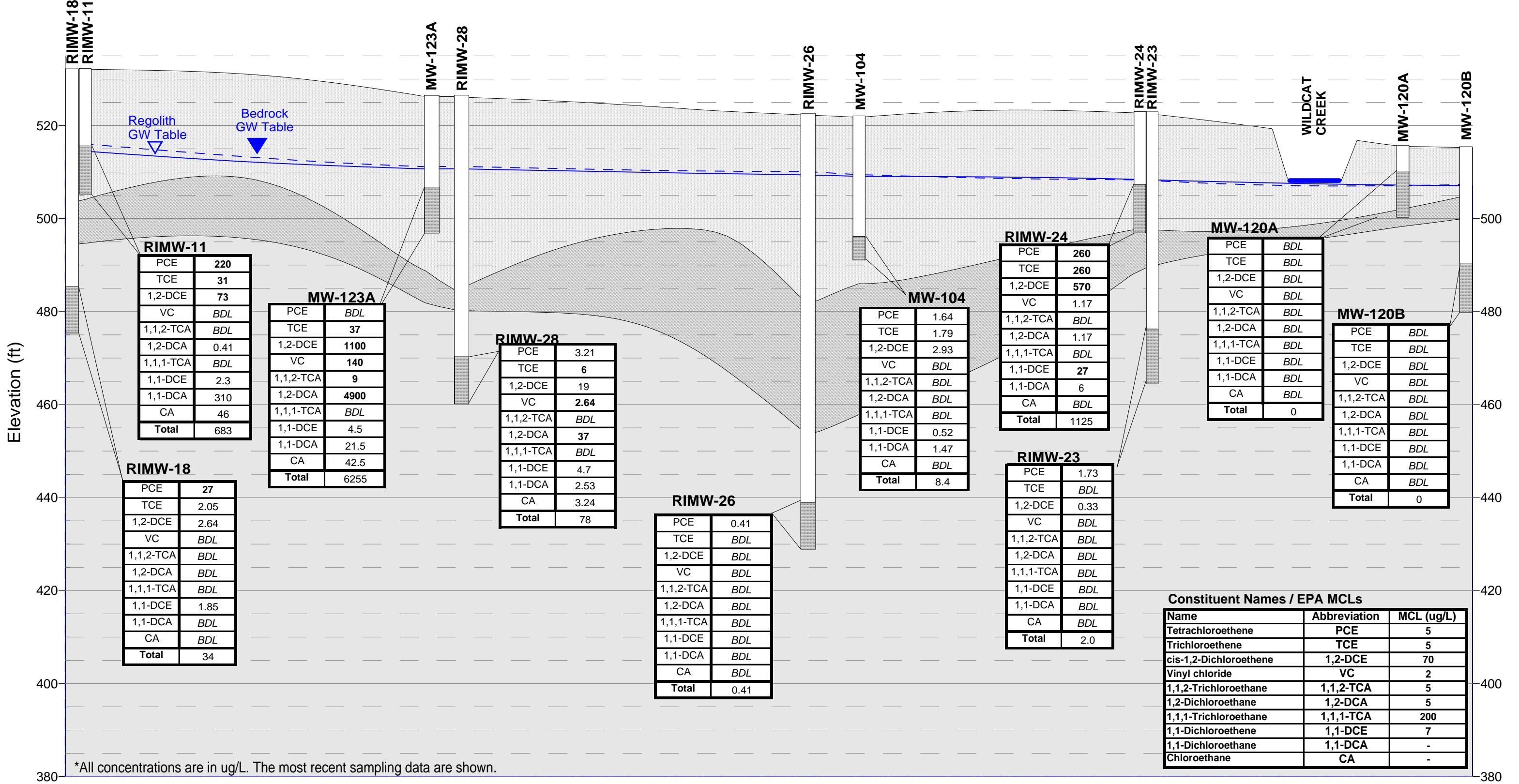




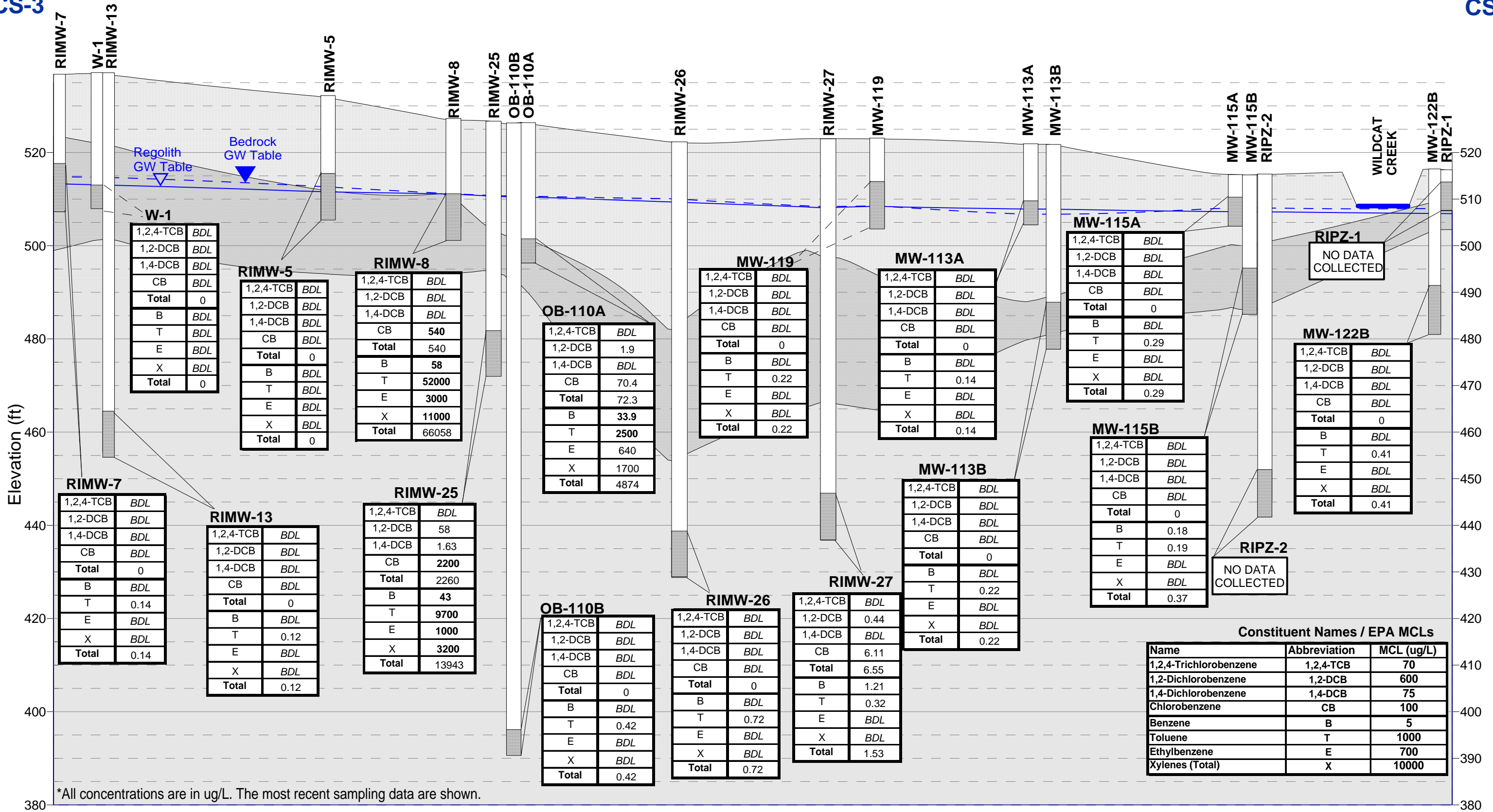
- Saprolite
- Partially Weathered Rock (PWR)
- Bedrock



- Saprolite
- Partially Weathered Rock (PWR)
- Bedrock

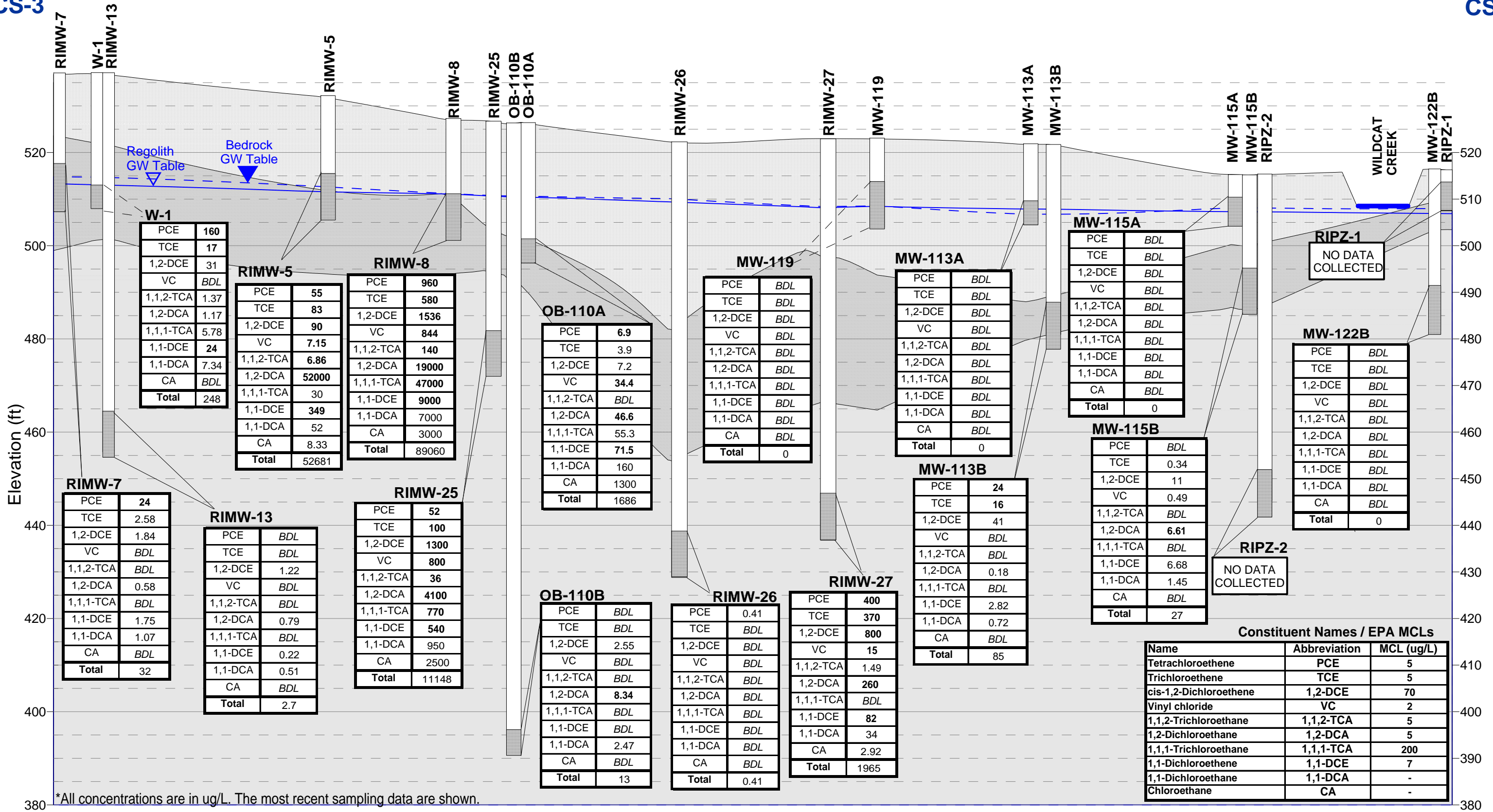


- Saprolite
- Partially Weathered Rock (PWR)
- Bedrock



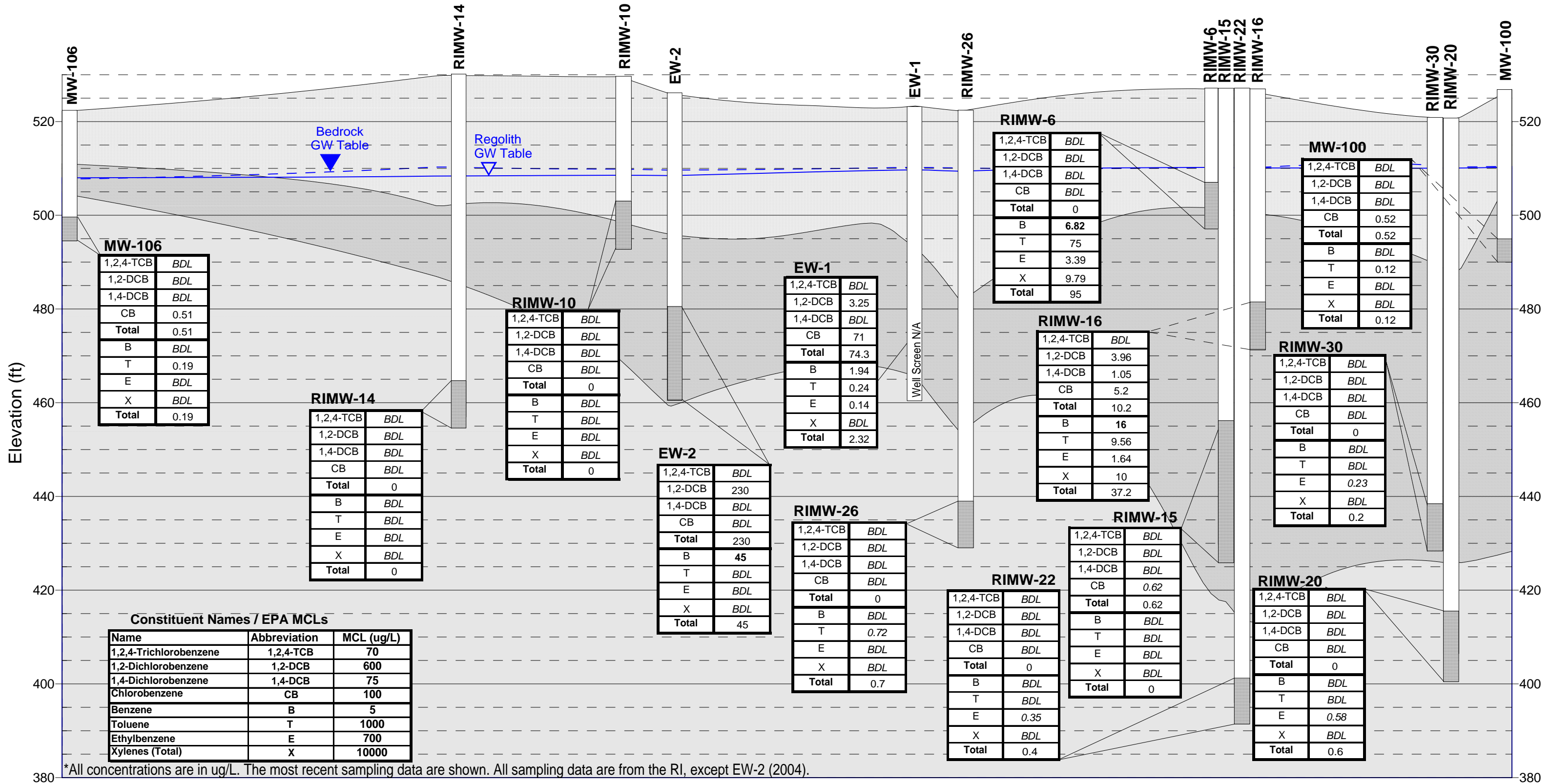
*All concentrations are in ug/L. The most recent sampling data are shown.

- Saprolite
- Partially Weathered Rock (PWR)
- Bedrock



*All concentrations are in ug/L. The most recent sampling data are shown.

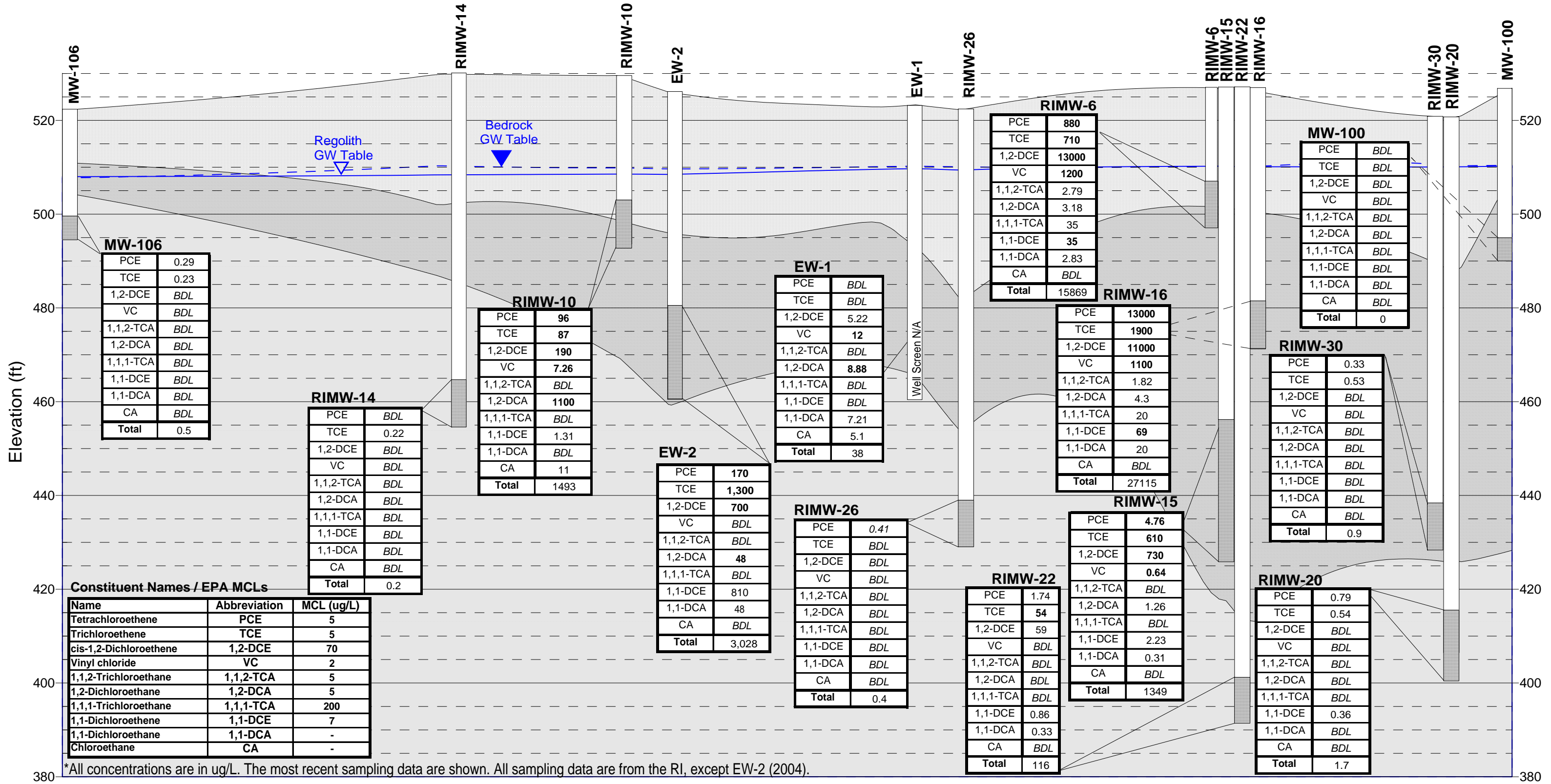
Figure 4-9
Cross Section 3
Chlorinated Ethenes/Ethanes
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina



*All concentrations are in ug/L. The most recent sampling data are shown. All sampling data are from the RI, except EW-2 (2004).

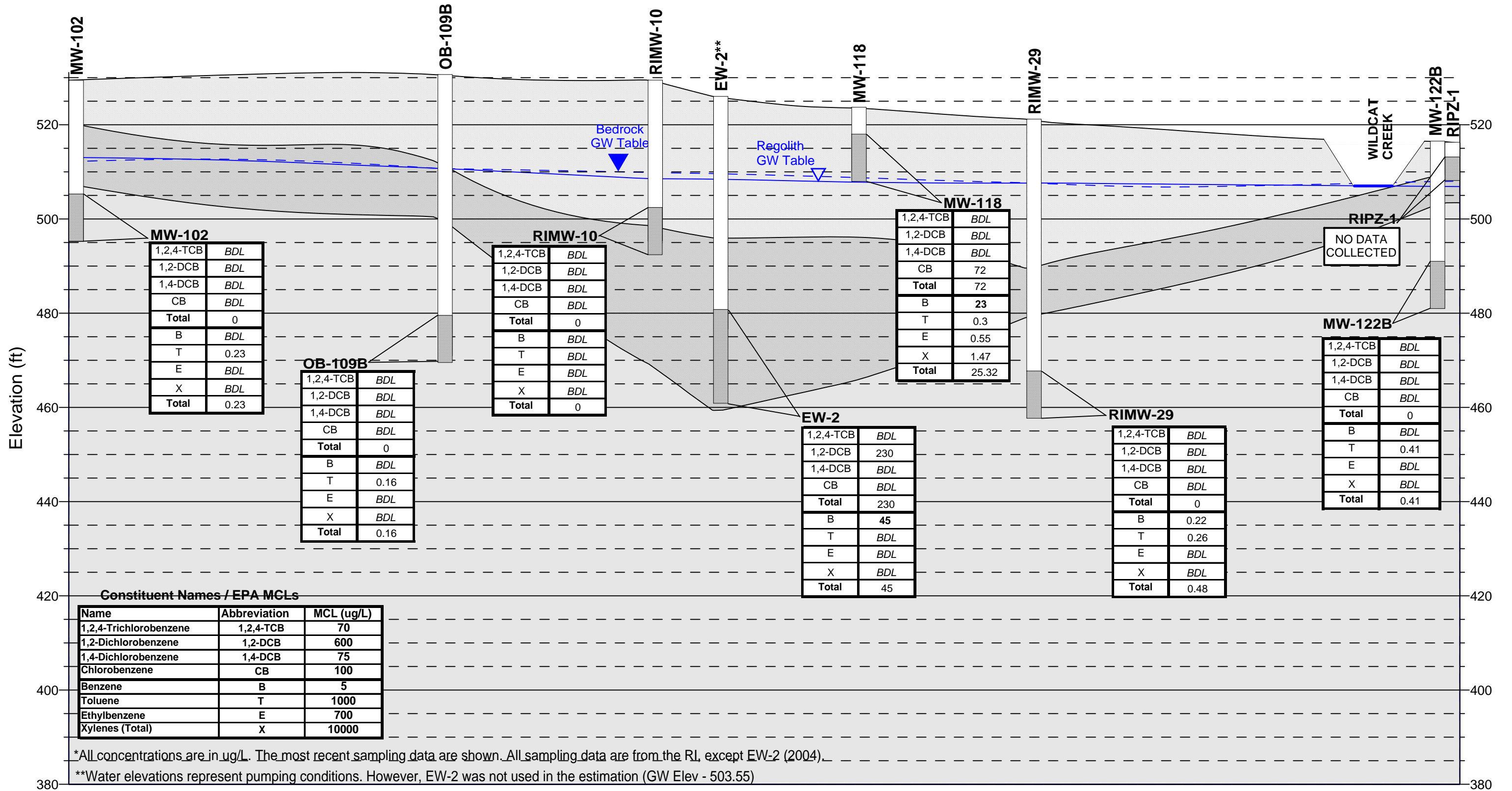
Figure 4-10
Cross Section 4
BTEX / Chlorinated Benzenes

Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina



- Saprolite
- Partially Weathered Rock (PWR)
- Bedrock

Figure 4-11
Cross Section 4
Chlorinated Ethenes/Ethanes



*All concentrations are in ug/L. The most recent sampling data are shown. All sampling data are from the RI, except EW-2 (2004).

**Water elevations represent pumping conditions. However, EW-2 was not used in the estimation (GW Elev - 503.55)

Figure 4-12
Cross Section 5
BTEX / Chlorinated Benzenes
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

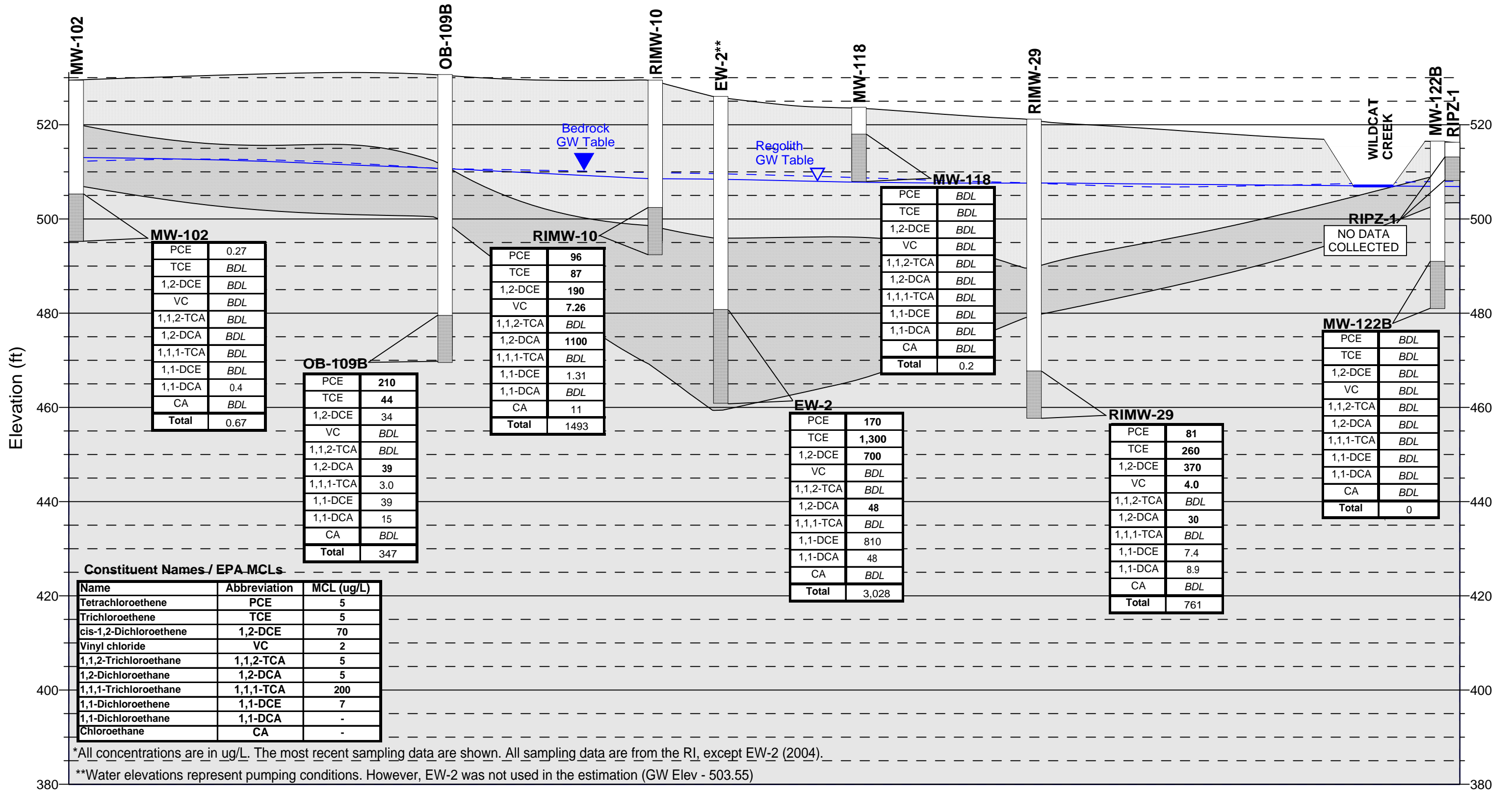


Figure 4-13
Cross Section 5
Chlorinated Ethenes/Ethanes
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

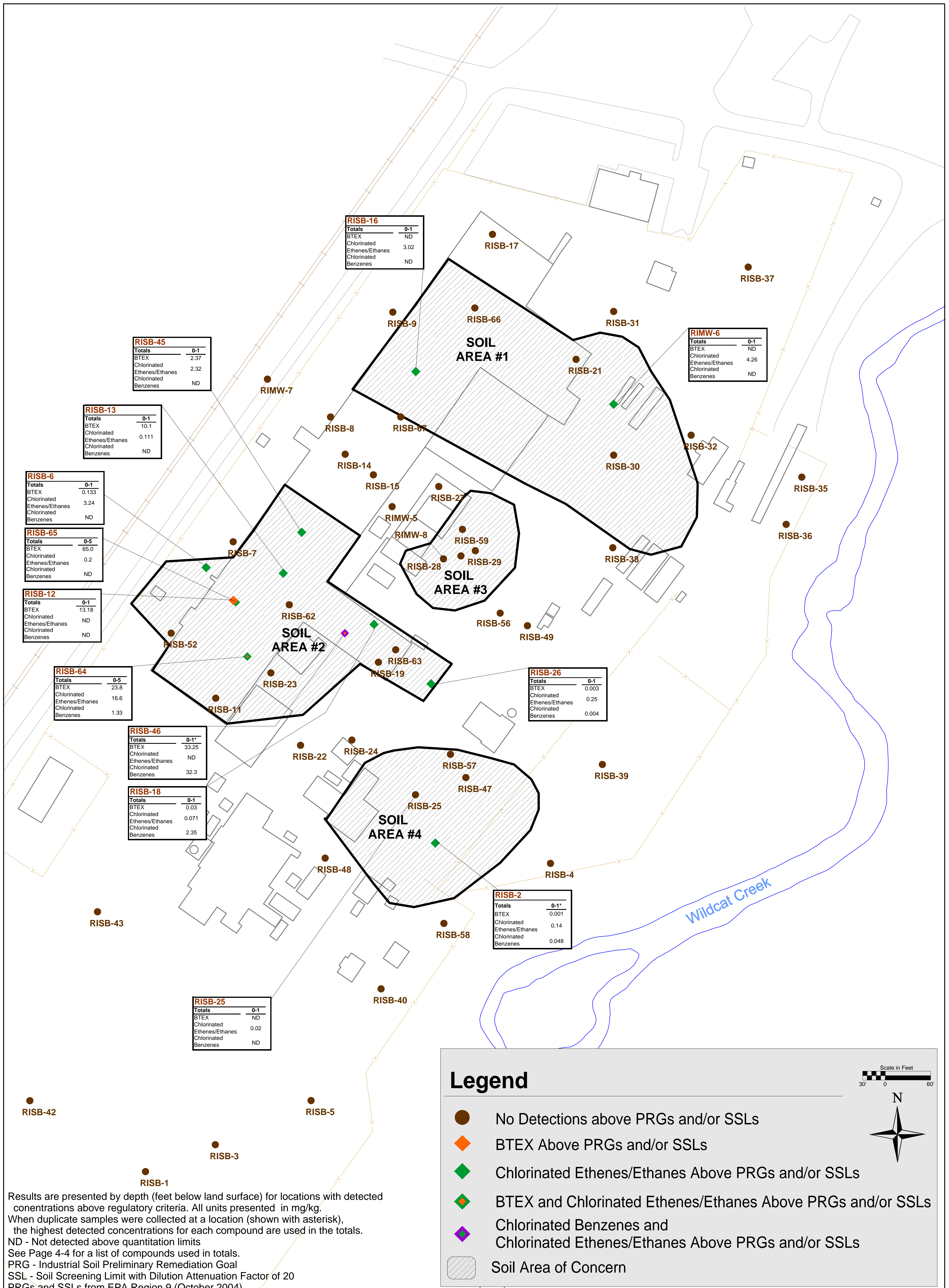


Figure 4-14
Surface Soil Locations with Detections of VOCs above Screening Criteria

Remedial Investigation Report
September 2008

Former PSC Site, Rock Hill, South Carolina

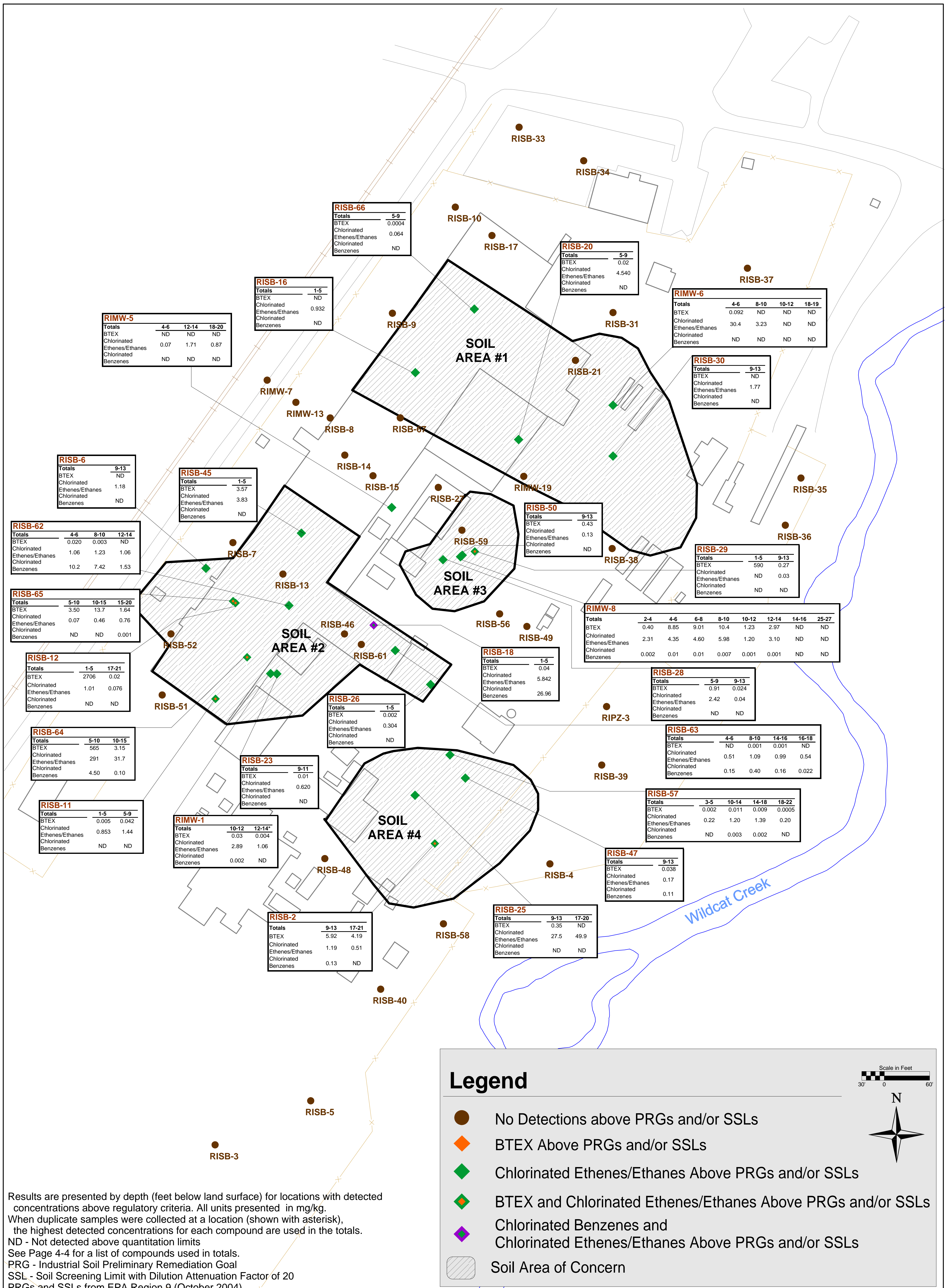
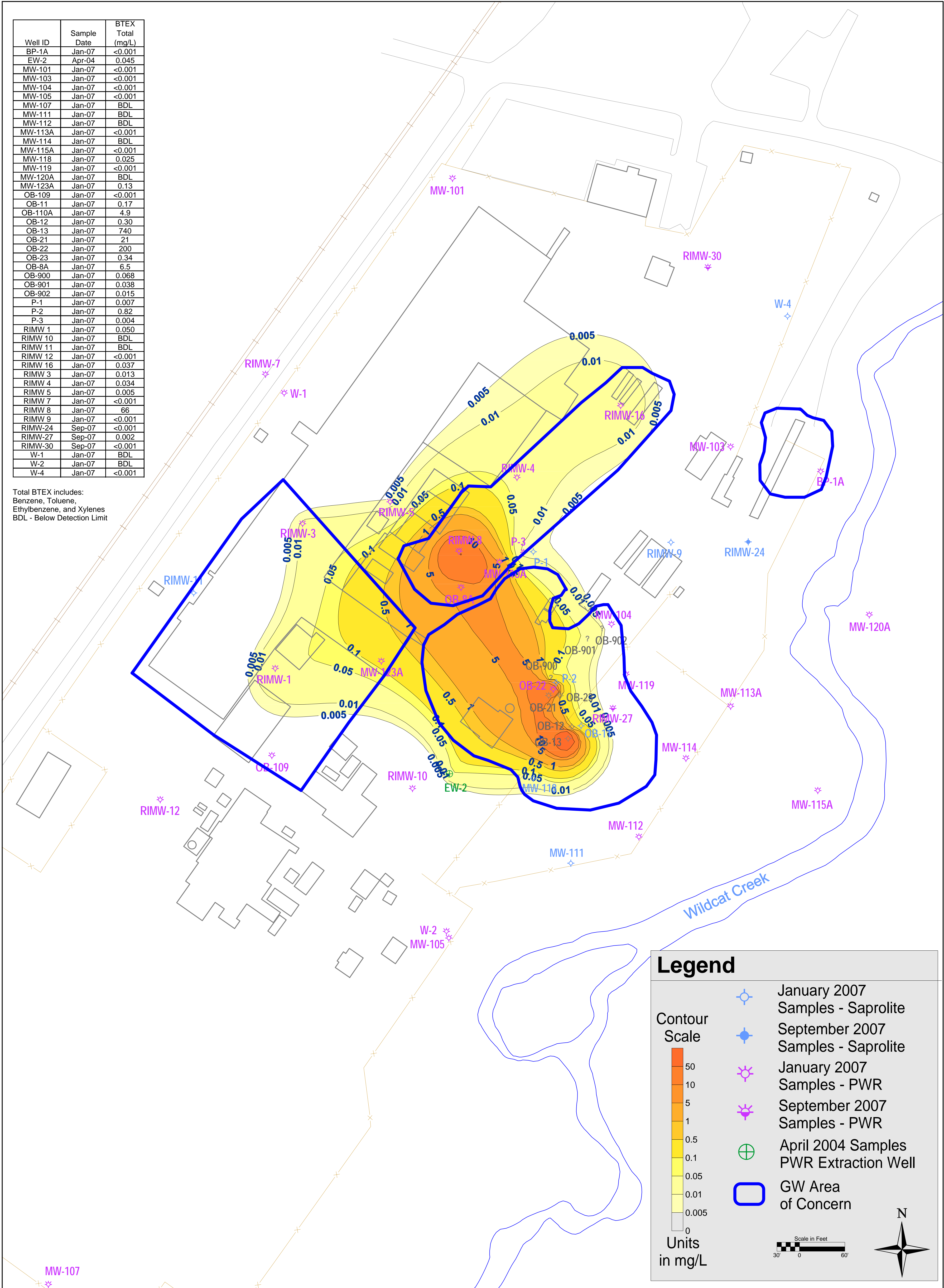


Figure 4-15
Subsurface Soil Locations with Detections of VOCs above Screening Criteria

| Well ID | Sample Date | BTEX Total (mg/L) |
|---------|-------------|-------------------|
| BP-1A | Jan-07 | <0.001 |
| EW-2 | Apr-04 | 0.045 |
| MW-101 | Jan-07 | <0.001 |
| MW-103 | Jan-07 | <0.001 |
| MW-104 | Jan-07 | <0.001 |
| MW-105 | Jan-07 | <0.001 |
| MW-107 | Jan-07 | BDL |
| MW-111 | Jan-07 | BDL |
| MW-112 | Jan-07 | BDL |
| MW-113A | Jan-07 | <0.001 |
| MW-114 | Jan-07 | BDL |
| MW-115A | Jan-07 | <0.001 |
| MW-118 | Jan-07 | 0.025 |
| MW-119 | Jan-07 | <0.001 |
| MW-120A | Jan-07 | BDL |
| MW-123A | Jan-07 | 0.13 |
| OB-109 | Jan-07 | <0.001 |
| OB-11 | Jan-07 | 0.17 |
| OB-110A | Jan-07 | 4.9 |
| OB-12 | Jan-07 | 0.30 |
| OB-13 | Jan-07 | 740 |
| OB-21 | Jan-07 | 21 |
| OB-22 | Jan-07 | 200 |
| OB-23 | Jan-07 | 0.34 |
| OB-8A | Jan-07 | 6.5 |
| OB-900 | Jan-07 | 0.068 |
| OB-901 | Jan-07 | 0.038 |
| OB-902 | Jan-07 | 0.015 |
| P-1 | Jan-07 | 0.007 |
| P-2 | Jan-07 | 0.82 |
| P-3 | Jan-07 | 0.004 |
| RIMW 1 | Jan-07 | 0.050 |
| RIMW 10 | Jan-07 | BDL |
| RIMW 11 | Jan-07 | BDL |
| RIMW 12 | Jan-07 | <0.001 |
| RIMW 16 | Jan-07 | 0.037 |
| RIMW 3 | Jan-07 | 0.013 |
| RIMW 4 | Jan-07 | 0.034 |
| RIMW 5 | Jan-07 | 0.005 |
| RIMW 7 | Jan-07 | <0.001 |
| RIMW 8 | Jan-07 | 66 |
| RIMW 9 | Jan-07 | <0.001 |
| RIMW-24 | Sep-07 | <0.001 |
| RIMW-27 | Sep-07 | 0.002 |
| RIMW-30 | Sep-07 | <0.001 |
| W-1 | Jan-07 | BDL |
| W-2 | Jan-07 | BDL |
| W-4 | Jan-07 | <0.001 |

Total BTEX includes:
Benzene, Toluene,
Ethylbenzene, and Xylenes
BDL - Below Detection Limit



Legend

- January 2007 Samples - Saprolite
- September 2007 Samples - Saprolite
- January 2007 Samples - PWR
- September 2007 Samples - PWR
- April 2004 Samples PWR Extraction Well
- GW Area of Concern

Contour Scale

50
10
5
1
0.5
0.1
0.05
0.01
0.005
0

Units in mg/L

Scale in Feet
30' 0 60'

N

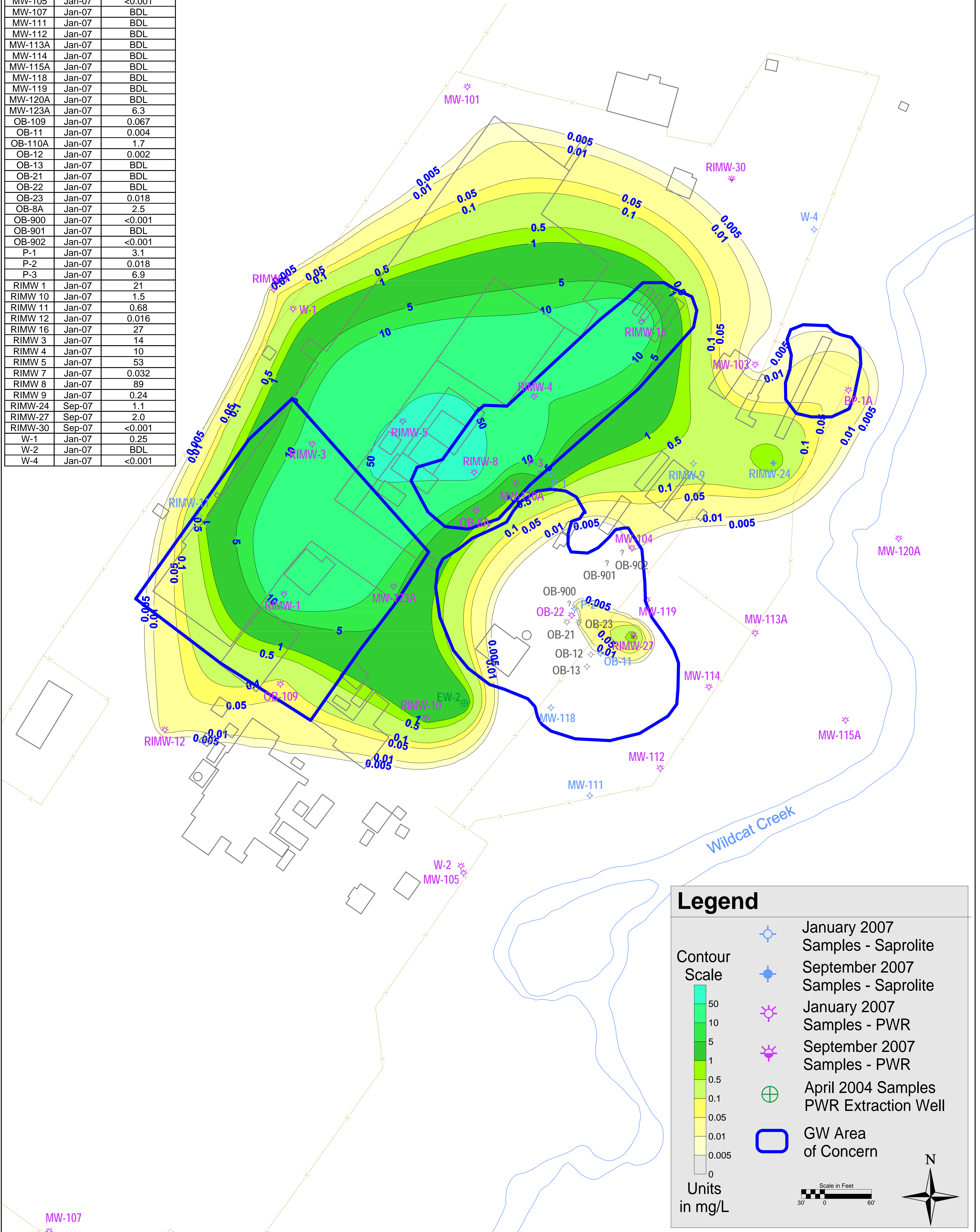
Figure 4-16
Total BTEX Concentration Map
Regolith Groundwater

Remedial Investigation Report
September 2008

Former PSC Site, Rock Hill, South Carolina

| Well ID | Sample Date | Total Chlorinated Ethenes/Ethanes (mg/L) |
|---------|-------------|------------------------------------------|
| BP-1A | Jan-07 | 0.053 |
| EW-2 | Apr-04 | 3.0 |
| MW-101 | Jan-07 | 0.002 |
| MW-103 | Jan-07 | 0.002 |
| MW-104 | Jan-07 | 0.008 |
| MW-105 | Jan-07 | <0.001 |
| MW-107 | Jan-07 | BDL |
| MW-111 | Jan-07 | BDL |
| MW-112 | Jan-07 | BDL |
| MW-113A | Jan-07 | BDL |
| MW-114 | Jan-07 | BDL |
| MW-115A | Jan-07 | BDL |
| MW-118 | Jan-07 | BDL |
| MW-119 | Jan-07 | BDL |
| MW-120A | Jan-07 | BDL |
| MW-123A | Jan-07 | 6.3 |
| OB-109 | Jan-07 | 0.067 |
| OB-11 | Jan-07 | 0.004 |
| OB-110A | Jan-07 | 1.7 |
| OB-12 | Jan-07 | 0.002 |
| OB-13 | Jan-07 | BDL |
| OB-21 | Jan-07 | BDL |
| OB-22 | Jan-07 | BDL |
| OB-23 | Jan-07 | 0.018 |
| OB-8A | Jan-07 | 2.5 |
| OB-900 | Jan-07 | <0.001 |
| OB-901 | Jan-07 | BDL |
| OB-902 | Jan-07 | <0.001 |
| P-1 | Jan-07 | 3.1 |
| P-2 | Jan-07 | 0.018 |
| P-3 | Jan-07 | 6.9 |
| RIMW 1 | Jan-07 | 21 |
| RIMW 10 | Jan-07 | 1.5 |
| RIMW 11 | Jan-07 | 0.68 |
| RIMW 12 | Jan-07 | 0.016 |
| RIMW 16 | Jan-07 | 27 |
| RIMW 3 | Jan-07 | 14 |
| RIMW 4 | Jan-07 | 10 |
| RIMW 5 | Jan-07 | 53 |
| RIMW 7 | Jan-07 | 0.032 |
| RIMW 8 | Jan-07 | 89 |
| RIMW 9 | Jan-07 | 0.24 |
| RIMW-24 | Sep-07 | 1.1 |
| RIMW-27 | Sep-07 | 2.0 |
| RIMW-30 | Sep-07 | <0.001 |
| W-1 | Jan-07 | 0.25 |
| W-2 | Jan-07 | BDL |
| W-4 | Jan-07 | <0.001 |

Total Chlorinated Ethenes/Ethanes include:
 Chloroethane, 1,1-Dichloroethane,
 1,1-Dichloroethene, 1,2-Dichloroethane,
 cis-1,2-Dichloroethene, 1,1,1-Trichloroethane,
 Tetrachloroethene, 1,1,1,2-Tetrachloroethane,
 Trichloroethene, 1,1,2-Trichloroethane,
 and Vinyl Chloride
 BDL - Below Detection Limit



Legend

⊕ January 2007 Samples - Saprilitte
⊕ September 2007 Samples - Saprilitte
⊕ January 2007 Samples - PWR
⊕ September 2007 Samples - PWR
⊕ April 2004 Samples PWR Extraction Well
 GW Area of Concern

Contour Scale
 50
 10
 5
 1
 0.5
 0.1
 0.05
 0.01
 0.005
 0

Units in mg/L

Scale in Feet
 30' 0 60'

N

Figure 4-17
Total Chlorinated Ethenes/Ethanes Concentration Map
Regolith Groundwater

Remedial Investigation Report
 September 2008

Former PSC Site, Rock Hill, South Carolina

| Well ID | Sample Date | Total Chlorinated Benzenes (mg/L) |
|---------|-------------|-----------------------------------|
| BP-1A | Jan-07 | 0.002 |
| EW-2 | Apr-04 | 0.23 |
| MW-101 | Jan-07 | <0.001 |
| MW-103 | Jan-07 | BDL |
| MW-104 | Jan-07 | BDL |
| MW-105 | Jan-07 | 0.003 |
| MW-107 | Jan-07 | BDL |
| MW-111 | Jan-07 | <0.001 |
| MW-112 | Jan-07 | BDL |
| MW-113A | Jan-07 | BDL |
| MW-114 | Jan-07 | BDL |
| MW-115A | Jan-07 | BDL |
| MW-118 | Jan-07 | 0.07 |
| MW-119 | Jan-07 | BDL |
| MW-120A | Jan-07 | BDL |
| MW-123A | Jan-07 | 6.9 |
| OB-109 | Jan-07 | BDL |
| OB-11 | Jan-07 | BDL |
| OB-110A | Jan-07 | 0.07 |
| OB-12 | Jan-07 | BDL |
| OB-13 | Jan-07 | BDL |
| OB-21 | Jan-07 | BDL |
| OB-22 | Jan-07 | BDL |
| OB-23 | Jan-07 | 0.001 |
| OB-8A | Jan-07 | 0.47 |
| OB-900 | Jan-07 | BDL |
| OB-901 | Jan-07 | BDL |
| OB-902 | Jan-07 | BDL |
| P-1 | Jan-07 | 0.046 |
| P-2 | Jan-07 | BDL |
| P-3 | Jan-07 | 0.072 |
| RIMW 1 | Jan-07 | 0.025 |
| RIMW 10 | Jan-07 | BDL |
| RIMW 11 | Jan-07 | <0.001 |
| RIMW 12 | Jan-07 | BDL |
| RIMW 16 | Jan-07 | 0.010 |
| RIMW 3 | Jan-07 | 0.002 |
| RIMW 4 | Jan-07 | 0.12 |
| RIMW 5 | Jan-07 | 0.12 |
| RIMW 7 | Jan-07 | <0.001 |
| RIMW 8 | Jan-07 | 0.54 |
| RIMW 9 | Jan-07 | <0.001 |
| RIMW-24 | Sep-07 | BDL |
| RIMW-27 | Sep-07 | 0.007 |
| RIMW-30 | Sep-07 | BDL |
| W-1 | Jan-07 | BDL |
| W-2 | Jan-07 | BDL |
| W-4 | Jan-07 | BDL |

Total Chlorinated Benzenes include:
 1,2-Dichlorobenzene, 1,3-Dichlorobenzene,
 1,4-Dichlorobenzene, 1,2,3-Trichlorobenzene,
 1,2,4-Trichlorobenzene, and Chlorobenzene
 BDL - Below Detection Limit

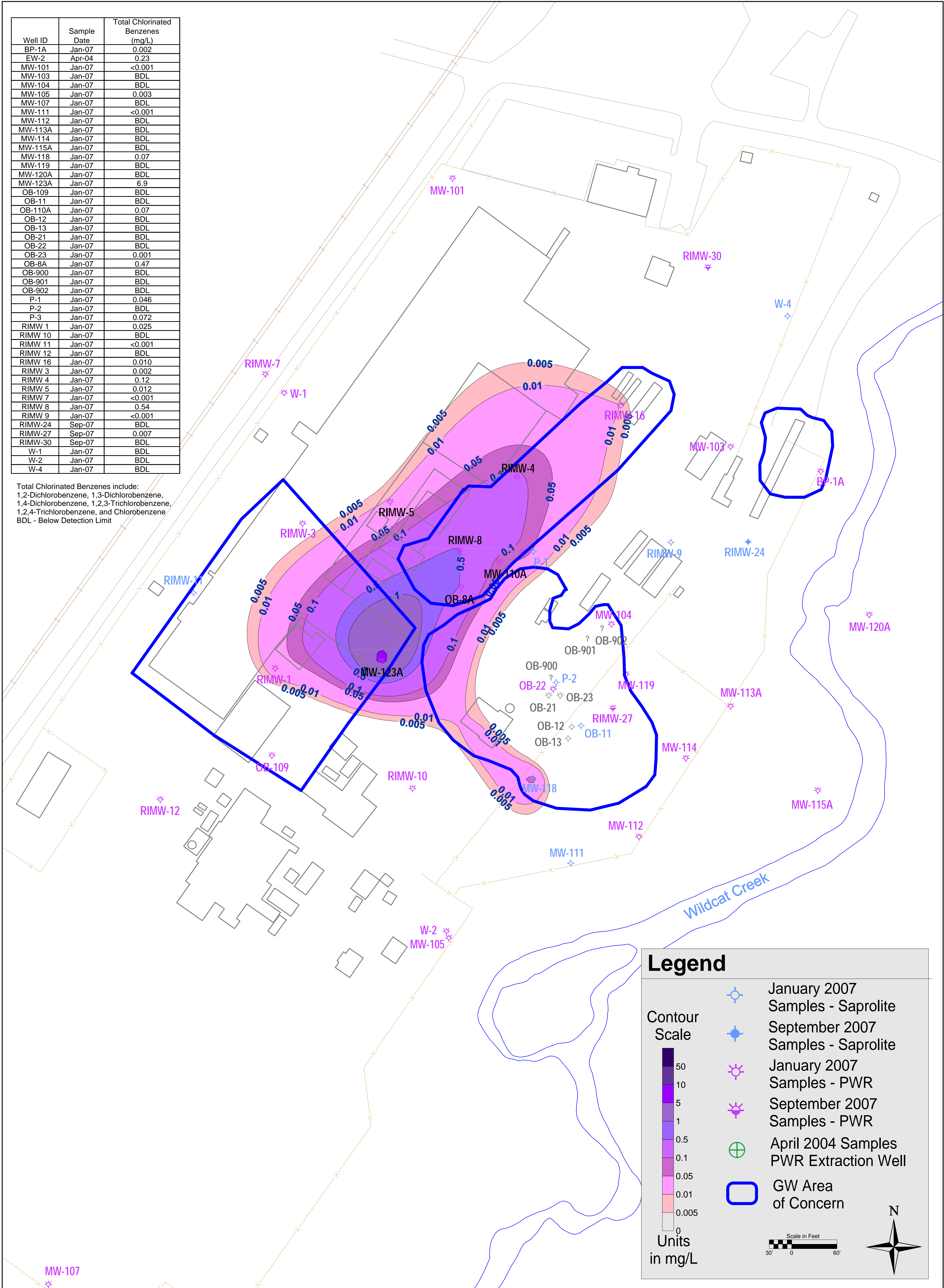
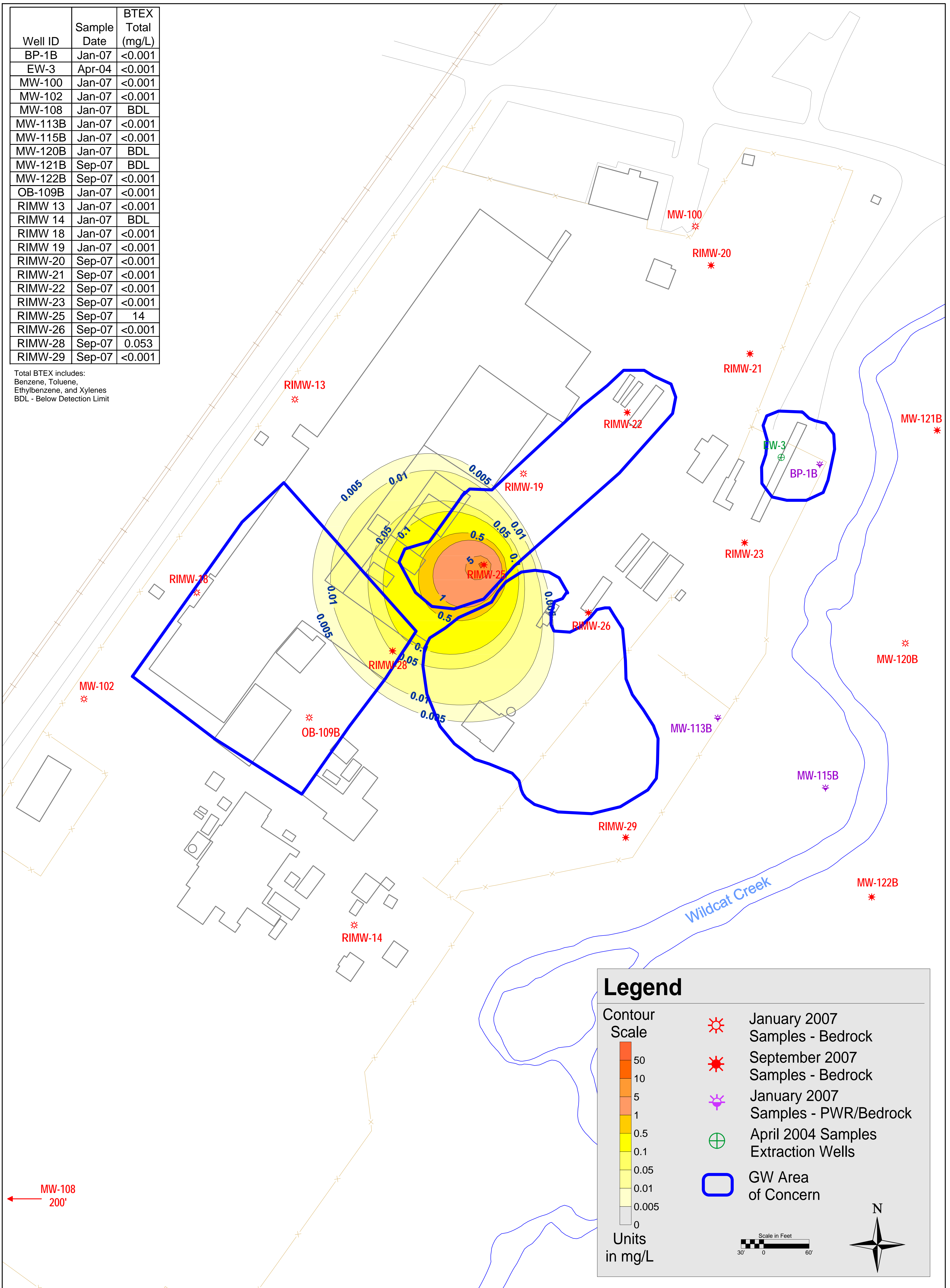


Figure 4-18
Total Chlorinated Benzenes Concentration Map
Regolith Groundwater
 Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, South Carolina

| Well ID | Sample Date | BTEX Total (mg/L) |
|---------|-------------|-------------------|
| BP-1B | Jan-07 | <0.001 |
| EW-3 | Apr-04 | <0.001 |
| MW-100 | Jan-07 | <0.001 |
| MW-102 | Jan-07 | <0.001 |
| MW-108 | Jan-07 | BDL |
| MW-113B | Jan-07 | <0.001 |
| MW-115B | Jan-07 | <0.001 |
| MW-120B | Jan-07 | BDL |
| MW-121B | Sep-07 | BDL |
| MW-122B | Sep-07 | <0.001 |
| OB-109B | Jan-07 | <0.001 |
| RIMW 13 | Jan-07 | <0.001 |
| RIMW 14 | Jan-07 | BDL |
| RIMW 18 | Jan-07 | <0.001 |
| RIMW 19 | Jan-07 | <0.001 |
| RIMW-20 | Sep-07 | <0.001 |
| RIMW-21 | Sep-07 | <0.001 |
| RIMW-22 | Sep-07 | <0.001 |
| RIMW-23 | Sep-07 | <0.001 |
| RIMW-25 | Sep-07 | 14 |
| RIMW-26 | Sep-07 | <0.001 |
| RIMW-28 | Sep-07 | 0.053 |
| RIMW-29 | Sep-07 | <0.001 |

Total BTEX includes:
Benzene, Toluene,
Ethylbenzene, and Xylenes
BDL - Below Detection Limit



Legend

Contour Scale

Units in mg/L

- January 2007 Samples - Bedrock
- September 2007 Samples - Bedrock
- January 2007 Samples - PWR/Bedrock
- April 2004 Samples Extraction Wells
- GW Area of Concern

Scale in Feet

30' 0 60'

N

Figure 4-19
Total BTEX Concentration Map
Bedrock Groundwater
Remedial Investigation Report
September 2008
Former PSC Site, Rock Hill, South Carolina

| Well ID | Sample Date | Total Chlorinated Ethene Ethanes (mg/L) |
|---------|-------------|-----------------------------------------|
| BP-1B | Jan-07 | 1.5 |
| EW-3 | Apr-04 | 2.4 |
| MW-100 | Jan-07 | BDL |
| MW-102 | Jan-07 | <0.001 |
| MW-108 | Jan-07 | BDL |
| MW-113B | Jan-07 | 0.085 |
| MW-115B | Jan-07 | 0.027 |
| MW-120B | Jan-07 | BDL |
| MW-121B | Sep-07 | 0.010 |
| MW-122B | Sep-07 | BDL |
| OB-109B | Jan-07 | 0.35 |
| RIMW 13 | Jan-07 | 0.003 |
| RIMW 14 | Jan-07 | <0.001 |
| RIMW 18 | Jan-07 | 0.03 |
| RIMW 19 | Jan-07 | 0.28 |
| RIMW-20 | Sep-07 | 0.002 |
| RIMW-21 | Sep-07 | BDL |
| RIMW-22 | Sep-07 | 0.12 |
| RIMW-23 | Sep-07 | 0.002 |
| RIMW-25 | Sep-07 | 11 |
| RIMW-26 | Sep-07 | <0.001 |
| RIMW-28 | Sep-07 | 0.08 |
| RIMW-29 | Sep-07 | 0.76 |

Total Chlorinated Ethenes/Ethanes include:
 Chloroethane, 1,1-Dichloroethane,
 1,1-Dichloroethene, 1,2-Dichloroethane,
 cis-1,2-Dichloroethene, 1,1,1-Trichloroethane,
 Tetrachloroethene, 1,1,2,2-Tetrachloroethane,
 Trichloroethene, 1,1,2-Trichloroethane,
 and Vinyl Chloride
 BDL - Below Detection Limit

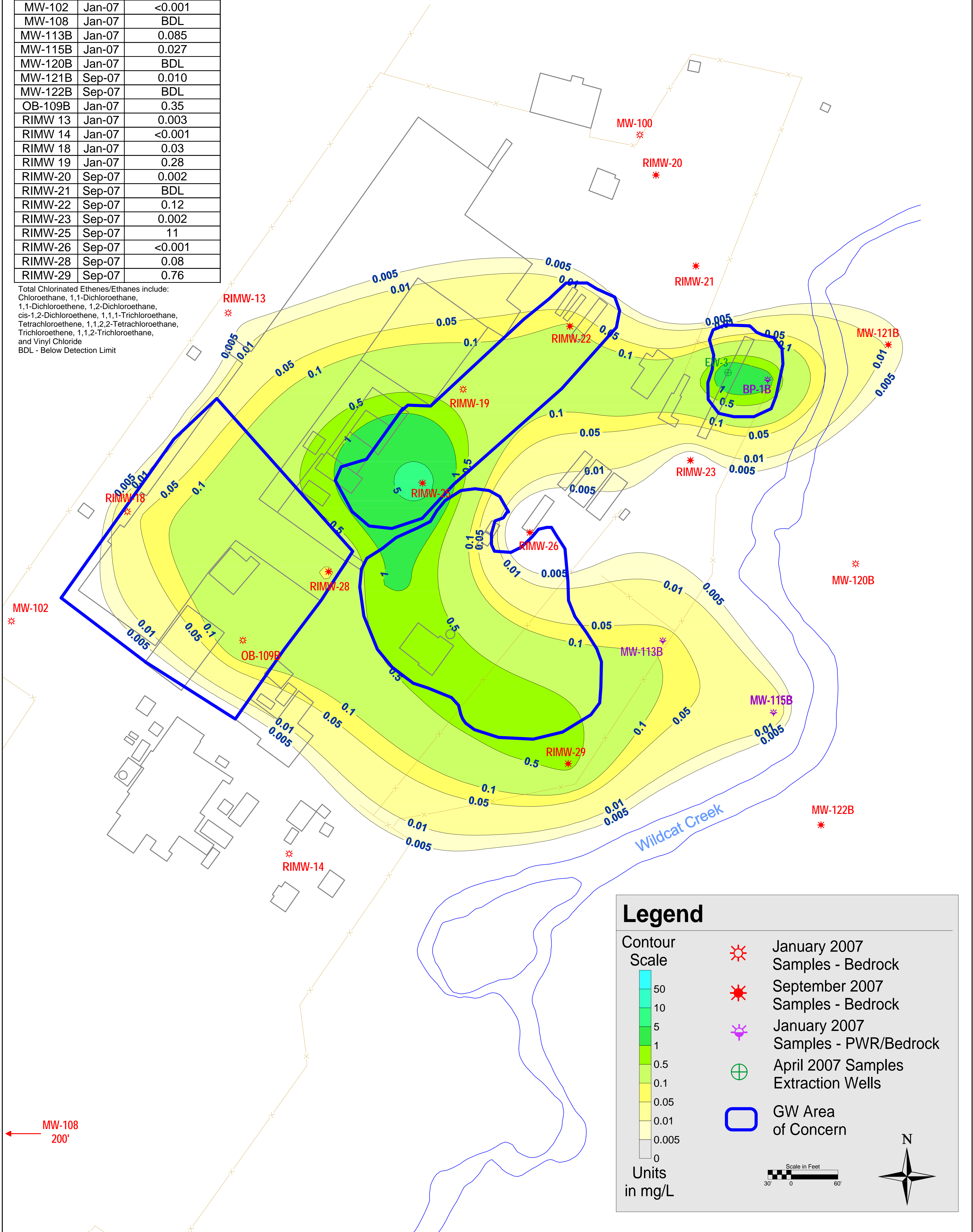


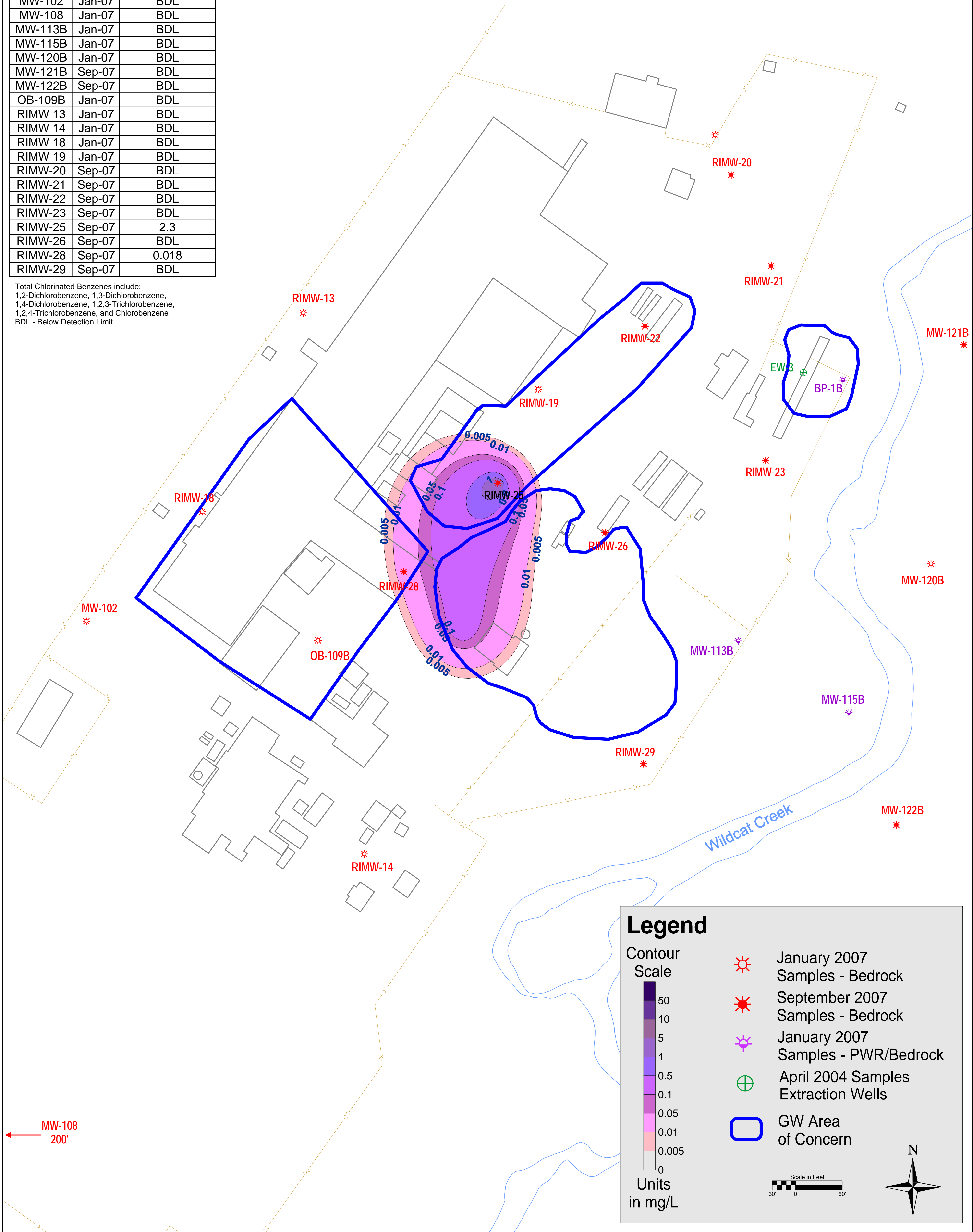
Figure 4-20
Total Chlorinated Ethenes/Ethanes Concentration Map
Bedrock Groundwater

Remedial Investigation Report
 September 2008

Former PSC Site, Rock Hill, South Carolina

| Well ID | Sample Date | Total Chlorinated Benzenes (mg/L) |
|---------|-------------|-----------------------------------|
| BP-1B | Jan-07 | 0.002 |
| EW-3 | Apr-04 | <0.001 |
| MW-100 | Jan-07 | <0.001 |
| MW-102 | Jan-07 | BDL |
| MW-108 | Jan-07 | BDL |
| MW-113B | Jan-07 | BDL |
| MW-115B | Jan-07 | BDL |
| MW-120B | Jan-07 | BDL |
| MW-121B | Sep-07 | BDL |
| MW-122B | Sep-07 | BDL |
| OB-109B | Jan-07 | BDL |
| RIMW 13 | Jan-07 | BDL |
| RIMW 14 | Jan-07 | BDL |
| RIMW 18 | Jan-07 | BDL |
| RIMW 19 | Jan-07 | BDL |
| RIMW-20 | Sep-07 | BDL |
| RIMW-21 | Sep-07 | BDL |
| RIMW-22 | Sep-07 | BDL |
| RIMW-23 | Sep-07 | BDL |
| RIMW-25 | Sep-07 | 2.3 |
| RIMW-26 | Sep-07 | BDL |
| RIMW-28 | Sep-07 | 0.018 |
| RIMW-29 | Sep-07 | BDL |

Total Chlorinated Benzenes include:
 1,2-Dichlorobenzene, 1,3-Dichlorobenzene,
 1,4-Dichlorobenzene, 1,2,3-Trichlorobenzene,
 1,2,4-Trichlorobenzene, and Chlorobenzene
 BDL - Below Detection Limit



Legend

Contour Scale

50
10
5
1
0.5
0.1
0.05
0.01
0.005
0

Units in mg/L

☀ January 2007 Samples - Bedrock
 ★ September 2007 Samples - Bedrock
 ☆ January 2007 Samples - PWR/Bedrock
 ⊕ April 2004 Samples Extraction Wells
 □ GW Area of Concern

Scale in Feet
 30' 0 60'

N

Figure 4-21
Total Chlorinated Benzenes Concentration Map
Bedrock Groundwater

Remedial Investigation Report
 September 2008

Former PSC Site, Rock Hill, South Carolina

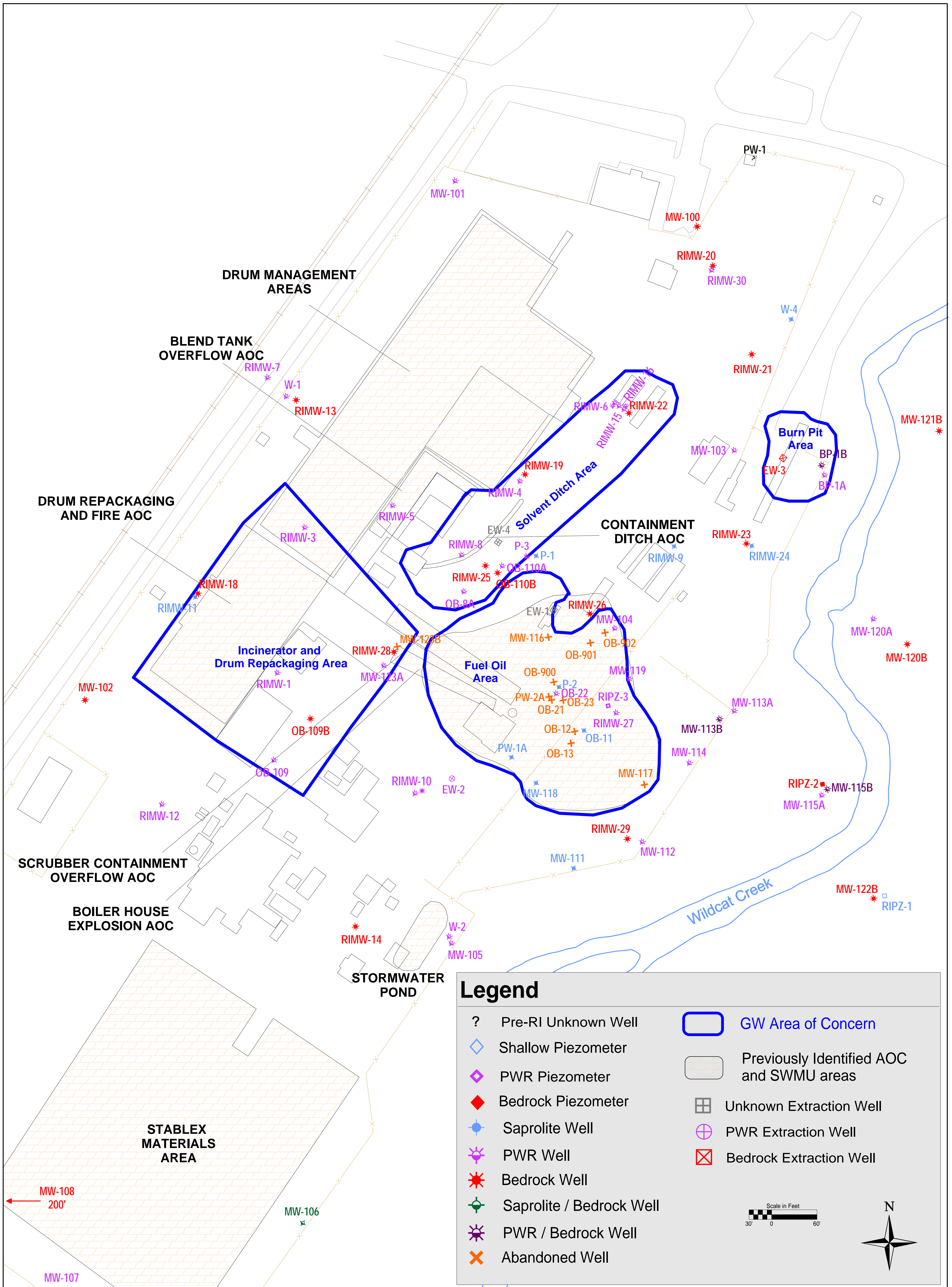


Figure 4-22
Groundwater Areas of Concern

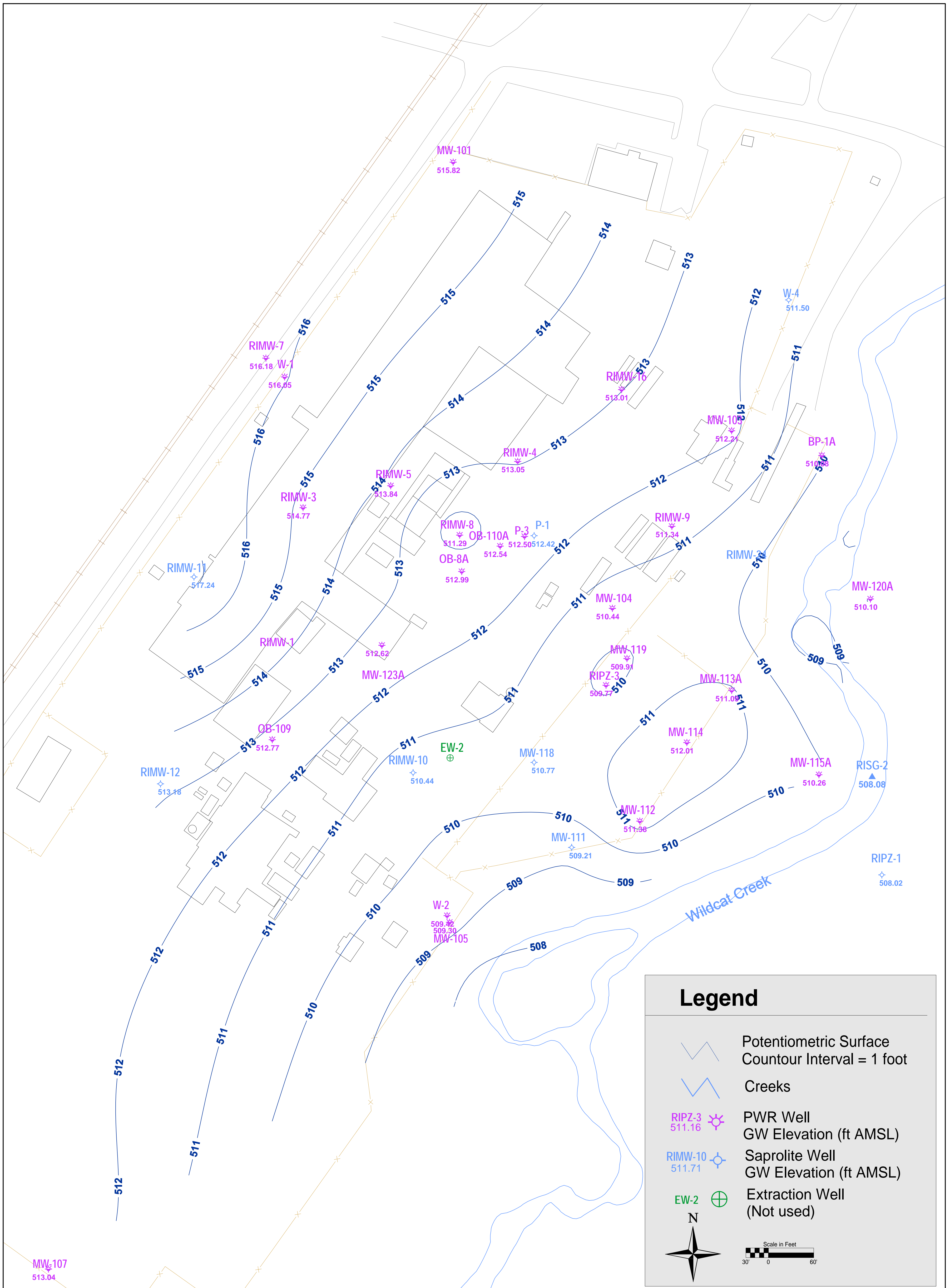
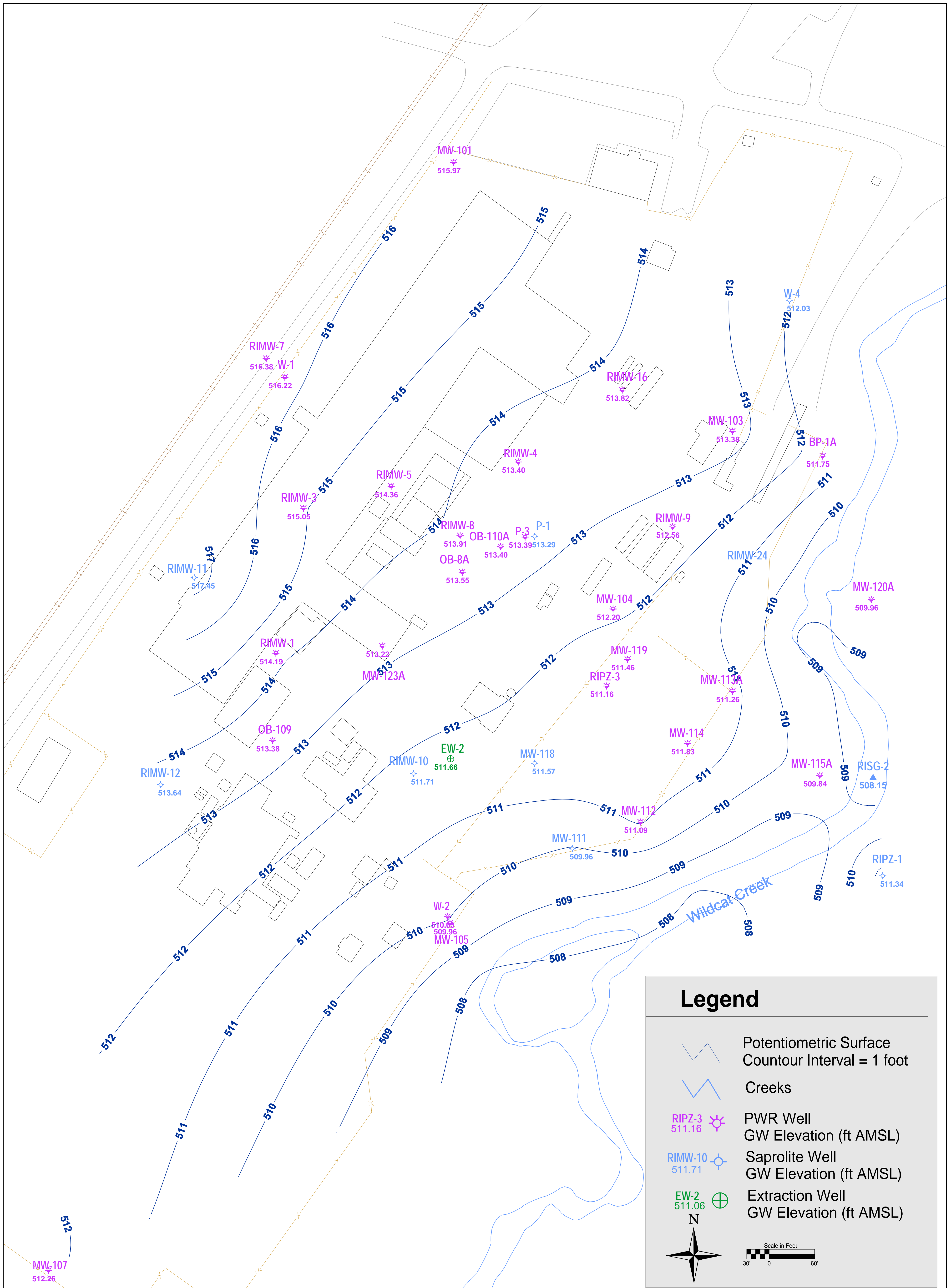


Figure 4-23
Regolith Potentiometric Surface Map
Pre-Equilibrium (Extraction Pumps ON)
 Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, South Carolina



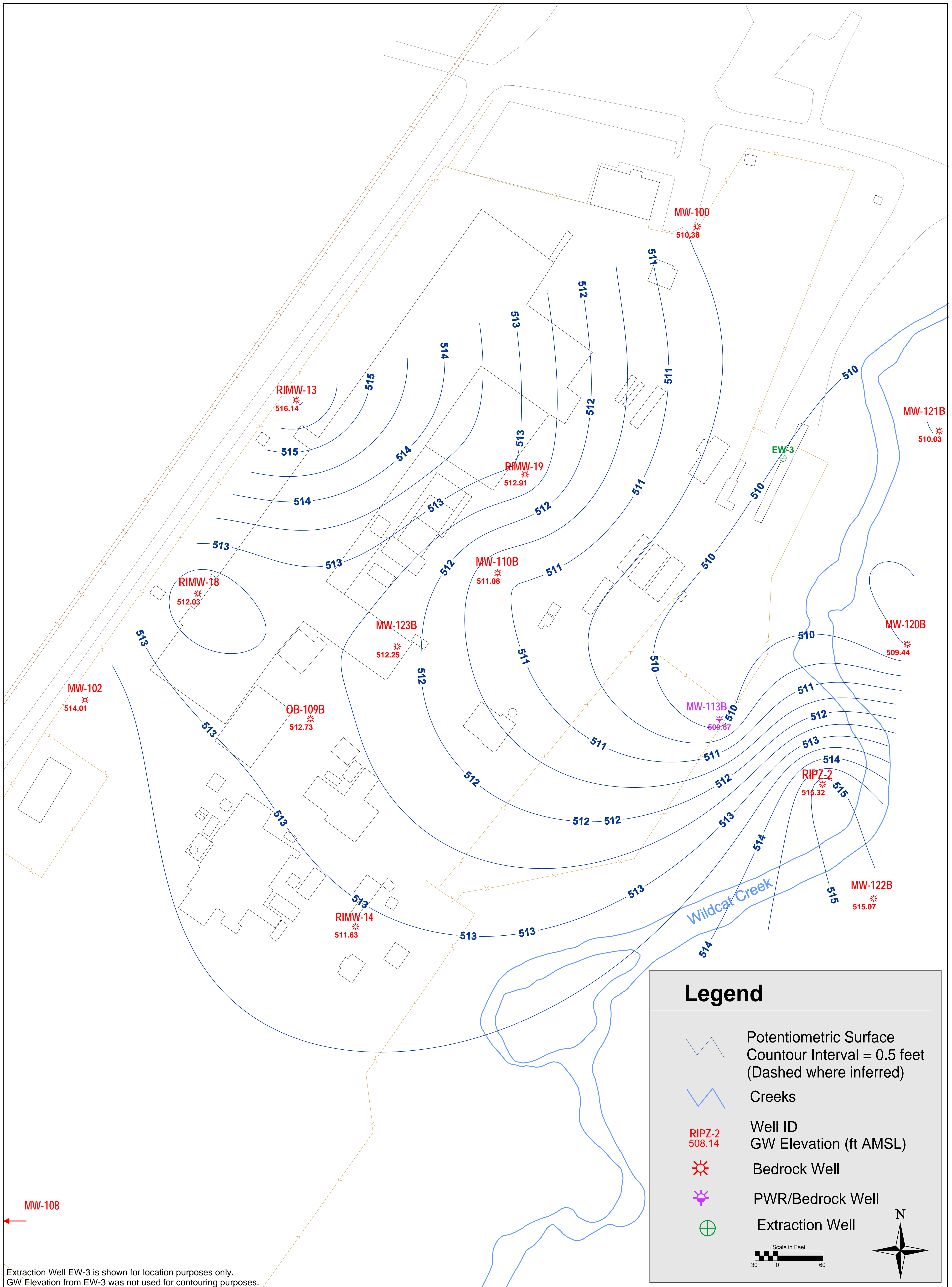


Figure 4-25
Bedrock Potentiometric Surface Map
Pre-Equilibrium (Extraction Pumps ON)

Remedial Investigation Report
 September 2008

Former PSC Site, Rock Hill, South Carolina

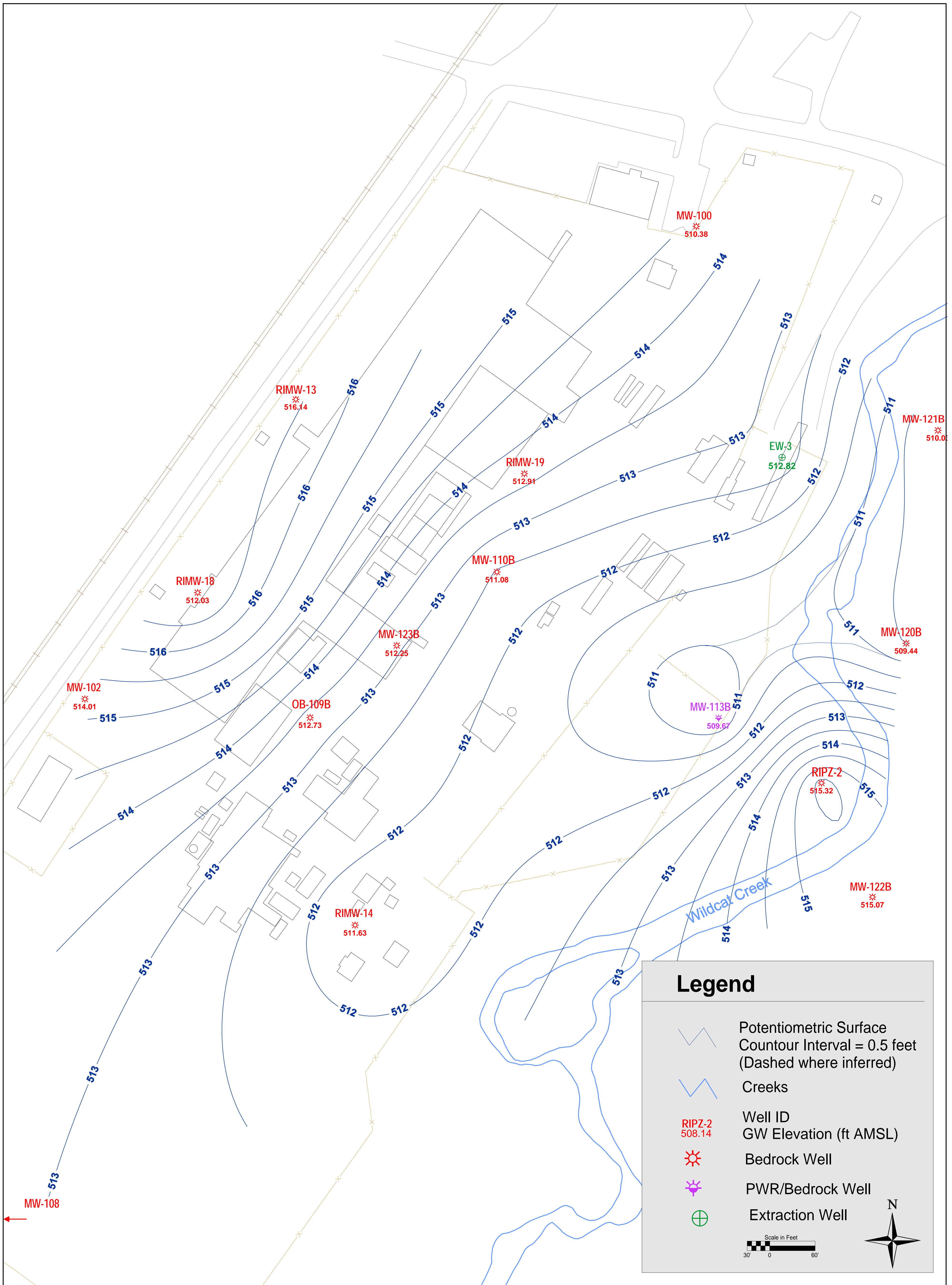


Figure 4-26
Bedrock Potentiometric Surface Map
Post-Equilibrium (Extraction Pumps OFF)
 Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, South Carolina

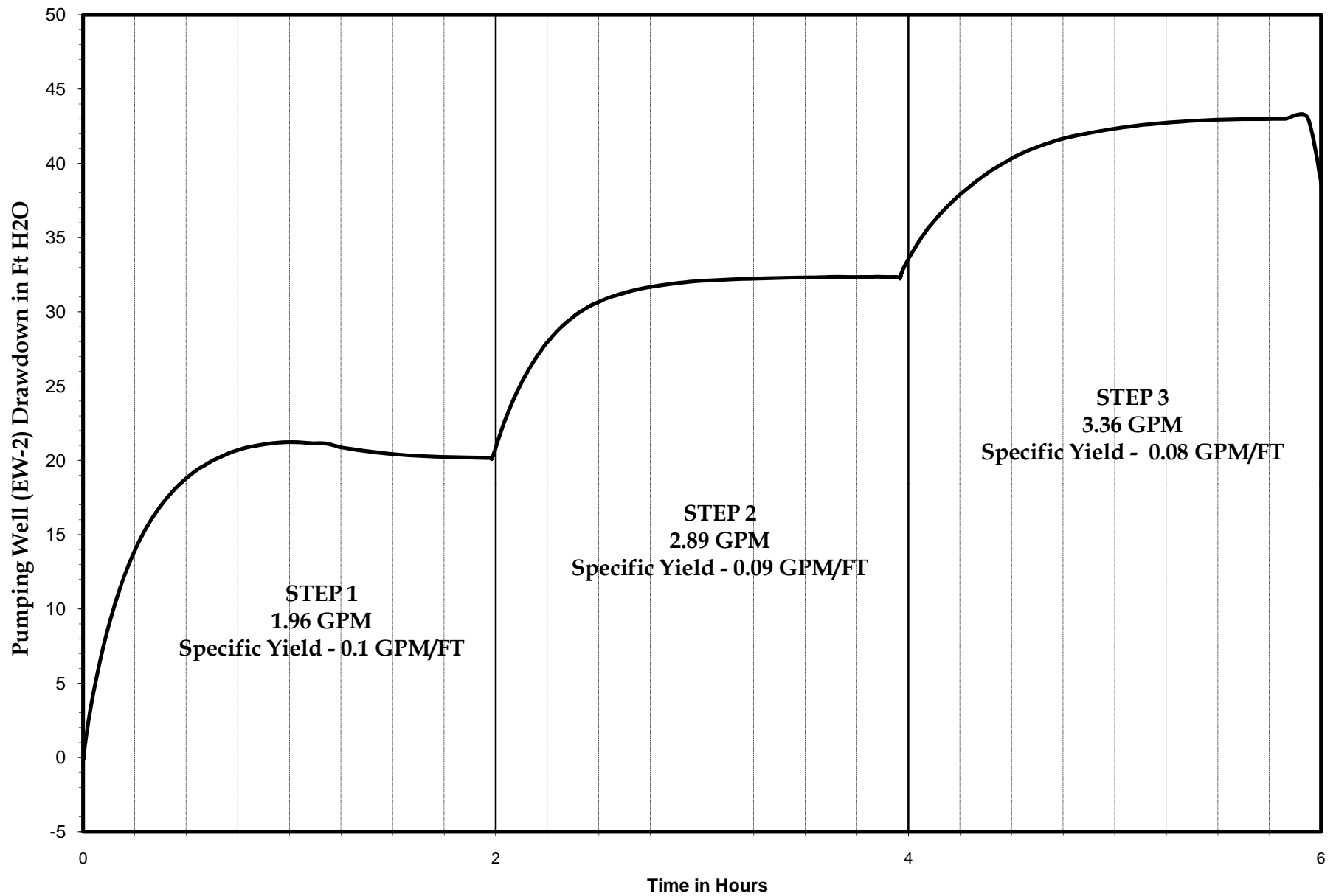


Figure 4-27
 EW-2 Step Test
 Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, South Carolina

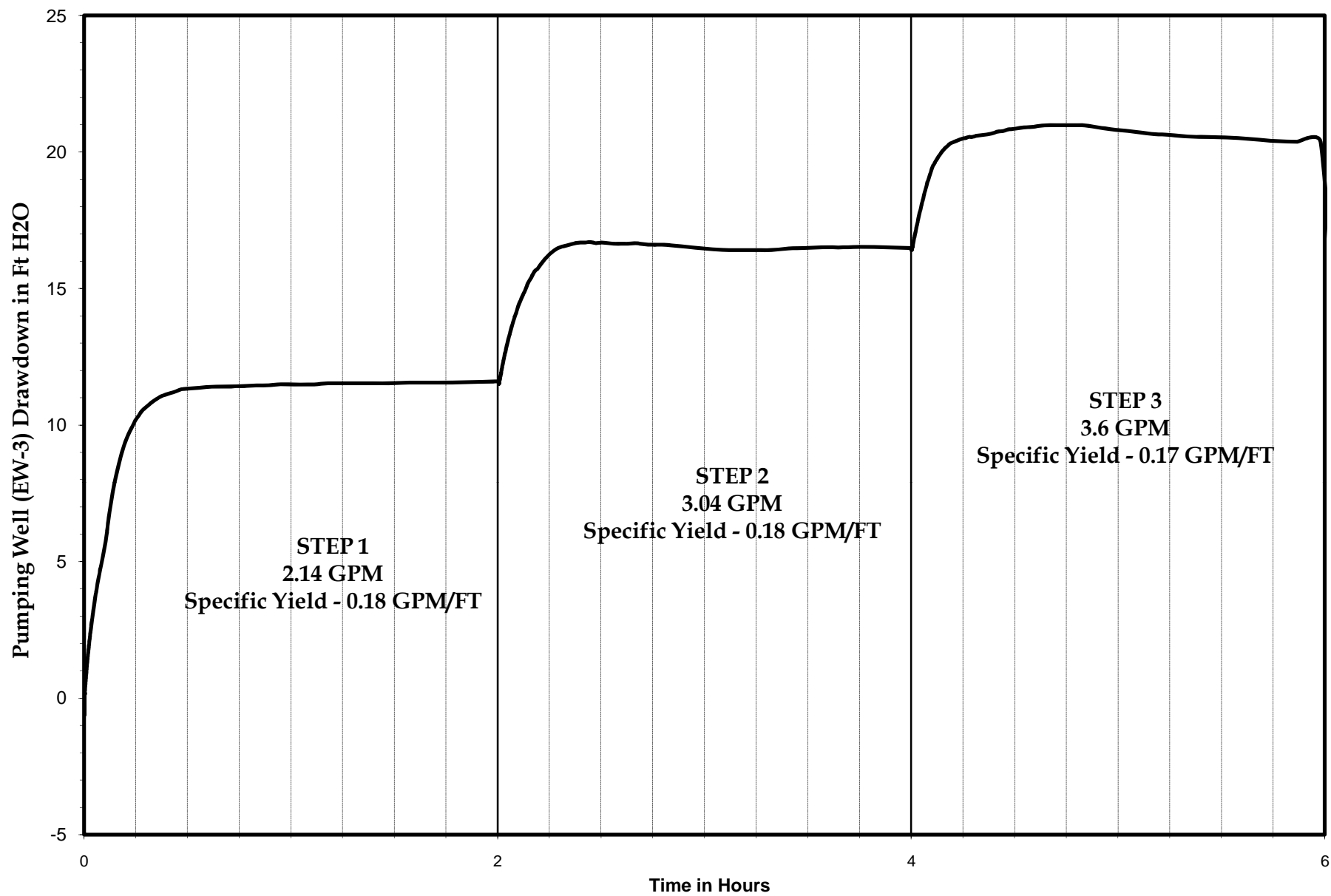
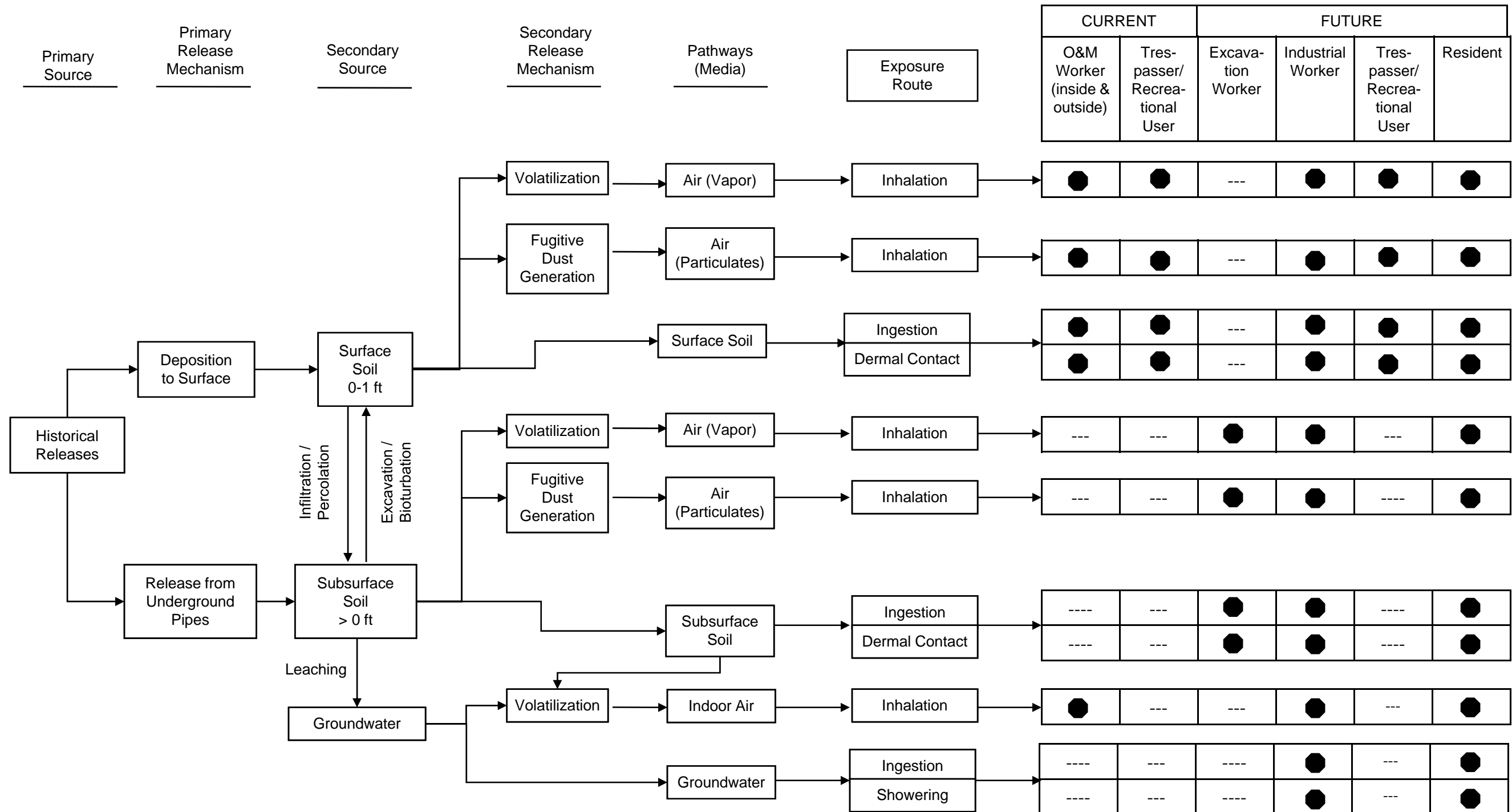


Figure 4-28
 EW-3 Step Test
 Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, South Carolina



LEGEND

→ = Pathways, current, historical and future

● = Pathways for quantitative evaluation

---- = Incomplete pathways

Figure 5-1
Site Conceptual Exposure Model
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, SC

Tables

Table 3-1
Phase I Sampling Summary
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Location | Start Depth (ft bgs) | End Depth (ft bgs) | Laboratory Analyses | | | | Duplicate Collected? |
|-------------------------|-------------------------|-----------------------|---------------------|-----------|------------|------|----------------------|
| | | | TCL VOCs | TCL SVOCs | TAL Metals | PCBs | |
| Soil Borings | | | | | | | |
| RI-BCK1 (background) | 0 | 1 | X | X | X | | |
| | 3 | 4 | X | X | X | | |
| RI-BCK2 (background) | 0 | 1 | X | X | X | | |
| | 3 | 4 | X | X | X | | |
| RISB-1 | 0 | 1 | X | X | X | | |
| RISB-2 | 0 | 1 | X | X | X | | X |
| | 9 | 13 | X | X | X | | |
| | 17 | 21 | X | X | X | | |
| RISB-3 | 0 | 1 | X | X | X | | |
| | 9 | 13 | X | X | X | | |
| RISB-4 | 0 | 1 | X | X | X | | |
| | 5 | 9 | X | X | X | | |
| RISB-5 | 0 | 1 | X | X | X | | |
| | 5 | 9 | X | X | X | | |
| RISB-6 | 0 | 1 | X | X | X | | |
| | 13 | 15 | X | X | X | | |
| RISB-7 | 0 | 1 | X | X | X | | |
| | 1 | 5 | X | X | X | | |
| RISB-8 | 0 | 1 | X | X | X | | |
| | 5 | 8 | X | X | X | | |
| RISB-9 | 0 | 1 | X | X | X | | |
| | 5 | 9 | X | X | X | | |
| RISB-10 | 5 | 9 | X | X | X | | |
| RISB-11 | 0 | 1 | X | X | X | | |
| | 1 | 5 | X | X | X | | |
| | 5 | 9 | X | X | X | | |
| RISB-12 | 0 | 1 | X | X | X | | |
| | 1 | 5 | X | X | X | | |
| | 17 | 21 | X | X | X | | |
| RISB-13 | 0 | 1 | X | X | X | | |
| | 5 | 9 | X | X | X | | X |
| RISB-14 | 0 | 1 | X | X | X | | |
| | 5 | 9 | X | X | X | | X |
| | 9 | 13 | X | X | X | | |
| RISB-15 | 0 | 1 | X | X | X | | |
| | 9 | 13 | X | X | X | | |
| RISB-16 | 0 | 1 | X | X | X | | |
| | 1 | 5 | X | X | X | | |
| RISB-17 | 0 | 1 | X | X | X | | |
| | 9 | 13 | X | X | X | | |
| RISB-18 | 0 | 1 | X | | | | |
| | 1 | 5 | X | X | X | X | |
| RISB-19 | 0 | 1 | X | X | X | X | |
| RISB-20 | 5 | 9 | X | X | X | | |

Table 3-1**Phase I Sampling Summary**

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| Location | Start Depth (ft bgs) | End Depth (ft bgs) | Laboratory Analyses | | | | Duplicate Collected? |
|----------|-------------------------|-----------------------|---------------------|-----------|------------|------|----------------------|
| | | | TCL VOCs | TCL SVOCs | TAL Metals | PCBs | |
| RISB-21 | 0 | 1 | X | X | X | | |
| | 5 | 9 | X | X | X | | |
| RISB-22 | 0 | 1 | X | X | X | | |
| RISB-23 | 0 | 1 | X | X | X | | |
| | 9 | 11 | X | X | X | | |
| RISB-24 | 0 | 1 | X | X | X | | |
| RISB-25 | 0 | 1 | X | X | X | | |
| | 9 | 13 | X | X | X | X | |
| | 17 | 20 | X | X | X | | |
| RISB-26 | 0 | 1 | X | | | | |
| | 1 | 5 | X | X | X | X | |
| RISB-27 | 0 | 1 | X | X | X | | |
| | 5 | 9 | X | X | X | | |
| RISB-28 | 0 | 1 | X | X | X | | |
| | 5 | 9 | X | | X | | |
| | 9 | 13 | X | X | X | | |
| RISB-29 | 0 | 1 | X | X | X | | |
| | 1 | 5 | X | X | X | | |
| | 9 | 13 | X | | | | |
| RISB-30 | 0 | 1 | X | X | X | | |
| | 9 | 13 | X | X | X | | |
| RISB-31 | 0 | 1 | X | X | X | | |
| | 9 | 13 | X | X | X | | |
| RISB-32 | 0 | 1 | X | X | X | | |
| RISB-33 | 5 | 9 | X | X | X | | |
| | 17 | 20 | X | X | X | | X |
| RISB-34 | 11 | 13 | X | X | X | | |
| RISB-35 | 0 | 1 | X | X | X | | |
| | 5 | 9 | X | X | X | | X |
| RISB-36 | 0 | 1 | X | X | X | | |
| | 13 | 16 | X | X | X | | |
| RISB-37 | 0 | 1 | X | X | X | | |
| | 9 | 13 | X | X | X | | |
| RISB-38 | 0 | 1 | X | X | X | | |
| | 17 | 21 | X | X | X | | |
| RISB-39 | 0 | 1 | X | X | X | | |
| | 13 | 17 | X | X | X | | |
| RISB-40 | 0 | 1 | X | X | X | | |
| | 9 | 13 | X | X | X | | |
| RISB-41 | 0 | 1 | X | X | X | | |
| RISB-42 | 0 | 1 | X | X | X | | |
| RISB-43 | 0 | 1 | X | X | X | | |
| RISB-44 | 0 | 1 | X | X | X | | |
| | 5 | 8.5 | X | X | X | | |
| RISB-45 | 0 | 1 | X | X | X | | |
| | 1 | 5 | X | X | X | | |

Table 3-1

Phase I Sampling Summary

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| Location | Start Depth (ft bgs) | End Depth (ft bgs) | Laboratory Analyses | | | | Duplicate Collected? |
|------------------------------------------|-------------------------|-----------------------|---------------------|-----------|------------|------|----------------------|
| | | | TCL VOCs | TCL SVOCs | TAL Metals | PCBs | |
| RISB-46 | 0 | 1 | X | X | X | X | X |
| | 1 | 5 | X | X | X | X | |
| RISB-47 | 0 | 1 | X | X | X | | |
| | 9 | 13 | X | X | X | | |
| RISB-48 | 0 | 1 | X | X | X | | |
| | 13 | 15 | X | X | X | | |
| RISB-49 | 0 | 1 | X | X | X | | |
| | 13 | 17 | X | X | X | | |
| RISB-50 | 9 | 13 | X | X | X | | |
| RISB-51 | 9 | 13 | X | X | X | | X |
| RISB-52 | 0 | 1 | X | X | X | | |
| | 9 | 13 | X | X | X | | |
| Sediment | | | | | | | |
| RISD-FCBK (Background) | | | X | X | X | | |
| RISD-WCBK (Background) | | | X | X | X | | |
| RISD-1 | | | X | X | X | | |
| RISD-2 | | | X | X | X | | |
| RISD-3 | | | X | X | X | | |
| RISD-4 | | | X | X | X | | X |
| RISD-5 | | | X | X | X | | |
| RICB-3 | | | X | X | X | | |
| RI-WASTE | | | X | X | X | | |
| Surface Soil Across Wildcat Creek | | | | | | | |
| RISS-1 | 0 | 1 | | X | X | | |
| RISS-2 | 0 | 1 | | X | X | | |
| RISS-3 | 0 | 1 | | X | X | | |
| RISS-4 | 0 | 1 | | X | X | | |
| RISS-5 | 0 | 1 | | X | X | | |
| RISS-6 | 0 | 1 | | X | X | | |
| RISS-7 | 0 | 1 | | X | X | | |
| RISS-8 | 0 | 1 | | X | X | | |
| RISS-9 | 0 | 1 | | X | X | | |
| RISS-10 | 0 | 1 | | X | X | | X |
| Groundwater | | | | | | | |
| RITW-12 | | | X | | | | |
| RITW-28 | | | X | | | | |
| RITW-34 | | | X | | | | |
| RITW-38 | | | X | | | | |

Notes:

BGS - Below Ground Surface

PCB - Polychlorinated Biphenyl

SVOC - Semi-Volatile Organic Compound

TCL - EPA's Target Compound List

TAL - EPA's Target Analyte List

VOC - Volatile Organic Compound

Table 3-2**Phase I Onsite Sampling Deviation Summary**

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| Location | Deviation | Explanation |
|----------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| RISB-1 | No Subsurface Sample | PID/Color-Tec results negative; SCDHEC removed subsurface sample. |
| RISB-2 | Location Moved | SCDHEC reduced Stablax Materials Area locations from 5 to 3. SB-2 was moved downgradient of SB-25 based on findings. |
| | Subsurface Sample Added | SCDHEC added a subsurface sample based on PID and Color-Tec readings. |
| RISB-4 | Location Moved | SCDHEC reduced Stablax Materials Area locations from 5 to 3. SB-4 was moved downgradient of SB-47 and SB-39 based on findings. |
| RISB-6 | Location Moved | SCDHEC directed location to be moved based on discussion with Mike McAbee. A former drum conveyer area was in this location. |
| RISB-10 | No Surface Sample | No recovery from 0-5 ft bls. |
| RISB-11 | Subsurface Sample Added | Based on SCDHEC request and Color-Tec results. |
| RISB-12 | Subsurface Sample Added | Based on SCDHEC request and PID/Color-Tec results. |
| RISB-14 | Subsurface Sample Added | Duplicate sample sent for 5-9 ft interval; 9-13 ft interval based on Color-Tec. |
| RISB-18 | Location Moved | SCDHEC directed location to be moved outside of asphalt area and added SB-46 to triangulate the incineration pit. |
| | Sample Analyses Removed | SCDHEC approved removal of SVOC/Metals analysis from surface sample. |
| RISB-19 | No Subsurface Sample | Subsurface sample not sent for analysis. Sample was in concrete cored area and was not re-sampled. |
| RISB-20 | No Surface Sample | No recovery from 0-5 ft bls. |
| RISB-22 | No Subsurface Sample | Based on SCDHEC request and PID/Color-Tec results. |
| RISB-24 | No Subsurface Sample | Based on SCDHEC request and PID/Color-Tec results. |
| RISB-25 | Subsurface Sample Added | Based on SCDHEC request and PID/Color-Tec results. |
| RISB-26 | Sample Analyses Removed | SCDHEC approved removal of SVOC/Metals analysis from surface sample. |
| RISB-28 | Subsurface Sample Added | Based on SCDHEC request and PID results. |
| | Sample Analyses Removed | 5-9 ft interval SVOC samples not received by lab; SCDHEC approved not resampling because 9-13 ft sample was collected for VOCs. |
| RISB-29 | Subsurface Sample Added | Based on SCDHEC request and PID results. |
| | Sample Analyses Removed | 9-13 ft interval not sampled for SVOC/Metals; re-sampled as RISB-50 to collect 9-13 ft interval per SCDHEC instructions. |
| RISB-32 | No Subsurface Sample | Based on SCDHEC request and PID/Color-Tec results. |
| RISB-33 | No Surface Sample | Based on SCDHEC request and PID/Color-Tec results. |
| | Subsurface Sample Added | Based on SCDHEC request. |
| RISB-34 | No Surface Sample | Based on SCDHEC request. |
| RISB-41 | No Subsurface Sample | Based on SCDHEC request and PID/Color-Tec results; refusal less than 10 ft bls. |
| RISB-42 | No Subsurface Sample | Based on SCDHEC request and PID/Color-Tec results; refusal less than 10 ft bls. |
| RISB-43 | No Subsurface Sample | Based on SCDHEC request and PID/Color-Tec results; refusal less than 10 ft bls. |
| RISB-45 | Location Added | Based on SCDHEC request prior to starting Phase I. |
| RISB-46 | Location Added | Based on SCDHEC request prior to starting Phase I. |
| RISB-47 | Location Added | Based on SCDHEC request to bound contamination located at RISB-25. |
| RISB-48 | Location Added | Based on SCDHEC request to bound contamination located at RISB-25. |
| RISB-49 | Location Added | Based on SCDHEC request to bound contamination located at RISB-29. |
| RISB-50 | Location Added | Location added to re-collect 9-13 ft interval at SB-29. |
| | No Surface Sample | Location replaced SB-29 subsurface only; no surface sample required. |
| RISB-51 | Location Added | Location added per SCDHEC request and SB-29 results. |
| | No Surface Sample | Based on SCDHEC request. |
| RISB-52 | Location Added | Replaced old SB-6 location. |
| RI-WASTE | Location Added | Location added inside building based on SCDHEC request. Sediment sample was collected in contained area near drum conveyer area. |

Table 3-3
Phase II Sampling Summary
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Location | Start Depth (ft bgs) | End Depth (ft bgs) | Laboratory Analyses | | | | Biochemical/ Geochemical Analyses* | Duplicate Collected? |
|----------------------------|-------------------------|-----------------------|---------------------|-------------|--------------|-----|------------------------------------------|-------------------------|
| | | | TAL Metals | TCL VOCs | TCL SVOCs | TOC | | |
| Groundwater Samples | | | | | | | | |
| BP-1A | | | | x | | | No | |
| BP-1B | | | | x | | | No | |
| EW-1 | | | | x | | | No | |
| EW-4 | | | | x | | | No | |
| MW-100 | | | | x | | | No | |
| MW-101 | | | | x | | | No | |
| MW-102 | | | | x | | | No | |
| MW-103 | | | | x | | | No | |
| MW-104 | | | | x | | | No | |
| MW-105 | | | | x | | | No | |
| MW-106 | | | | x | | | No | |
| MW-107 | | | | x | | | No | |
| MW-108 | | | | x | | | No | |
| MW-111 | | | | x | | | No | |
| MW-112 | | | | x | | | No | |
| MW-113A | | | | x | | | No | |
| MW-113B | | | | x | | | No | |
| MW-114 | | | | x | | | No | |
| MW-115A | | | | x | | x | No | |
| MW-115B | | | | x | | x | No | |
| MW-116 | | | | x | | | No | |
| MW-117 | | | | x | | | Yes | |
| MW-118 | | | | x | | | No | |
| MW-119 | | | | x | | | No | |
| MW-120A | | | | x | | | No | |
| MW-120B | | | | x | | | No | |
| MW-121B | | | | x | | | No | |
| MW-122B | | | | x | | | No | |
| MW-123A | | | | x | | x | No | |
| MW-123B | | | | x | | | No | |
| OB-109 | | | | x | | | No | |
| OB-109B | | | | x | | | No | |
| OB-11 | | | | x | | x | No | |
| OB-110A | | | | x | | x | No | |
| OB-110B | | | | x | | x | No | |
| OB-12 | | | | x | | | No | |
| OB-13 | | | | x | | | No | |
| OB-21 | | | | x | | | No | |
| OB-22 | | | | x | | | No | |
| OB-23 | | | | x | | | No | |
| OB-8A | | | | x | | | No | |
| OB-900 | | | | x | | | No | |
| OB-901 | | | | x | | | No | |
| OB-902 | | | | x | | | No | |
| P-1 | | | | x | | | No | |
| P-2 | | | | x | | | No | |

Table 3-3
Phase II Sampling Summary
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Location | Start Depth (ft bgs) | End Depth (ft bgs) | Laboratory Analyses | | | | Biochemical/ Geochemical Analyses* | Duplicate Collected? |
|---------------------|-------------------------|-----------------------|---------------------|-------------|--------------|-----|------------------------------------------|-------------------------|
| | | | TAL Metals | TCL VOCs | TCL SVOCs | TOC | | |
| P-3 | | | | x | | | | No |
| PW-1 | | | | x | | | | No |
| PW-2A | | | | x | | | | No |
| RIMW-1 | | | x | x | x | | | No |
| RIMW-3 | | | x | x | x | | | No |
| RIMW-4 | | | x | x | x | | | Yes |
| RIMW-5 | | | x | x | x | | x | Yes |
| RIMW-6 | | | x | x | x | | x | No |
| RIMW-7 | | | x | x | x | | | No |
| RIMW-8 | | | x | x | x | | | Yes |
| RIMW-9 | | | x | x | x | | | Yes |
| RIMW-10 | | | x | x | x | | | No |
| RIMW-11 | | | x | x | x | | | No |
| RIMW-12 | | | x | x | x | | | No |
| RIMW-13 | | | x | x | x | | | No |
| RIMW-14 | | | x | x | x | | x | No |
| RIMW-15 | | | x | x | x | | x | Yes |
| RIMW-16 | | | x | x | x | | | No |
| RIMW-18 | | | x | x | x | | | No |
| Packer Test | 44 | 56 | | x | | | | No |
| Packer Test | 56 | 68 | | x | | | | No |
| RIMW-19 | | | x | x | x | | | No |
| Packer Test | 63 | 75 | | x | | | | No |
| Packer Test | 76 | 88 | | x | | | | No |
| RIPZ-1 | | | | | | | x | No |
| RIPZ-3 | | | x | x | x | | | Yes |
| RITW-64 | | | | x | | | | No |
| RITW-65 | | | | x | | | | No |
| W-1 | | | | x | | | x | No |
| W-2 | | | | x | | | | No |
| W-4 | | | | x | | | | No |
| Soil Samples | | | | | | | | |
| RIMW-1 | 10 | 12 | | x | | | | No |
| | 12 | 14 | | x | | | | Yes |
| RIMW-5 | 0 | 1 | | x | | | | No |
| | 4 | 6 | | x | | | | No |
| | 12 | 14 | | x | | | | No |
| | 18 | 20 | | x | | | | No |
| RIMW-6 | 0 | 1 | | x | | | | No |
| | 4 | 6 | | x | | | | No |
| | 8 | 10 | | x | | | | No |
| | 10 | 12 | | | | x | | No |
| | 18 | 19 | | | | x | | No |
| RIMW-7 | 0 | 1 | | x | | | | No |
| | 4 | 6 | | x | | | | No |
| | 8 | 10 | | x | | | | No |

Table 3-3
Phase II Sampling Summary
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Location | Start Depth (ft bgs) | End Depth (ft bgs) | Laboratory Analyses | | | | Biochemical/ Geochemical Analyses* | Duplicate Collected? |
|----------|-------------------------|-----------------------|---------------------|-------------|--------------|-----|------------------------------------------|-------------------------|
| | | | TAL Metals | TCL VOCs | TCL SVOCs | TOC | | |
| RIMW-8 | 0 | 1 | | x | | | No | |
| | 2 | 4 | | x | | | No | |
| | 4 | 6 | | x | | | No | |
| | 6 | 8 | | x | | | No | |
| | 8 | 10 | | x | | | No | |
| | 10 | 12 | | x | | | Yes | |
| | 12 | 14 | | x | | x | No | |
| | 14 | 16 | | | | x | No | |
| | 25 | 27 | | | | x | No | |
| RIMW-13 | 14 | 16 | | | | x | No | |
| RIMW-19 | 8 | 10 | | x | | | No | |
| | 12 | 14 | | x | | | No | |
| | 16 | 18 | | x | | | No | |
| RIPZ-3 | 10 | 12 | | | | x | No | |
| | 18 | 20 | | | | x | No | |
| RISB-56 | 0 | 1 | | x | | | No | |
| | 4 | 6 | | x | | | No | |
| | 8 | 10 | | x | | | No | |
| | 12 | 14 | | x | | | No | |
| RISB-57 | 0 | 1 | | x | | | No | |
| | 3 | 5 | | x | | | No | |
| | 10 | 14 | | x | | | No | |
| | 14 | 18 | | x | | | No | |
| | 18 | 22 | | x | | | No | |
| RISB-58 | 0 | 1 | | x | | | No | |
| | 4 | 6 | | x | | | No | |
| | 10 | 12 | | x | | | No | |
| | 14 | 16 | | x | | | No | |
| | 18 | 20 | | x | | | No | |
| RISB-59 | 0 | 1 | | x | | | No | |
| | 4 | 6 | | x | | | No | |
| | 10 | 12 | | x | | | No | |
| | 12 | 14 | | x | | | Yes | |
| RISB-61 | 10 | 12 | | x | | | No | |
| | 16 | 18 | | x | | | No | |
| | 20 | 22 | | x | | | No | |
| RISB-62 | 0 | 1 | | x | | | No | |
| | 4 | 6 | | x | | | No | |
| | 8 | 10 | | x | | | No | |
| | 12 | 14 | | x | | | Yes | |
| RISB-63 | 0 | 1 | | x | | | No | |
| | 4 | 6 | | x | | | No | |
| | 8 | 10 | | x | | | No | |
| | 14 | 16 | | x | | | No | |
| | 16 | 18 | | x | | | No | |
| RISB-64 | 0 | 5 | | x | x | | No | |
| | 5 | 10 | | x | x | | No | |
| | 10 | 15 | | x | x | | No | |

Table 3-3
Phase II Sampling Summary
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Location | Start Depth (ft bgs) | End Depth (ft bgs) | Laboratory Analyses | | | | Biochemical/ Geochemical Analyses* | Duplicate Collected? |
|----------|-------------------------|-----------------------|---------------------|-------------|--------------|-----|------------------------------------------|-------------------------|
| | | | TAL Metals | TCL VOCs | TCL SVOCs | TOC | | |
| RISB-65 | 0 | 5 | | x | x | | No | |
| | 5 | 10 | | x | x | | No | |
| | 10 | 15 | | x | x | | No | |
| | 15 | 20 | | x | | | No | |
| RISB-66 | 0 | 5 | | x | | | No | |
| | 5 | 9 | | x | | | No | |
| RISB-67 | 0 | 5 | | x | | | No | |
| | 5 | 10 | | x | | | No | |

Notes:

bgs - below ground surface

TAL - Target Analyte List (EPA)

TCL - Target Compound List (EPA)

TOC - Total Organic Carbon

DOC - Dissolved Organic Carbon

SVOCs - Semi-Volatile Organic Compounds

VOCs - Volatile Organic Compounds

* Biochemical and geochemical analyses include dissolved organic carbon, ferrous and total iron, nitrate and nitrite, phosphate, sulfate and sulfide, methane, alkalinity, carbon dioxide, and dissolved oxygen.

Table 3-4
Packer Testing Detections
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | | | | | | | | | | |
|----------|------------------|----------------|-----------------------|-----------------------|--------------------|--------------------|---------------------|--------------------|----------------------|---------|----------------------|---------------|--------------|------------|------------------------|--------------|-------------------|---------|-----------------|------------------------|----------------|-----------------|
| | | | 1,1,1-Trichloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethane | 1,1-Dichloroethene | 1,2-Dichlorobenzene | 1,2-Dichloroethane | 4-Methyl-2-pentanone | Benzene | Bromodichloromethane | Chlorobenzene | Chloroethane | Chloroform | cis-1,2-Dichloroethene | Ethylbenzene | Tetrachloroethene | Toluene | Trichloroethene | Trichlorofluoromethane | Vinyl chloride | Xylenes (Total) |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| RIMW-18 | 44 | 56 | | | | 1.2 | | | 5.23 | | 3.77 | | | 19 | 5.5 | 1.78 | 70 | 80 | 2.08 | | | 3.48 |
| | 56 | 68 | | | | 2.14 | | | | | 3.86 | | | 19 | 6.06 | 1.15 | 93 | 36 | 2.32 | | | 2.28 |
| RIMW-19 | 63 | 75 | 10 | 1.24 | 18 | 60 | | 460 | | | | | | 2.18 | 70 | | 85 | 0.86 | 68 | 1.75 | | |
| | 76 | 88 | 8.92 | 1.24 | 15 | 56 | 0.56 | 3000 | | 0.36 | | 3.76 | 5.89 | 2.07 | 50 | 0.34 | 57 | 1.43 | 42 | 2.72 | 0.62 | |

Table 3-5
RIMW-15 Diffusion Tests
Laboratory Detections

Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Location ID | Depth (ft bgs) | 1,2-Dichloroethane | 1,1-Dichloroethene | trans-1,2-Dichloroethene | Tetrachloroethene | Trichloroethene |
|----------------|----------------|--------------------|--------------------|--------------------------|-------------------|-----------------|
| Units | | ug/L | ug/L | ug/L | ug/L | ug/L |
| RIMW-15 DIFF#1 | 70-77.5 | 1.1 | 2.2 | 1 | 10 | 330 |
| RIMW-15 DIFF#4 | 92.5-100 | 1.3 | 2.9 | 1.3 | 7.3 | 480 |

Notes:

bgs - Below Ground Surface

Only those compounds that were detected in either sample are included on this table.

Samples from Diffusion Samplers 2 (77.5-85 ft bgs) and 3 (85-92.5 ft bgs) were not sent to the laboratory for analysis.

Table 3-6
Phase III Sampling Summary
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Well / Gage ID | Depth Interval (ft bgs) | Water Levels | TCL VOC Analysis | Duplicate Analysis |
|----------------|-------------------------|--------------|------------------|--------------------|
| BP-1A | | X | | |
| BP-1B | | X | | |
| EW-1 | | X | | |
| EW-2 | | X | | |
| EW-3 | | X | | |
| EW-4 | | X | | |
| MW-100 | | X | | |
| MW-101 | | X | | |
| MW-102 | | X | | |
| MW-103 | | X | | |
| MW-104 | | X | | |
| MW-105 | | X | | |
| MW-106 | | X | | |
| MW-107 | | X | | |
| MW-108 | | X | | |
| MW-111 | | X | | |
| MW-112 | | X | | |
| MW-113A | | X | | |
| MW-113B | | X | | |
| MW-114 | | X | | |
| MW-115A | | X | | |
| MW-115B | | X | | |
| MW-118 | | X | | |
| MW-119 | | X | | |
| MW-120A | | X | | |
| MW-120B | | X | | |
| MW-121B | | X | X | |
| MW-122B | | X | X | |
| MW-123A | | X | | |
| OB-109 | | X | | |
| OB-109B | | X | | |
| OB-11 | | X | | |
| OB-110A | | X | | |
| OB-110B | | X | | |
| OB 22 | | X | | |
| OB-8A | | X | | |
| P-1 | | X | | |
| P-2 | | X | | |
| P-3 | | X | | |
| PW-1A | | X | | |
| RIMW-1 | | X | | |
| RIMW-3 | | X | | |
| RIMW-4 | | X | | |
| RIMW-5 | | X | | |
| RIMW-6 | | X | | |
| RIMW-7 | | X | | |
| RIMW-8 | | X | | |
| RIMW-9 | | X | | |
| RIMW-10 | | X | | |
| RIMW-11 | | X | | |
| RIMW-12 | | X | | |
| RIMW-13 | | X | | |
| RIMW-14 | | X | | |
| RIMW-15 | | X | X | |

Table 3-6
Phase III Sampling Summary
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Well / Gage ID | Depth Interval (ft bgs) | Water Levels | TCL VOC Analysis | Duplicate Analysis |
|----------------|-------------------------|--------------|------------------|--------------------|
| RIMW-15* | 70-77.5 | | X | |
| | 92.5-100 | | X | |
| RIMW-16 | | X | | |
| RIMW-18 | | X | | |
| RIMW-19 | | X | | |
| RIMW-20 | | X | X | |
| RIMW-21 | | X | X | |
| RIMW-22 | | X | X | |
| RIMW-23 | | X | X | |
| RIMW-24 | | X | X | |
| RIMW-25 | | X | X | X |
| RIMW-26 | | X | X | |
| RIMW-27 | | X | X | X |
| RIMW-28 | | X | X | |
| RIMW-29 | | X | X | |
| RIMW-30 | | X | X | |
| RIPZ-1 | | X | | |
| RIPZ-2 | | X | | |
| RIPZ-3 | | X | | |
| W-1 | | X | | |
| W-2 | | X | | |
| W-4 | | X | | |

*Diffusion samplers were used on RIMW-15 at two depth intervals (bgs - below ground surface)

Table 4-1**Regulatory Criteria**

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| Compound | CAS # | Region 9 PRGs (2004) | | | Region 4 ESV (mg/kg) | MCL (ug/L) |
|------------------------------------------|-----------|----------------------------|---------------------------------------------|-------------------------|----------------------------|---------------|
| | | Industrial Soil (mg/kg) | Soil Screening Level - DAF 20 (mg/kg) | Tap Water PRG (ug/L) | | |
| <i>Volatile Organic Compounds</i> | | | | | | |
| 1,1,1-Trichloroethane | 71-55-6 | 1,200 | 2 | 3,172 | - | 200 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | 0.93 | 0.003 | 0.055 | - | - |
| 1,1,2-Trichloroethane | 79-00-5 | 1.6 | 0.02 | 0.2 | - | 5 |
| 1,1-Dichloroethane | 75-34-3 | 1,739 | 23 | 811 | - | - |
| 1,1-Dichloroethene | 75-35-4 | 413 | 0.06 | 339 | - | 7 |
| 1,2,4-Trichlorobenzene | 120-82-1 | 216 | 5 | 7.2 | - | 70 |
| 1,2-Dichlorobenzene | 95-50-1 | 600 | 17 | 370 | - | 600 |
| 1,2-Dichloroethane | 107-06-2 | 0.60 | 0.02 | 0.12 | - | 5 |
| 1,2-Dichloropropane | 78-87-5 | 0.74 | 0.03 | 0.16 | - | 5 |
| 1,4-Dichlorobenzene | 106-46-7 | 7.9 | 2 | 0.5 | - | 75 |
| 4-Methyl-2-pentanone | 108-10-1 | 47,001 | - | 1,993 | - | - |
| Acetone | 67-64-1 | 54,321 | 16 | 5,475 | - | - |
| Benzene | 71-43-2 | 1.4 | 0.03 | 0.35 | - | 5 |
| Bromodichloromethane | 75-27-4 | 1.8 | 0.6 | 0.18 | - | - |
| Carbon tetrachloride | 56-23-5 | 0.55 | 0.07 | 0.17 | - | 5 |
| Chlorobenzene | 108-90-7 | 530 | 1 | 106 | - | 100 |
| Chloroethane | 75-00-3 | 6.5 | - | 4.6 | - | - |
| Chloroform | 67-66-3 | 0.47 | 0.6 | 0.17 | - | - |
| cis-1,2-Dichloroethene | 156-59-2 | 146 | 0.4 | 60.8 | - | 70 |
| Cyclohexane | 110-82-7 | 140 | - | 10,342 | - | - |
| Dibromochloromethane | 124-48-1 | 2.6 | 0.4 | 0.13 | - | - |
| Ethylbenzene | 100-41-4 | 395 | 13 | 1,340 | - | 700 |
| Isopropylbenzene | 98-82-8 | 1,977 | - | 658 | - | - |
| Methyl tert-butyl ether | 1634-04-4 | 70 | - | 11 | - | - |
| Methylcyclohexane | 108-87-2 | 8,716 | - | 5,217 | - | - |
| Methylene chloride | 75-09-2 | 20.5 | 0.02 | 4.3 | - | - |
| Tetrachloroethene | 127-18-4 | 1.3 | 0.06 | 0.1 | - | 5 |
| Toluene | 108-88-3 | 520 | 12 | 723 | - | 1000 |
| Trichloroethene | 79-01-6 | 0.11 | 0.06 | 0.028 | - | 5 |
| Vinyl chloride | 75-01-4 | 0.75 | 0.01 | 0.02 | - | 2 |
| Xylenes (Total) | 1330-20-7 | 420 | 210 | 206 | - | 10000 |

Table 4-1**Regulatory Criteria**

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| Compound | CAS # | Region 9 PRGs (2004) | | | Region 4 ESV (mg/kg) | MCL (ug/L) |
|----------------------------------------|-----------|----------------------------|---------------------------------------------|-------------------------|----------------------------|--------------------|
| | | Industrial Soil (mg/kg) | Soil Screening Level - DAF 20 (mg/kg) | Tap Water PRG (ug/L) | | |
| Semi-Volatile Organic Compounds | | | | | | |
| 2-Chlorophenol | 95-57-8 | 236 | 4 | 30.4 | - | - |
| 2-Methylnaphthalene | 91-57-6 | - | - | - | 0.33 | - |
| Benzo(a)anthracene | 56-55-3 | 2.1 | 2 | 0.092 | 0.33 | - |
| Benzo(a)pyrene | 50-32-8 | 0.21 | 8 | 0.0092 | 0.33 | 0.2 |
| Bis(2-ethylhexyl)phthalate | 117-81-7 | 123 | - | 4.8 | 0.18 | 6 |
| Chrysene | 218-01-9 | 211 | 160 | 9.2 | 0.33 | - |
| Fluoranthene | 206-44-0 | 22,000 | 4,300 | 1,460 | 0.33 | - |
| Fluorene | 86-73-7 | 26,281 | 560 | 243 | 0.33 | - |
| Naphthalene | 91-20-3 | 188 | 84 | 6.2 | 0.33 | - |
| NDPA/DPA | 86-30-6 | 352 | 1 | 13.7 | - | - |
| Phenanthrene | 85-01-8 | - | - | - | 0.33 | - |
| Pyrene | 129-00-0 | 29,126 | 4,200 | 183 | 0.33 | - |
| Inorganics | | | | | | |
| Antimony | 7440-36-0 | 409 | 5 | 14.6 | 12 | 6 |
| Arsenic | 7440-38-2 | 1.6 | 29 | 0.045 | 7.24 | 10 |
| Cadmium | 7440-43-9 | 451 | 8 | 18.2 | 1 | 5 |
| Chromium | 7440-47-3 | 448 ^A | 38 ^A | 109 ^B | 52.3 | 100 |
| Copper | 7440-50-8 | 40,877 | - | 1,460 | 18.7 | 1,300 ^C |
| Iron | 7439-89-6 | 100,000 | - | 10,950 | - | - |
| Lead | 7439-92-1 | 800 | - | - | 30.2 | 15 ^C |
| Manganese | 7439-96-5 | 19,458 | - | 876 | - | - |
| Mercury | 7487-94-7 | 306 | - | 10.9 | 0.13 | 2 |
| Nickel | 7440-02-0 | 20,439 | 130 | 730 | 15.9 | - |
| Silver | 7440-22-4 | 5,110 | 34 | 182 | 2 | - |
| Thallium | 7440-28-0 | 67.5 | - | 2.4 | - | 2 |
| Zinc | 7440-66-6 | 100,000 | 12,000 | 10,950 | 124 | - |

Notes:

DAF - Dilution Attenuation Factor

MCL - Maximum Contaminant Level

PRG - EPA Region 9 Preliminary Remediation Goal (10/2004)

ESV - EPA Region 4 Ecological Screening Value (11/2001)

Only detected compounds in soil, groundwater, or sediment above criteria are included on this table.

^A Total Chromium (1:6 ratio Cr VI:Cr III)^B Chromium VI^C Action Level

Table 4-2
September 2007 Groundwater Elevations

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| Well / Gage ID | Top of Casing Elevation (ft) | Total Depth (ft btoc) | Hydraulic Zone | Depth to Product (ft btoc) | Depth to Water (ft btoc) | Water Elevation (ft) | Product Thickness (ft) |
|----------------|------------------------------|-----------------------|-------------------|----------------------------|--------------------------|----------------------|------------------------|
| BP-1A | 523.03 | 25.2 | PWR | | 15.38 | 507.65 | |
| BP-1B | 523.74 | 39.68 | PWR/Bedrock | | 16.32 | 507.42 | |
| EW-1 | 525.19 | 64 | No Data | 14.76 | 14.95 | 510.24 | 0.19 |
| EW-2 | 525.12 | 65 | PWR | Active Pumping Well | | | |
| EW-3 | 521.13 | 52 | Bedrock | Active Pumping Well | | | |
| EW-4 | 528.18 | 78.4 | No Data | | 16.95 | 511.23 | |
| MW-100 | 530.04 | 41.6 | Bedrock | | 19.61 | 510.43 | |
| MW-101 | 529.95 | 32 | PWR | | 17.79 | 512.16 | |
| MW-102 | 531.31 | 36.1 | Bedrock | | 19.16 | 512.15 | |
| MW-103 | 523.16 | 31.14 | PWR | | 13.8 | 509.36 | |
| MW-104 | 522.36 | 31.8 | PWR | | 13.28 | 509.08 | |
| MW-105 | 528.29 | 44.7 | PWR | | 20.89 | 507.40 | |
| MW-106 | 524.76 | 20.42 | Saprolite/Bedrock | | 15.75 | 509.01 | |
| MW-107 | 521.55 | 30.49 | PWR | | 12.56 | 508.99 | |
| MW-108 | 517.94 | 21.38 | Bedrock | | 10.25 | 507.69 | |
| MW-111 | 522.96 | 19.88 | Saprolite | | 15.58 | 507.38 | |
| MW-112 | 522.11 | 17.22 | PWR | | 14.46 | 507.65 | |
| MW-113A | 524.38 | 20.08 | PWR | | 16.51 | 507.87 | |
| MW-113B | 521.20 | 40.8 | PWR/Bedrock | | 14.42 | 506.78 | |
| MW-114 | 522.92 | 14.85 | PWR | Dry | | | |
| MW-115A | 519.47 | 14.16 | PWR | | 12.17 | 507.30 | |
| MW-115B | 518.90 | 32.33 | PWR/Bedrock | | 11.31 | 507.59 | |
| MW-116 | 524.43 | 24.1 | PWR/Bedrock | Abandoned 8/2007 | | | |
| MW-117 | 521.69 | 19.4 | Saprolite/Bedrock | Abandoned 8/2007 | | | |
| MW-118 | 523.31 | 15.7 | Saprolite | | 15.48 | 507.83 | |
| MW-119 | 522.88 | 19.5 | PWR | | 14.42 | 508.46 | |
| MW-120A | 518.98 | 18.7 | PWR | | 11.79 | 507.19 | |
| MW-120B | 518.07 | 38.28 | Bedrock | | 10.74 | 507.33 | |
| MW-121B | 519.32 | 40.25 | Bedrock | | 11.69 | 507.63 | |
| MW-122B | 520.32 | 39.42 | Bedrock | | 12.33 | 507.99 | |
| MW-123A | 529.14 | 32.5 | PWR | | 18.46 | 510.68 | |
| MW-123B | 529.06 | 51.9 | Bedrock | Abandoned 8/2007 | | | |
| OB-109 | 532.64 | 28.02 | PWR | | 21.92 | 510.72 | |
| OB-109B | 530.38 | 60.8 | Bedrock | | 19.68 | 510.70 | |
| OB-11 | 524.50 | 20.21 | Saprolite | 16.01 | 16.25 | 508.25 | 0.24 |
| OB-110A | 526.41 | 30.35 | PWR | | 15.96 | 510.45 | |
| OB-110B | 525.60 | 132.1 | Bedrock | | 16.27 | 509.33 | |
| OB-12 | 524.92 | 20 | Saprolite | Abandoned 8/2007 | | | |
| OB-13 | 524.92 | 19.9 | Saprolite | Abandoned 8/2007 | | | |
| OB-21 | 524.91 | 27.7 | PWR | Abandoned 8/2007 | | | |
| OB-22 | 524.82 | 27.35 | PWR | 16.17 | 16.43 | 508.39 | 0.26 |
| OB-23 | 524.55 | 23.1 | PWR | Abandoned 8/2007 | | | |
| OB-8A | 526.14 | 25.7 | PWR | | 15.37 | 510.77 | |
| OB-900 | 524.20 | 23 | No Data | Abandoned 8/2007 | | | |
| OB-901 | 523.22 | 22.2 | No Data | Abandoned 8/2007 | | | |
| OB-902 | 524.36 | 25 | No Data | Abandoned 8/2007 | | | |

Table 4-2
September 2007 Groundwater Elevations

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| Well / Gage ID | Top of Casing Elevation (ft) | Total Depth (ft btoc) | Hydraulic Zone | Depth to Product (ft btoc) | Depth to Water (ft btoc) | Water Elevation (ft) | Product Thickness (ft) |
|----------------|------------------------------|-----------------------|----------------|----------------------------|--------------------------|----------------------|------------------------|
| P-1 | 525.73 | 17.65 | Saprolite | | 15.35 | 510.38 | |
| P-2 | 523.98 | 20 | Saprolite | 15.19 | 16.21 | 507.77 | 1.02 |
| P-3 | 526.12 | 34.82 | PWR | | 15.7 | 510.42 | |
| PW-1 | 531.19 | 166.5 | No Data | | 20.13 | 511.06 | |
| PW-1A | 526.84 | 26.88 | No Data | 18.13 | 21.56 | 505.28 | 3.43 |
| PW-2 | 535.88 | > 202 | No Data | Well Not Found | | | |
| PW-2A | 525.85 | 32.4 | PWR/Bedrock | Abandoned 8/2007 | | | |
| PW-3 | 525.88 | 187 | No data | Well Not Found | | | |
| RIMW-1 | 531.31 | 30 | PWR | | 19.63 | 511.68 | |
| RIMW-3 | 531.76 | 35 | PWR | | 19.21 | 512.55 | |
| RIMW-4 | 529.26 | 31 | PWR | | 18.5 | 510.76 | |
| RIMW-5 | 531.88 | 26.5 | PWR | | 20.31 | 511.57 | |
| RIMW-6 | 526.21 | 31 | PWR | | 15.98 | 510.23 | |
| RIMW-7 | 536.73 | 30 | PWR | | 23.42 | 513.31 | |
| RIMW-8 | 530.59 | 27 | PWR | | 19.48 | 507.17 | |
| RIMW-9 | 524.48 | 23 | Saprolite | | 15.11 | 509.37 | |
| RIMW-10 | 529.46 | 38 | PWR | | 20.91 | 508.55 | |
| RIMW-11 | 532.11 | 27 | Saprolite | | 17.39 | 514.72 | |
| RIMW-12 | 529.10 | 36 | PWR | | 18.03 | 511.07 | |
| RIMW-13 | 536.49 | 83 | Bedrock | | 21.85 | 514.64 | |
| RIMW-14 | 529.77 | 76.5 | Bedrock | | 19.44 | 510.33 | |
| RIMW-15 | 526.31 | 102.5 | Deep PWR | | 16.38 | 509.93 | |
| RIMW-16 | 526.40 | 56 | PWR | | 16.26 | 510.14 | |
| RIMW-18 | 532.05 | 56.5 | Bedrock | | 15.75 | 516.30 | |
| RIMW-19 | 529.51 | 81 | Bedrock | | 18.86 | 510.65 | |
| RIMW-20 | 520.27 | 119.6 | Bedrock | | 9.96 | 510.31 | |
| RIMW-21 | 517.73 | 87.6 | Bedrock | | 5.28 | 512.45 | |
| RIMW-22 | 526.45 | 135.2 | Bedrock | | 16.36 | 510.09 | |
| RIMW-23 | 522.40 | 57.9 | Bedrock | | 14.05 | 508.35 | |
| RIMW-24 | 522.57 | 25 | Saprolite | | 14.21 | 508.36 | |
| RIMW-25 | 526.46 | 54.8 | Bedrock | | 15.66 | 510.80 | |
| RIMW-26 | 522.01 | 93.4 | Bedrock | | 11.91 | 510.10 | |
| RIMW-27 | 522.91 | 87 | PWR | | 14.81 | 508.10 | |
| RIMW-28* | 525.95 | 66.5 | Bedrock | | 26.42 | 499.53 | |
| RIMW-29 | 521.06 | 63.8 | Bedrock | | 13.37 | 507.69 | |
| RIMW-30 | 520.20 | 92 | PWR | | 10.13 | 510.07 | |
| RIPZ-1 | 516.31 | 9 | Alluvium | Dry | | | |
| RIPZ-2 | 519.12 | 74 | Bedrock | | 10.98 | 508.14 | |
| RIPZ-3 | 522.91 | 46 | PWR | | 14.57 | 508.34 | |
| W-1 | 537.66 | 29.9 | PWR | | 24.57 | 513.09 | |
| W-2 | 529.48 | 22.7 | PWR | | 21.9 | 507.58 | |
| W-3 | 522.80 | 27.3 | No Data | Well Not Found | | | |
| W-4 | 518.30 | 22.25 | Saprolite | | 9.35 | 508.95 | |

*RIMW-28 water elevation was approximately 10 feet below surrounding wells. The well had not likely fully recharged since being installed.

Table 4-3
Calculated Vertical Gradients for Well Pairs

Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Well Pair | Well ID | Hydraulic Zone | Groundwater Elevation (ft) | Distance Between Screens (ft) | Hydraulic Gradient (ft / ft) | Direction |
|-----------|---------|----------------|----------------------------|-------------------------------|------------------------------|-----------|
| 1 | RIMW-11 | Saprolite | 514.72 | 29.5 | 0.054 | Up |
| | RIMW-18 | Bedrock | 516.30 | | | |
| 2 | W-1 | PWR | 513.09 | 50.5 | 0.031 | Up |
| | RIMW-13 | Bedrock | 514.64 | | | |
| 3 | W-2 | PWR | 507.58 | 22.5 | 0.008 | Down |
| | MW-105 | PWR | 507.40 | | | |
| 4 | MW-115A | PWR | 507.30 | 17 | 0.017 | Up |
| | MW-115B | PWR / Bedrock | 507.59 | | | |
| 5 | RIMW-30 | PWR | 510.07 | 25.1 | 0.010 | Up |
| | RIMW-20 | Bedrock | 510.31 | | | |
| 6 | BP-1A | PWR | 507.65 | 15 | 0.015 | Down |
| | BP-1B | PWR / Bedrock | 507.42 | | | |
| 7 | RIMW-24 | Saprolite | 508.36 | 31.8 | 0.0003 | Down |
| | RIMW-23 | Bedrock | 508.35 | | | |
| 8 | RIMW-6 | PWR | 510.23 | 25 | 0.003 | Down |
| | RIMW-16 | PWR | 510.14 | | | |
| 9 | RIMW-16 | PWR | 510.14 | 35 | 0.006 | Down |
| | RIMW-15 | Deep PWR | 509.93 | | | |
| 10 | RIMW-15 | Deep PWR | 509.93 | 44.9 | 0.004 | Up |
| | RIMW-22 | Bedrock | 510.09 | | | |
| 11 | RIMW-4 | PWR | 510.76 | 50 | 0.002 | Down |
| | RIMW-19 | Bedrock | 510.65 | | | |
| 12 | OB-110A | PWR | 510.45 | 105 | 0.011 | Down |
| | OB-110B | Bedrock | 509.33 | | | |
| 13 | P-1 | Saprolite | 510.38 | 17.3 | 0.002 | Up |
| | P-3 | PWR | 510.42 | | | |

Notes:

Groundwater elevations are from Phase III of the RI (September 2007).

Distance between screens was calculated as the distance from the center of screen for well 1 to the center of screen for well 2.

Hydraulic gradient = [GW Elev Well 1 - GW Elev Well 2] / Distance Between Screens

Table 4-4
Well Summary
Remedial Investigation Report
September 2008
PSC Site - Rock Hill, South Carolina

| Location ID | Hydraulic Zone | Year Installed | Construction | Screened Interval (ft bgs) | Measured Depth from TOC (ft) | Top of Casing Elevation (ft) | Free Product | | Depth to Water (ft) | Groundwater Elevation (ft) | Pre-RI VOC / SVOC Detections Above AL? |
|-------------|-------------------|----------------|-----------------------------------------|----------------------------|------------------------------|------------------------------|----------------|-------------------------------|---------------------|----------------------------|----------------------------------------|
| | | | | | | | Yes or No | If Yes, Depth to Product (ft) | | | |
| BP-1A | PWR | 1988 | 2" PVC | 13.25 - 22.7 | 25.20 | 523.03 | No | | 15.38 | 507.65 | Yes |
| BP-1B | PWR/Bedrock | 1992 | 2" PVC | 28 - 38 | 39.68 | 523.74 | No | | 16.32 | 507.42 | Yes |
| EW-1 | No Data | 1988 | OH with SS surface casing | Unknown | -64 | 525.19 | Yes | 14.76 | 14.95 | 510.24 | Yes |
| EW-2 | PWR | 1994 | 6" SS | 45 - 65 | 65.00 | 525.12 | No | | Active Pumping Well | | Yes |
| EW-3 | Bedrock | 1994 | 6" SS casing to 25.5'; OH to 52' | 25.5 - 52 | 52.00 | 521.13 | No | | Active Pumping Well | | Yes |
| EW-4 | No Data | Unknown | 6" SS with OH | Unknown | 78.40 | 528.18 | No | | 16.95 | 511.23 | Unknown |
| MW-100 | Bedrock | 1983 | 4" GS | 32 - 37 | 41.60 | 530.04 | No | | 19.61 | 510.43 | Yes |
| MW-101 | PWR | 1983 | 4" GS | 24.5 - 29.5 | 32.00 | 529.95 | No | | 17.79 | 512.16 | Yes |
| MW-102 | Bedrock | 1983 | 4" GS to 23.3'; OH 24-34' | 24 - 34 | 36.10 | 531.31 | No | | 19.16 | 512.15 | Yes |
| MW-103 | PWR | 1983 | 4" GS | 23.5 - 28.5 | 31.14 | 523.16 | No | | 13.80 | 509.36 | Yes |
| MW-104 | PWR | 1983 | 4" GS casing with SS screen | 25 - 30 | 31.80 | 522.36 | No | | 13.28 | 509.08 | Yes |
| MW-105 | PWR | 1983 | 4" GS | 38 - 42 | 44.70 | 528.29 | No | | 20.89 | 507.40 | Yes |
| MW-106 | Saprolite/Bedrock | 1983 | 2" PVC | 22.5 - 27.5 | 20.42 | 524.76 | No | | 15.75 | 509.01 | No |
| MW-107 | PWR | 1983 | 2" PVC | 8.2 - 13.2 | 30.49 | 521.55 | No | | 12.56 | 508.99 | No |
| MW-108 | Bedrock | 1983 | 2" PVC | 13 - 18 | 21.38 | 517.94 | No | | 10.25 | 507.69 | No |
| MW-111 | Saprolite | 1991 | 2" PVC | 12.9 - 17.9 | 19.88 | 522.96 | No | | 15.58 | 507.38 | No |
| MW-112 | PWR | 1991 | 2" PVC | 11.2 - 16.2 | 17.22 | 522.11 | No | | 14.46 | 507.65 | Unknown |
| MW-113A | PWR | 1991 | 2" PVC | 12.2 - 17.2 | 20.08 | 524.38 | No | | 16.51 | 507.87 | Yes |
| MW-113B | PWR/Bedrock | 1992 | 2" PVC | 34 - 44 | 40.80 | 521.20 | No | | 14.42 | 506.78 | Yes |
| MW-114 | PWR | 1990 | 2" PVC | 8.2 - 13.2 | 14.85 | 522.92 | No | | Dry | | Unknown |
| MW-115A | PWR | 1992 | 2" PVC | 5 - 11 | 14.16 | 519.47 | No | | 12.17 | 507.30 | Yes |
| MW-115B | PWR/Bedrock | 1992 | 2" PVC | 20 - 30 | 32.33 | 518.90 | No | | 11.31 | 507.59 | Yes |
| MW-116 | PWR/Bedrock | 1992 | 2" PVC | 12 - 22 | 24.10 | 524.43 | Abandoned 2007 | | | | Unknown |
| MW-117 | Saprolite/Bedrock | 1992 | 2" PVC | 11 - 21 | 19.40 | 521.69 | Abandoned 2007 | | | | Yes |
| MW-118 | Saprolite | 1992 | 2" PVC | 5.5 - 15.5 | 15.70 | 523.31 | No | | 15.48 | 507.83 | Unknown |
| MW-119 | PWR | 1992 | 2" PVC | 9 - 19.5 | 19.50 | 522.88 | No | | 14.42 | 508.46 | Unknown |
| MW-120A | PWR | 1998 | 2" PVC Casing with SS screen | 5 - 15 | 18.70 | 518.98 | No | | 11.79 | 507.19 | No |
| MW-120B | Bedrock | 1998 | 2" PVC Casing with SS screen | 24 - 34 | 38.28 | 518.07 | No | | 10.74 | 507.33 | No |
| MW-121B | Bedrock | 1998 | 2" PVC Casing with SS screen | 25 - 35 | 40.25 | 519.32 | No | | 11.69 | 507.63 | No |
| MW-122B | Bedrock | 1998 | 2" PVC Casing with SS screen | 25.5 - 35.5 | 39.42 | 520.32 | No | | 12.33 | 507.99 | No |
| MW-123A | PWR | 2000 | 2" SS | 20 - 30 | 32.50 | 529.14 | No | | 18.46 | 510.68 | Unknown |
| MW-123B | Bedrock | 2000 | 2" SS | 39 - 49 | 51.90 | 529.06 | Abandoned 2007 | | | | Unknown |
| OB-109 | PWR | 1985 | 2" SS | 20 - 25 | 28.02 | 532.64 | No | | 21.92 | 510.72 | Yes |
| OB-109B | Bedrock | 1997 | 8" PVC to 32'; 2" to 51' with SS screen | 51 - 61 | 60.80 | 530.38 | No | | 19.68 | 510.70 | Yes |
| OB-11 | Saprolite | 1991 | Unknown | ? - 19 | 20.21 | 524.50 | Yes | 16.01 | 16.25 | 508.25 | Unknown |
| OB-110A | PWR | 1985 | 2" GS casing with SS screen | 25 - 30 | 30.35 | 526.41 | No | | 15.96 | 510.45 | Yes |
| OB-110B | Bedrock | 1986 | 1.5" PVC | 130 - 135 | 132.10 | 525.60 | No | | 16.27 | 509.33 | Yes |
| OB-12 | Saprolite | 1991 | Unknown | ? - 18 | 20.00 | 524.92 | Abandoned 2007 | | | | Unknown |
| OB-13 | Saprolite | 1991 | Unknown | 13.2 - 18.2 | 19.90 | 524.92 | Abandoned 2007 | | | | Unknown |
| OB-21 | PWR | 1991 | Unknown | ? - 24.8 | 27.70 | 524.91 | Abandoned 2007 | | | | Unknown |
| OB-22 | PWR | 1991 | Unknown | ? - 24.7 | 27.35 | 524.82 | Yes | 16.17 | 16.43 | 508.39 | Unknown |
| OB-23 | PWR | 1991 | Unknown | ? - 24.3 | 23.10 | 524.55 | Abandoned 2007 | | | | Unknown |
| OB-8A | PWR | 1985 | 2" SS | 20.5 - 25.5 | 25.70 | 526.14 | No | | 15.37 | 510.77 | Yes |

Table 4-4
Well Summary
Remedial Investigation Report
September 2008
PSC Site - Rock Hill, South Carolina

| Location ID | Hydraulic Zone | Year Installed | Construction | Screened Interval (ft bgs) | Measured Depth from TOC (ft) | Top of Casing Elevation (ft) | Free Product | | Depth to Water (ft) | Groundwater Elevation (ft) | Pre-RI VOC / SVOC Detections Above AL? |
|-------------|----------------|----------------|-------------------------------------------------------------|----------------------------|------------------------------|------------------------------|----------------|-------------------------------|---------------------|----------------------------|----------------------------------------|
| | | | | | | | Yes or No | If Yes, Depth to Product (ft) | | | |
| OB-900 | No Data | Unknown | Unknown | Unknown | 23.00 | 524.20 | Abandoned 2007 | | | | Unknown |
| OB-901 | No Data | Unknown | Unknown | Unknown | 22.20 | 523.22 | Abandoned 2007 | | | | Unknown |
| OB-902 | No Data | Unknown | Unknown | Unknown | 25.00 | 524.36 | Abandoned 2007 | | | | Unknown |
| P-1 | Saprolite | 1988 | 2" PVC | 8.1 - 18.1 | 17.65 | 525.73 | No | | 15.35 | 510.38 | Unknown |
| P-2 | Saprolite | 1988 | 2" PVC | 9.5 - 19.5 | 20.00 | 523.98 | Yes | 15.19 | 16.21 | 507.77 | Unknown |
| P-3 | PWR | 1988 | 2" PVC | 27.9 - 32.8 | 34.82 | 526.12 | No | | 15.70 | 510.42 | Unknown |
| PW-1 | No Data | 1979 | 6" SS | Unknown | 166.50 | 531.19 | No | | 20.13 | 511.06 | Yes |
| PW-1A | No Data | 1991 | Unknown | ? - 22.7 | 26.88 | 526.84 | Yes | 18.13 | 21.56 | 505.28 | Unknown |
| PW-2 | No Data | 1981 | 6" ??? | Unknown | > 202 | 535.88 | Not located | | | | Yes |
| PW-2A | PWR/Bedrock | 1991 | Unknown | ? - 29.6 | 32.40 | 525.85 | Abandoned 2007 | | | | Unknown |
| PW-3 | No data | 1987 | 4" PVC to 35'; 6.5" OH to 129'; OH with 1 or 2" PVC to 187' | 129 - 187 | 187.00 | 525.88 | Not located | | | | Yes |
| RIMW-1 | PWR | 2006 | 2" PVC | 19-29 | 30 | 531.31 | No | | 19.63 | 511.68 | N/A |
| RIMW-3 | PWR | 2006 | 2" PVC | 24-34 | 35 | 531.76 | No | | 19.21 | 512.55 | N/A |
| RIMW-4 | PWR | 2006 | 2" PVC | 20-30 | 31 | 529.26 | No | | 18.5 | 510.76 | N/A |
| RIMW-5 | PWR | 2006 | 2" PVC | 16-26 | 26.5 | 531.88 | No | | 20.31 | 511.57 | N/A |
| RIMW-6 | PWR | 2006 | 2" PVC | 20-30 | 31 | 526.21 | No | | 15.98 | 510.23 | N/A |
| RIMW-7 | PWR | 2006 | 2" PVC | 19-29 | 30 | 536.73 | No | | 23.42 | 513.31 | N/A |
| RIMW-8 | PWR | 2006 | 2" PVC | 16-26 | 27 | 530.59 | No | | 19.48 | 507.17 | N/A |
| RIMW-9 | Saprolite | 2006 | 2" PVC | 12-22 | 23 | 524.48 | No | | 15.11 | 509.37 | N/A |
| RIMW-10 | PWR | 2006 | 2" PVC | 27-37 | 38 | 529.46 | No | | 20.91 | 508.55 | N/A |
| RIMW-11 | Saprolite | 2006 | 2" PVC | 16-26 | 27 | 532.11 | No | | 17.39 | 514.72 | N/A |
| RIMW-12 | PWR | 2006 | 2" PVC | 25-35 | 36 | 529.10 | No | | 18.03 | 511.07 | N/A |
| RIMW-13 | Bedrock | 2006 | 6" steel casing to 37', 2" PVC to 82' | 72-82 | 83 | 536.49 | No | | 21.85 | 514.64 | N/A |
| RIMW-14 | Bedrock | 2006 | 6" steel casing to 46', 2" PVC to 75' | 65-75 | 76.5 | 529.77 | No | | 19.44 | 510.33 | N/A |
| RIMW-15 | Deep PWR | 2006 | 2" PVC | 70-100 | 102.5 | 526.31 | No | | 16.38 | 509.93 | N/A |
| RIMW-16 | PWR | 2006 | 2" PVC | 45-55 | 56 | 526.40 | No | | 16.26 | 510.14 | N/A |
| RIMW-18 | Bedrock | 2006 | 6" steel casing to 40', 2" PVC to 55.5' | 45.5-55.5 | 56.5 | 532.05 | No | | 15.75 | 516.30 | N/A |
| RIMW-19 | Bedrock | 2006 | 6" steel casing to 55', 2" PVC to 80' | 70-80 | 81 | 529.51 | No | | 18.86 | 510.65 | N/A |
| RIMW-20 | Bedrock | 2007 | 6" steel casing to 100', 2" PVC to 120' | 104.6-119.6 | 119.57 | 520.27 | No | | 9.96 | 510.31 | N/A |
| RIMW-21 | Bedrock | 2007 | 6" steel casing to 70', 2" PVC to 88' | 77.3-87.3 | 87.57 | 517.73 | No | | 5.28 | 512.45 | N/A |
| RIMW-22 | Bedrock | 2007 | 6" steel casing to 117', 2" PVC to 135' | 124.9-134.9 | 135.20 | 526.45 | No | | 16.36 | 510.09 | N/A |
| RIMW-23 | Bedrock | 2007 | 6" steel casing to 37', 2" PVC to 58' | 45.8-57.8 | 57.88 | 522.4 | No | | 14.05 | 508.35 | N/A |
| RIMW-24 | Saprolite | 2007 | 2" PVC | 15-25 | 25.00 | 522.57 | No | | 14.21 | 508.36 | N/A |
| RIMW-25 | Bedrock | 2007 | 6" steel casing to 40', 2" PVC to 55' | 44.7-54.7 | 54.76 | 526.46 | No | | 15.66 | 510.80 | N/A |
| RIMW-26 | Bedrock | 2007 | 6" steel casing to 71', 2" PVC to 94' | 83.2-93.2 | 93.37 | 522.01 | No | | 11.91 | 510.10 | N/A |
| RIMW-27 | PWR | 2007 | 6" steel casing to 69', 2" PVC to 87' | 76-86 | 87.00 | 522.91 | No | | 14.81 | 508.10 | N/A |
| RIMW-28 | Bedrock | 2007 | 6" steel casing to 46', 2" PVC to 67' | 56.4-66.4 | 66.52 | 525.95 | No | | 26.42 | 499.53 | N/A |
| RIMW-29 | Bedrock | 2007 | 6" steel casing to 47', 2" PVC to 64' | 54-64 | 63.83 | 521.06 | No | | 13.37 | 507.69 | N/A |
| RIMW-30 | PWR | 2007 | 2" PVC | 82-92 | 92.00 | 520.2 | No | | 10.13 | 510.07 | N/A |
| RIPZ-1 | Alluvium | 2006 | 1" PVC | 3-8 | 9 | 516.31 | No | | 4.97 | 511.34 | N/A |
| RIPZ-2 | Bedrock | 2006 | 4" PVC to 38', 1" PVC to 73' | 63-73 | 74 | 519.12 | No | | 10.98 | 508.14 | N/A |
| RIPZ-3 | PWR | 2006 | 6" Steel casing to 35', 1" PVC to 44.5 | 39.5-44.5 | 46 | 522.91 | No | | 14.57 | 508.34 | N/A |

Table 4-4
Well Summary

Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Location ID | Hydraulic Zone | Year Installed | Construction | Screened Interval (ft bgs) | Measured Depth from TOC (ft) | Top of Casing Elevation (ft) | Free Product | | Depth to Water (ft) | Groundwater Elevation (ft) | Pre-RI VOC / SVOC Detections Above AL? |
|-------------|----------------|----------------|--------------|----------------------------|------------------------------|------------------------------|------------------|-------------------------------|---------------------|----------------------------|----------------------------------------|
| | | | | | | | Yes or No | If Yes, Depth to Product (ft) | | | |
| W-1 | PWR | 1981 | 4" PVC | 24 - 29 | 29.90 | 537.66 | No | | 24.57 | 513.09 | Unknown |
| W-2 | PWR | 1981 | 4" PVC | 15 - 20 | 22.70 | 529.48 | No | | 21.90 | 507.58 | Unknown |
| W-3 | No Data | 1981 | 4" PVC | 20 - 25 | 27.30 | 522.80 | Unable to Locate | | | | Unknown |
| W-4 | Saprolite | 1981 | 4" PVC | 15 - 20 | 22.25 | 518.30 | No | | 9.35 | 508.95 | Unknown |

Notes:

- AL - EPA Action Level
- GS - Galvanized Steel
- NA - Not Analyzed
- OH - Open Hole
- PVC - Polyvinyl Chloride
- SS - Stainless Steel

Table information originates from several sources, including available boring logs, well construction forms, CDM's 2004 investigation, historical reports, and/or information provided by URS. Where information could not be obtained from an available source, "Unknown" was used. Measured depths to water and to product are from Phase III of the RI (CDM, September 2007). Water bearing zone designations are based on professional judgement after reviewing available information. Monitor Well PW-2, PW-3, and W-3 could not be located during the September 2007 sampling event.

Table 4-5
Summary of Soil Detections Above Screening Criteria
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | | | | | | | | SVOCs | | Inorganics | | | | | |
|----------------------|------------------|----------------|-----------------------|-----------------------|--------------------|------------------------|---------------------|--------------------|---------------------|---------|---------|---------------|------------|------------------------|--------------|--------------------|-------------------|---------|-----------------|----------------|-----------------|------------|---------|----------|--------|----------|-------|
| | | | 1,1,1-Trichloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethene | 1,2,4-Trichlorobenzene | 1,2-Dichlorobenzene | 1,2-Dichloroethane | 1,4-Dichlorobenzene | Acetone | Benzene | Chlorobenzene | Chloroform | cis-1,2-Dichloroethene | Ethylbenzene | Methylene chloride | Tetrachloroethene | Toluene | Trichloroethene | Vinyl chloride | Xylenes (Total) | NDPA/DPA | Arsenic | Chromium | Nickel | Thallium | |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | mg/kg | mg/kg | mg/kg | mg/kg |
| SSLs (DAF 20) | | | 2,000 | 20 | 60 | 5,000 | 17,000 | 20 | 2,000 | 16,000 | 30 | 1,000 | 600 | 400 | 13,000 | 20 | 60 | 12,000 | 60 | 10 | 2.1E+05 | 1,000 | 29 | 38 | 130 | - | |
| Industrial Soil PRGs | | | 1.2E+06 | 1,605 | 4.1E+05 | 2.2E+05 | 6.0E+05 | 603 | 7,867 | 5.4E+07 | 1,409 | 5.3E+05 | 470 | 1.5E+05 | 4.0E+05 | 20,527 | 1,309 | 5.2E+05 | 115 | 746 | 4.2E+05 | 3.5E+05 | 1.6 | 448 | 20,439 | 67 | |
| Phase I | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RI-BCK1 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | 1.6 |
| RISB-1 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 1.7 |
| RISB-2 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 45 |
| Duplicate | 0 | 1 | | | | | | 71 | | | | | | | | | | | | | | | | | | | 1.8 |
| RISB-2 | 9 | 13 | | | | | | 780 | | 247 | | | | | | | | | 67 | | | | | | | | 2 |
| RISB-2 | 17 | 21 | | | | | | 350 | | 264 | | | | | | | | | | | | | | | | | 98 |
| RISB-4 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 73 |
| RISB-4 | 5 | 9 | | | | | | | | | | | | | | | | | | | | | | | | | 2.8 |
| RISB-6 | 0 | 1 | | | | | | | | | | | | | | | 2700 | | | 300 | | | | | | | |
| RISB-6 | 13 | 15 | | | | | | | | | | | | | | | 1000 | | | | | | | | | | |
| RISB-7 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 91 |
| RISB-7 | 1 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | 1.6 |
| RISB-11 | 1 | 5 | | | | | | | | | | | 840 | | | | | | | | | | | | | | 48 |
| RISB-11 | 5 | 9 | | | | | | 100 | | 42 | | | | | | | | | | | | | | | | | 68 |
| RISB-12 | 0 | 1 | | | | | | | | 150 | | | | | | | | | | | | | | | | | 1.7 |
| RISB-12 | 1 | 5 | | | | | | | | 19000 | 5600 | | | 150000 | | | | 300 | 1900000 | 240 | | 650000 | | | | | 43 |
| RISB-12 | 17 | 21 | | | | | | | | | | | | | | | | | | | | | | | | | 61 |
| RISB-13 | 0 | 1 | | | | | | | | | | | | | | | | 111 | | | | | | | | | 49 |
| RISB-15 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 2.6 |
| RISB-16 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 1.8 |
| RISB-16 | 1 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | 99 |
| RISB-17 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 1.7 |
| RISB-17 | 9 | 13 | | | | | | | | | | | | | | | | | | | | | | | | | 47 |
| RISB-18 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| RISB-18 | 1 | 5 | | 99 | | | 22000 | 4800 | 4000 | | | | 460 | | | | | | | 452 | 29 | NA | NA | NA | NA | NA | NA |
| RISB-20 | 5 | 9 | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| RISB-23 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 1.8 |
| RISB-23 | 9 | 11 | | | | | | | | | | | | | | | | | | | | | | | | | 340 |
| RISB-24 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 6.1 |
| RISB-25 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 2.1 |
| RISB-25 | 9 | 13 | | | | | | | | 24000 | | | | 2900 | 110 | 280 | | | | 310 | | | | | | | 2.8 |
| RISB-25 | 17 | 20 | | | | | | | | 45000 | | | | 690 | 4100 | 160 | 300 | | | 470 | | | | | | | 2.1 |
| RISB-26 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| RISB-26 | 1 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| RISB-28 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 1.9 |
| RISB-28 | 5 | 9 | | | 400 | | | 27 | | | | | | | | | | | | | | | | | | | 50 |
| RISB-29 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 100 |
| RISB-29 | 1 | 5 | | | | | | | | | | | | 70000 | | | | | | | | | | | | | 8.9 |
| RISB-29 | 9 | 13 | | | | | | | | | | | | | | | | | | | | | | | | | 54 |
| RISB-30 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 1.9 |
| RISB-30 | 9 | 13 | | | | | | | | 23 | | | | | | | | | | | | | | | | | 68 |
| RISB-30 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| RISB-30 | 9 | 13 | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| RISB-31 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 61 |
| RISB-31 | 9 | 13 | | | | | | | | | | | | | | | | | | | | | | | | | 140 |
| RISB-32 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 2.7 |
| RISB-32 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 43 |
| RISB-32 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 1.8 |
| RISB-32 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 42 |

Table 4-5
Summary of Soil Detections Above Screening Criteria
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | | | | | | | | | SVOCs | | Inorganics | | | | |
|----------------------|------------------|----------------|-----------------------|-----------------------|--------------------|------------------------|---------------------|--------------------|---------------------|---------|---------|---------------|------------|------------------------|--------------|--------------------|-------------------|---------|-----------------|----------------|-----------------|----------|------------|----------|--------|----------|-------|
| | | | 1,1,1-Trichloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethene | 1,2,4-Trichlorobenzene | 1,2-Dichlorobenzene | 1,2-Dichloroethane | 1,4-Dichlorobenzene | Acetone | Benzene | Chlorobenzene | Chloroform | cis-1,2-Dichloroethene | Ethylbenzene | Methylene chloride | Tetrachloroethene | Toluene | Trichloroethene | Vinyl chloride | Xylenes (Total) | NDPA/DPA | Arsenic | Chromium | Nickel | Thallium | |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | mg/kg | mg/kg | mg/kg | mg/kg |
| SSLs (DAF 20) | | | 2,000 | 20 | 60 | 5,000 | 17,000 | 20 | 2,000 | 16,000 | 30 | 1,000 | 600 | 400 | 13,000 | 20 | 60 | 12,000 | 60 | 10 | 2.1E+05 | 1,000 | 29 | 38 | 130 | - | |
| Industrial Soil PRGs | | | 1.2E+06 | 1,605 | 4.1E+05 | 2.2E+05 | 6.0E+05 | 603 | 7,867 | 5.4E+07 | 1,409 | 5.3E+05 | 470 | 1.5E+05 | 4.0E+05 | 20,527 | 1,309 | 5.2E+05 | 115 | 746 | 4.2E+05 | 3.5E+05 | 1.6 | 448 | 20,439 | 67 | |
| RISB-34 | 11 | 13 | | | | | | | | | | | | | | | | | | | | | 1.7 | | | | |
| RISB-37 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | 2.9 | | | | |
| RISB-39 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | 1.8 | 40 | | | |
| RISB-40 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | 2.1 | | | | |
| RISB-41 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | 74 | |
| RISB-42 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | 2.1 | | | | |
| RISB-43 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | 71 | | | |
| RISB-44 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | 2.6 | 53 | | | |
| RISB-45 | 0 | 1 | | | 340 | | | 1400 | | | | | | | 54 | 93 | | 200 | | | | | 1.6 | | | | |
| RISB-45 | 1 | 5 | | | 480 | | | 2500 | | | | | | | 110 | 120 | | 330 | | | | | | | | | |
| RISB-46 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | 2 | 99 | 180 | | |
| Duplicate | 0 | 1 | | | | 17000 | | | 3700 | | | | | | | | | 21000 | | | | | 1.8 | 68 | 180 | | |
| RISB-47 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | 3.1 | 40 | 140 | | |
| RISB-47 | 9 | 13 | | | | | | | | | | | | | | | | | | | | | | | | | |
| RISB-48 | 13 | 15 | | | | | | | | | | | | | | | | | | | | | | | | | |
| RISB-49 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| RISB-49 | 13 | 17 | | | | | | | | | | | | | | | | | | | | | | | | | |
| RISB-50 | 9 | 13 | | | | | | 75 | | | | | | | | | | | | | | | | | | | |
| RISB-52 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | 41 | |
| Phase II | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RIMW-1 | 10 | 12 | | | | | | | | | | | | 1100 | | | | 71 | | | | | NA | NA | NA | NA | NA |
| RIMW-1 | 12 | 14 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| Duplicate | 12 | 14 | | | | | | | | | | | | 460 | | | | | | | | | NA | NA | NA | NA | NA |
| RIMW-5 | 12 | 14 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RIMW-5 | 18 | 20 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RIMW-6 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RIMW-6 | 4 | 6 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RIMW-6 | 8 | 10 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RIMW-8 | 2 | 4 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RIMW-8 | 4 | 6 | 2400 | 23 | 120 | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RIMW-8 | 6 | 8 | 2600 | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RIMW-8 | 8 | 10 | 3600 | 30 | 160 | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RIMW-8 | 10 | 12 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| Duplicate | 10 | 12 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RIMW-8 | 12 | 14 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RISB-57 | 10 | 14 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RISB-57 | 14 | 18 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RISB-57 | 18 | 22 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RISB-62 | 4 | 6 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RISB-62 | 8 | 10 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RISB-62 | 12 | 14 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| Duplicate | 12 | 14 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RISB-63 | 4 | 6 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RISB-63 | 8 | 10 | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |

**Table 4-5
Summary of Soil Detections Above Screening Criteria**

Remedial Investigation Report
September 2008
PSC Site - Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | | | | | | | | | SVOCs | | Inorganics | | | |
|----------------------|------------------|----------------|--------------------------------|--------------------------------|-----------------------------|---------------------------------|------------------------------|-----------------------------|------------------------------|------------------|------------------|------------------------|---------------------|---------------------------------|-----------------------|-----------------------------|----------------------------|------------------|--------------------------|-------------------------|--------------------------|-------------------|------------------|-------------------|-----------------|-------------------|
| | | | 1,1,1-Trichloroethane ug/kg | 1,1,2-Trichloroethane ug/kg | 1,1-Dichloroethene ug/kg | 1,2,4-Trichlorobenzene ug/kg | 1,2-Dichlorobenzene ug/kg | 1,2-Dichloroethane ug/kg | 1,4-Dichlorobenzene ug/kg | Acetone ug/kg | Benzene ug/kg | Chlorobenzene ug/kg | Chloroform ug/kg | cis-1,2-Dichloroethene ug/kg | Ethylbenzene ug/kg | Methylene chloride ug/kg | Tetrachloroethene ug/kg | Toluene ug/kg | Trichloroethene ug/kg | Vinyl chloride ug/kg | Xylenes (Total) ug/kg | NDPA/DPA ug/kg | Arsenic mg/kg | Chromium mg/kg | Nickel mg/kg | Thallium mg/kg |
| SSLs (DAF 20) | | | 2,000 | 20 | 60 | 5,000 | 17,000 | 20 | 2,000 | 16,000 | 30 | 1,000 | 600 | 400 | 13,000 | 20 | 60 | 12,000 | 60 | 10 | 2.1E+05 | 1,000 | 29 | 38 | 130 | - |
| Industrial Soil PRGs | | | 1.2E+06 | 1,605 | 4.1E+05 | 2.2E+05 | 6.0E+05 | 603 | 7,867 | 5.4E+07 | 1,409 | 5.3E+05 | 470 | 1.5E+05 | 4.0E+05 | 20,527 | 1,309 | 5.2E+05 | 115 | 746 | 4.2E+05 | 3.5E+05 | 1.6 | 448 | 20,439 | 67 |
| RISB-63 | 14 | 16 | | | | | | 910 | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RISB-63 | 16 | 18 | | | | | | 530 | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RISB-64 | 0 | 5 | | | | | | 930 | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RISB-64 | 5 | 10 | | | 80.3 | | | 11000 | | 24000 | 2100 | | 750 | 58000 | 33000 | 402 | 72000 | 370000 | 150000 | 85.8 | | NA | NA | NA | NA | NA |
| RISB-64 | 10 | 15 | | | | | | 9300 | | 36000 | 281 | | | 5200 | 33000 | 237 | 1200 | | | | | NA | NA | NA | NA | NA |
| RISB-65 | 0 | 5 | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |
| RISB-65 | 5 | 10 | | | | | | | | 31000 | 329 | | | | | | | 45000 | 120 | | | NA | NA | NA | NA | NA |
| RISB-65 | 10 | 15 | | | | | | | | 28000 | 118 | | | | | | | | | | | NA | NA | NA | NA | NA |
| RISB-65 | 15 | 20 | | | | | | | | | 91 | | | 436 | | | | | | | | NA | NA | NA | NA | NA |
| RISB-66 | 5 | 9 | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA |

Notes:

NA - Not Analyzed

This table only includes detected results above either the industrial soil preliminary remediation goal (PRG) or soil screening level (SSL) with a dilution attenuation factor (DAF) of 20. PRGs and SSLs from EPA Region 9 (10/2004).

Bold values indicate exceedances of both the PRG and SSL.

Values in red and italics indicate exceedances of the SSL only.

Other values not in bold or italics indicate exceedances of the PRG only.

Table 4-6
Summary of Groundwater Detections Above Screening Criteria
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Location | VOCs | | | | | | | | | | | | | | | | | | | | | | | | | | SVOCs | | | Inorganics | | | | | | | | | |
|-----------------|-----------------------|---------------------------|-----------------------|--------------------|--------------------|------------------------|---------------------|--------------------|---------------------|---------------------|----------------------|---------|---------|----------------------|----------------------|---------------|--------------|------------|------------------------|-------------|----------------------|--------------|------------------|-------------------------|-------------------|--------------------|-------------------|---------|-----------------|----------------|---------|----------------|----------------------------|-------------|--------|-----------|------|----|----|
| | 1,1,1-Trichloroethane | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethane | 1,1-Dichloroethene | 1,2,4-Trichlorobenzene | 1,2-Dichlorobenzene | 1,2-Dichloroethane | 1,2-Dichloropropane | 1,4-Dichlorobenzene | 4-Methyl-2-pentanone | Acetone | Benzene | Bromodichloromethane | Carbon tetrachloride | Chlorobenzene | Chloroethane | Chloroform | cis-1,2-Dichloroethene | Cyclohexane | Dibromochloromethane | Ethylbenzene | Isopropylbenzene | Methyl tert-butyl ether | Methylcyclohexane | Methylene chloride | Tetrachloroethene | Toluene | Trichloroethene | Vinyl chloride | Xylenes | 2-Chlorophenol | Bis(2-ethylhexyl)phthalate | Naphthalene | Iron | Manganese | | | |
| | MCL | 200 | - | 5 | - | 7 | 70 | 600 | 5 | 5 | 75 | - | - | 5 | - | 5 | 100 | - | - | 70 | - | - | 700 | - | - | - | - | 5 | 1,000 | 5 | 2 | 10,000 | - | 6 | - | - | - | - | |
| PRG | 3,172 | 0.055 | 0.20 | 811 | 339 | 7.20 | 370 | 0.12 | 0.16 | 0.50 | 1,993 | 5,475 | 0.35 | 0.18 | 0.17 | 106 | 4.60 | 0.17 | 60.8 | 10,342 | 0.13 | 1,340 | 658 | 11 | 5,217 | 4.30 | 0.10 | 723 | 0.03 | 0.02 | 206 | 30.4 | 4.8 | 6.2 | 10.95 | 0.88 | | | |
| UNITS | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | | |
| Phase I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RITW-12 | | | | 1000 | 89 | | | | | | 7100 | | 410 | | | | | | 1200 | | | 710 | | | | | 1400 | 28000 | 82 | 40 | 2700 | NA | NA | NA | NA | NA | | | |
| RITW-28 | 51000 | | 154 | 1600 | 6600 | | | 15000 | | | 11000 | | 69 | | 11000 | 123 | | 882 | 235 | | | 3000 | | | | 7900 | 428 | 51000 | 1200 | | 10000 | NA | NA | NA | NA | NA | | | |
| RITW-34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3.45 | 1.8 | | NA | NA | NA | NA | NA | | | |
| RITW-38 | | | | | 130 | | | 1.14 | | | | | 2.39 | | | | | | 490 | | | | | | | | 190 | | | | | NA | NA | NA | NA | NA | | | |
| Phase II | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BP-1A | | | | | | | 0.42 | | | | | | 0.45 | | | | | | | | | | | | | 1.37 | | 9.07 | 1.4 | | NA | NA | NA | NA | NA | | | | |
| BP-1B | | | 0.75 | | 22 | | 1.27 | | | | | | | | | | 0.38 | 670 | | | | | | | | 170 | | 620 | 2.06 | | NA | NA | NA | NA | NA | | | | |
| EW-1 | | | 1.73 | | 94 | | | 3200 | | | | 1.94 | | | 31 | 1.29 | 148 | | | | | | | | | | 44 | | 130 | 38 | | NA | NA | NA | NA | NA | | | |
| EW-4 | | | | | 22 | | | 97 | | | | 6.41 | | | 110 | 400 | | | | | | | | | | 8.91 | 1.48 | 2.5 | 14 | 280 | NA | NA | NA | NA | NA | | | | |
| MW-100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| MW-101 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| MW-102 | | | | | | | | | | | | | | | | | 1.34 | | | | | | | | | | 0.27 | | | | NA | NA | NA | NA | NA | | | | |
| MW-103 | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.41 | | 1.15 | | NA | NA | NA | NA | NA | | | | |
| MW-104 | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.64 | | 1.79 | | NA | NA | NA | NA | NA | | | | |
| MW-105 | | | | | | | | | | | | | | | | | 0.51 | | | | | | | | | | | | 0.29 | | NA | NA | NA | NA | NA | | | | |
| MW-106 | | | | | | | | | | | | | | | | | 0.52 | | | | | | | | | | 0.29 | | 0.23 | | NA | NA | NA | NA | NA | | | | |
| MW-107 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| MW-108 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| MW-111 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| MW-112 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| MW-113A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| MW-113B | | | | | | | 0.18 | | | | | | | | | | | | | | | | | | | | 24 | | 16 | | NA | NA | NA | NA | NA | | | | |
| MW-114 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| MW-115A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| MW-115B | | | | | | | 6.61 | | | | | | | | | | | | | | | | | | | | | | | 0.34 | 0.49 | NA | NA | NA | NA | NA | | | |
| MW-116 | | | | | | | 8.88 | | | | | | 120 | | 5.1 | | | | | | | | | | 35 | | | | | | NA | NA | NA | NA | NA | | | | |
| MW-117 | | | | | | | | | | | | 2.39 | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| Duplicate | | | | | | | | | | | | 2.43 | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| MW-118 | | | | | | | | | | | | 23 | | | | | | | | | | | | | 13 | | | | | | NA | NA | NA | NA | NA | | | | |
| MW-119 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| MW-120A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| MW-120B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| MW-121B | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.57 | | 7.66 | | NA | NA | NA | NA | NA | | | | |
| MW-122B | | | | | | | 0.46 | | | | | | | | | | | | | | | | | | | | | 0.25 | | | NA | NA | NA | NA | NA | | | | |
| MW-123A | | | 9 | | | | 2500 | 4900 | | 1300 | | | 16.25 | | | 3000 | 42.5 | | 1100 | | | | | | | 29.75 | | 37 | 140 | | NA | NA | NA | NA | NA | | | | |
| MW-123B | | | 7.74 | | 15 | | 1400 | 2300 | | 1100 | | | 17 | | 3500 | 35 | 4.17 | 680 | | | | | | | | 12 | 2.3 | 130 | 84 | | NA | NA | NA | NA | NA | | | | |
| OB-8A | 310 | | 4.98 | | 71 | | | 540 | 0.53 | 0.61 | | | 20 | | 460 | 1300 | 2.05 | | | | | | | | | 330 | 19 | 5200 | 15 | 24 | 1000 | NA | NA | NA | NA | NA | | | |
| OB-11 | | | | | | | | 2.94 | | | | | 100 | | | | | | | | | | | | | | | | 0.32 | | NA | NA | NA | NA | NA | | | | |
| OB-12 | | | | | | | 1.04 | | | | | | 36 | | | | | | | | | | | | | | | | | 0.55 | | NA | NA | NA | NA | NA | | | |
| OB-21 | | | | | | | | | | | | | 306 | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| OB-22 | | | | | | | | | | | | | 1050 | | | | | | | | | | | | | | 3100 | 2900 | 444 | | 19000 | 3080 | | 17000 | 150000 | NA | NA | NA | NA |
| OB-23 | | | | | | | 2.77 | | | | | | 69 | | | 6.6 | | | | | | | | | | | | | | 0.22 | 0.56 | NA | NA | NA | NA | NA | | | |
| OB-109 | | | | | | | 0.33 | | | | | | 0.66 | | | | | | | | | | | | | | 0.31 | | 15 | 4.97 | NA | NA | NA | NA | NA | | | | |
| OB-109B | | | | | 39 | | 1.57 | | | | | | | | | | 1.12 | | | | | | | | | | | 210 | 44 | | NA | NA | NA | NA | NA | | | | |
| OB-110A | | | | | 71.5 | | 46.6 | | | | | | 33.9 | | | 1300 | | | | | | | | | | 29 | 6.9 | 2500 | 3.9 | 34.4 | 1700 | NA | NA | NA | NA | NA | | | |
| OB-110B | | | | | | | 8.34 | | | | | | | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| OB-900 | | | | | | | | | | | | | 60 | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| OB-901 | | | | | | | | | | | | | 13 | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| OB-902 | | | | | | | | | | | | | 2.88 | | | | | | | | | | | | | | | | | | NA | NA | NA | NA | NA | | | | |
| P-1 | | | 1.07 | | 100 | | 2600 | 0.66 | 1.02 | | | | 1.08 | | | | | | | | | | | | | | | | | | | | | | | | | | |

Table 4-6
Summary of Groundwater Detections Above Screening Criteria

Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Location | VOCs | | | | | | | | | | | | | | | | | | | | | | | | | | | SVOCs | | | Inorganics | | | | | | | |
|------------------|-----------------------|---------------------------|-----------------------|--------------------|--------------------|------------------------|---------------------|--------------------|---------------------|---------------------|----------------------|---------|--------------|--------------------|----------------------|---------------|--------------|------------|------------------------|-------------|----------------------|--------------|------------------|-------------------------|-------------------|--------------------|-------------------|--------------|-----------------|----------------|--------------|----------------|----------------------------|-------------|-------|-----------|------|-----|
| | 1,1,1-Trichloroethane | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethane | 1,1-Dichloroethene | 1,2,4-Trichlorobenzene | 1,2-Dichlorobenzene | 1,2-Dichloroethane | 1,2-Dichloropropane | 1,4-Dichlorobenzene | 4-Methyl-2-pentanone | Acetone | Benzene | Bromochloromethane | Carbon tetrachloride | Chlorobenzene | Chloroethane | Chloroform | cis-1,2-Dichloroethene | Cyclohexane | Dibromochloromethane | Ethylbenzene | Isopropylbenzene | Methyl tert-butyl ether | Methylcyclohexane | Methylene chloride | Tetrachloroethene | Toluene | Trichloroethene | Vinyl chloride | Xylenes | 2-Chlorophenol | Bis(2-ethylhexyl)phthalate | Naphthalene | Iron | Manganese | | |
| MCL | 200 | - | 5 | - | 7 | 70 | 600 | 5 | 5 | 75 | - | - | 5 | - | 5 | 100 | - | - | 70 | - | - | 700 | - | - | - | 5 | 1,000 | 5 | 2 | 10,000 | - | 6 | - | - | - | - | | |
| PRG | 3,172 | 0.055 | 0.20 | 811 | 339 | 7.20 | 370 | 0.12 | 0.16 | 0.50 | 1,993 | 5,475 | 0.35 | 0.18 | 0.17 | 106 | 4.60 | 0.17 | 60.8 | 10,342 | 0.13 | 1,340 | 658 | 11 | 5,217 | 4.30 | 0.10 | 723 | 0.03 | 0.02 | 206 | 30.4 | 4.8 | 6.2 | 10.95 | 0.88 | | |
| UNITS | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | |
| RIMW-5 | | | 6.86 | | 349 | | | 52000 | | 1.97 | | | 5.27 | | | | 8.33 | 19 | 90 | | | | | | | 7.59 | 55 | | 83 | 7.15 | | | | | | | | |
| Duplicate | | | 7.34 | | 370 | | | 53000 | | 2.72 | | | 6.82 | | | | 8.74 | 20 | 93 | | | | | | | 8.06 | 56 | | 88 | 7.86 | | | NA | NA | NA | NA | NA | |
| RIMW-6 | | | 2.79 | | 35 | | | | | 3.18 | | | | | | | | | | | | | | | | | 880 | | 710 | 1200 | | | | | 9.1 | | 6 | |
| RIMW-7 | | | | | | | | | | 0.58 | | | | | | | | | | | | | | | | 24 | | 2.58 | | | | | | | | | | |
| RIMW-8 | 47000 | | 140 | 7000 | 9000 | | | 19000 | | | | | 58 | | | 540 | 3000 | 140 | 1536 | | | | | | | 3700 | 960 | 52000 | 580 | 844 | 11000 | 150 | 10 | 33 | 13 | 12 | | |
| Duplicate | 47000 | | 146 | 7400 | 7200 | | | 19000 | | | | | 58 | | | 530 | 2700 | 134 | 1506 | | | | | | | 3700 | 892 | 52000 | 582 | 824 | 11000 | 140 | 19 | 28 | 12 | 12 | | |
| RIMW-9 | | | | | | | | | | | | | | | | | | 3.98 | | | | | | | | 70 | | 23 | | | | | | | | | | |
| Duplicate | | | | | | | | | | | | | | | | | | 3.79 | | | | | | | | 66 | | 17 | | | | | NA | NA | NA | NA | NA | |
| RIMW-10 | | | | | | | | | | | | | | | | | | | | | | | | | | 96 | | 87 | 7.26 | | | | | | | | | |
| RIMW-11 | | | | | | | | 1100 | | | | | | | | | 11 | 19 | 190 | | | | | | | | 96 | | 31 | | | | | | | | | |
| RIMW-12 | | | | | | | | 0.41 | | | | | | | | | 46 | 16 | 73 | | | | | | | | 220 | | 31 | | | | | | | | | |
| RIMW-13 | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.88 | | 1.42 | 0.45 | | | | | | | | |
| RIMW-14 | | | | | | | | 0.79 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 7 | | |
| RIMW-15 | | | 1.17 | | 12 | | | 2.31 | | | | | 1.95 | | | | | | | | | | | | | | | | 0.22 | | | | | | | | | |
| Duplicate | | | 1.2 | | 11 | | | 2.06 | | | | | 1.76 | | | | | | | | | | | | | | | | | | | | | | | | | |
| RIMW-16 | | | 1.82 | | 69 | | | 4.3 | | 1.05 | | | 16 | | | | | | | | | | | | | | | | | | | | | | | | | |
| RIMW-18 | | | | | | | | | | | | | | | | | | | 15 | | | | | | | | | | | | | | | | | | | 2.4 |
| RIMW-19 | | | 1.56 | | 45 | | | | | | | | | | | | | | 1.99 | 69 | | | | | | | | | | | | | | | | | | |
| RIPZ-3 | | | 1.05 | | 96 | | | | | | | | 1.03 | | | | | 27 | 1.51 | 280 | | | | | | | | | | | | | | | | | | 1.1 |
| Duplicate | | | 1.83 | | 97 | | | | | 0.61 | | | 1.05 | | | | | 27 | 1.59 | 290 | | | | | | | | | | | | | | | | | | NA |
| RITW-64 | | | 0.75 | | 20 | | | 199.6 | | 0.5 | | | 25 | | | | 7.1 | 12.51 | 930 | | | | | | | 16 | 1300 | | 820 | 13 | | | | | | | NA | |
| RITW-65 | | | 5.15 | | 180 | | | 19 | | 0.69 | | | 14 | | | | 47 | 2.17 | 1000 | | | | | | | | | | | | | | | | | | | NA |
| W-1 | | | 1.37 | | 24 | | | 1.17 | | | | | | | | | | 1.72 | | | | | | | | | | | | | | | | | | | | NA |
| W-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| W-4 | | | | | | | | 0.34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| OB-13* | | | | | | | | | | | | 22000 | 18000 | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| Phase III | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MW-121B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| MW-122B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| RIMW-15 | | | | | | | | 1.26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| RIMW-20 | | | | | | | | | | | | | | | | 5.36 | | | | | | | | | | | | | | | | | | | | | | NA |
| RIMW-21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| RIMW-22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| RIMW-23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| RIMW-24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| RIMW-25 | 770 | 3.24 | 36 | 950 | 540 | | | 4100 | 2.18 | 1.63 | | | 43 | | | 2200 | 2500 | | | | | | | | | | | | | | | | | | | | NA | |
| RIMW-26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| RIMW-27 | | | 1.49 | | 82 | | | 260 | | | | | 1.21 | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| RIMW-28 | | | | | | | | 37 | | 0.99 | | | 0.76 | 2.58 | | | | | | | | | | | | | | | | | | | | | | | | NA |
| RIMW-29 | | | | | | | | 7.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA |
| RIMW-30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA |

Notes:
 NA - Not Analyzed
 This table only includes detected results above either the tap water preliminary remediation goal (PRG) or MCL.
Bold values indicate exceedances of both the PRG and MCL.
 Values in red and italics indicate exceedances of the MCL only.
 Other values not in bold or italics indicate exceedances of the tap water PRG only.

Table 4-7**Hydraulic Analysis Groundwater Elevations**

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| Well / Gage ID | Top of Casing Elevation (ft AMSL) | Hydraulic Zone | Pre Equilibration January 27, 2007 | | Post Equilibration February 12, 2007 | |
|-------------------|--------------------------------------------|-------------------|---------------------------------------|------------------------------|-----------------------------------------|------------------------------|
| | | | Groundwater Elevation (ft AMSL) | Product Thickness (ft) | Groundwater Elevation (ft AMSL) | Product Thickness (ft) |
| BP-1A | 523.03 | PWR | 510.08 | | 511.75 | |
| BP-1B | 523.74 | PWR/Bedrock | 509.90 | | 512.46 | |
| EW-1 | 525.19 | No Data | 510.92 | | 512.40 | 0.08 |
| EW-2 | 525.12 | PWR | Pumping | | 511.66 | |
| EW-3 | 521.13 | Bedrock | Pumping | | 512.82 | |
| EW-4 | 528.18 | No Data | 514.07 | | 514.57 | |
| MW-100 | 530.04 | Bedrock | 510.38 | | 514.44 | |
| MW-101 | 529.95 | PWR | 515.82 | | 515.97 | |
| MW-102 | 531.31 | Bedrock | 514.01 | | 515.19 | |
| MW-103 | 523.16 | PWR | 512.21 | | 513.38 | |
| MW-104 | 522.36 | PWR | 510.44 | | 512.20 | |
| MW-105 | 528.29 | PWR | 509.30 | | 509.96 | |
| MW-106 | 524.76 | Saprolite/Bedrock | 511.55 | | 511.80 | |
| MW-107 | 521.55 | PWR | 513.04 | | 512.26 | |
| MW-108 | 517.94 | Bedrock | 513.72 | | 513.37 | |
| MW-111 | 522.96 | Saprolite | 509.21 | | 509.96 | |
| MW-112 | 522.11 | PWR | 511.38 | | 511.09 | |
| MW-113A | 524.38 | PWR | 511.09 | | 511.26 | |
| MW-113B | 521.20 | PWR/Bedrock | 509.67 | | 510.52 | |
| MW-114 | 522.92 | PWR | 512.01 | | 511.83 | |
| MW-115A | 519.47 | PWR | 510.26 | | 509.84 | |
| MW-115B | 518.90 | PWR/Bedrock | 509.46 | | 509.97 | |
| MW-116 | 524.43 | PWR/Bedrock | 508.60 | 2.65 | 510.29 | 2.39 |
| MW-117 | 521.69 | Saprolite/Bedrock | 509.87 | | 510.53 | |
| MW-118 | 523.31 | Saprolite | 510.77 | | 511.57 | |
| MW-119 | 522.88 | PWR | 509.91 | | 511.46 | |
| MW-120A | 518.98 | PWR | 510.10 | | 509.96 | |
| MW-120B | 518.07 | Bedrock | 509.44 | | 510.46 | |
| MW-121B | 519.32 | Bedrock | 510.03 | | 509.95 | |
| MW-122B | 520.32 | Bedrock | 515.07 | | 515.44 | |
| MW-123A | 529.14 | PWR | 512.62 | | 513.22 | |
| MW-123B | 529.06 | Bedrock | 512.25 | | 513.09 | |
| OB-109 | 532.64 | PWR | 512.77 | | 513.38 | |
| OB-109B | 530.38 | Bedrock | 512.73 | | 513.35 | |
| OB-11 | 524.50 | Saprolite | 509.68 | 0.23 | 511.63 | 0.22 |
| OB-110A | 526.41 | PWR | 512.54 | | 513.40 | |
| OB-110B | 525.60 | Bedrock | 511.08 | | 512.46 | |
| OB-12 | 524.92 | Saprolite | 507.28 | 2.52 | 508.05 | 4.06 |
| OB-13 | 524.92 | Saprolite | 506.10 | 4.19 | 506.24 | 6.04 |
| OB-21 | 524.91 | PWR | 509.44 | 0.03 | 511.71 | 0.06 |
| OB-22 | 524.82 | PWR | 509.48 | 0.07 | 511.72 | 0.08 |
| OB-23 | 524.55 | PWR | 506.31 | 3.46 | 508.84 | 3.41 |
| OB-8A | 526.14 | PWR | 512.99 | | 513.55 | |

Table 4-7**Hydraulic Analysis Groundwater Elevations**

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| Well / Gage ID | Top of Casing Elevation (ft AMSL) | Hydraulic Zone | Pre Equilibration January 27, 2007 | | Post Equilibration February 12, 2007 | |
|-------------------|--------------------------------------------|-------------------|---------------------------------------|------------------------------|-----------------------------------------|------------------------------|
| | | | Groundwater Elevation (ft AMSL) | Product Thickness (ft) | Groundwater Elevation (ft AMSL) | Product Thickness (ft) |
| OB-900 | 524.20 | No Data | 516.44 | 2.11 | 516.39 | 2.11 |
| OB-901 | 523.22 | No Data | 510.53 | | 509.56 | 2.88 |
| OB-902 | 524.36 | No Data | 511.06 | | 508.51 | 4.30 |
| P-1 | 525.73 | Saprolite | 512.42 | | 513.29 | |
| P-2 | 523.98 | Saprolite | 507.94 | 1.54 | 510.45 | 1.58 |
| P-3 | 526.12 | PWR | 512.50 | | 513.39 | |
| PW-1 | 531.19 | No Data | 514.18 | | 510.63 | 5.73 |
| PW-2A | 525.85 | PWR/Bedrock | 504.94 | 5.23 | 507.33 | 5.14 |
| RIMW-1 | 531.31 | PWR | Not Measured | | 514.19 | |
| RIMW-3 | 531.76 | PWR | 514.77 | | 515.05 | |
| RIMW-4 | 529.26 | PWR | 513.05 | | 513.40 | |
| RIMW-5 | 531.88 | PWR | 513.84 | | 514.36 | |
| RIMW-6 | 526.21 | PWR | 512.73 | | 513.60 | |
| RIMW-7 | 536.73 | PWR | 516.18 | | 516.38 | |
| RIMW-8 | 530.59 | PWR | 511.29 | | 513.91 | |
| RIMW-9 | 524.48 | Saprolite | 511.34 | | 512.56 | |
| RIMW-10 | 529.46 | PWR | 510.44 | | 511.71 | |
| RIMW-11 | 532.11 | Saprolite | 517.24 | | 517.45 | |
| RIMW-12 | 529.10 | PWR | 513.18 | | 513.64 | |
| RIMW-13 | 536.49 | Bedrock | 516.14 | | 516.58 | |
| RIMW-14 | 529.77 | Bedrock | Not Measured | | 511.63 | |
| RIMW-15 | 526.31 | Deep PWR | 513.35 | | 513.96 | |
| RIMW-16 | 526.40 | PWR | 513.01 | | 513.82 | |
| RIMW-18 | 532.05 | Bedrock | 512.03 | | 517.19 | |
| RIMW-19 | 529.51 | Bedrock | 512.91 | | 513.68 | |
| RIPZ-1 | 516.31 | Alluvium | 508.02 | | 511.34 | |
| RIPZ-2 | 519.12 | Bedrock | 515.32 | | 515.71 | |
| RIPZ-3 | 522.91 | PWR | 509.77 | | 511.16 | |
| W-1 | 537.66 | PWR | 516.05 | | 516.22 | |
| W-2 | 529.48 | PWR | 509.42 | | 510.03 | |
| W-4 | 518.30 | Saprolite | 511.50 | | 512.03 | |
| RISG-1 | | Surface Water | 510.25 | | 510.27 | |
| RISG-2 | | Surface Water | 508.08 | | 508.15 | |
| RISG-3 | | Surface Water | 506.84 | | 506.84 | |
| RISG-4 | | Surface Water | 507.99 | | 507.87 | |
| RISG-5 | | Surface Water | 505.49 | | 505.31 | |

Table 4-8
Summary of Sediment and Surface Soil Detections Above Screening Criteria

Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

Table 4-8A
 Sediment Detections above Screening Criteria

| Location | SVOCs | | | | | | | | | | Inorganics | | | | | | | | | | |
|-----------|---------------------|--------------------|----------------|----------------------------|----------|--------------|----------|-------------|--------------|--------|------------|---------|---------|----------|--------|-------|---------|--------|--------|-------|--|
| | 2-Methylnaphthalene | Benzo(a)anthracene | Benzo(a)pyrene | Bis(2-ethylhexyl)phthalate | Chrysene | Fluoranthene | Fluorene | Naphthalene | Phenanthrene | Pyrene | Antimony | Arsenic | Cadmium | Chromium | Copper | Lead | Mercury | Nickel | Silver | Zinc | |
| | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | |
| ESV | 330 | 330 | 330 | 180 | 330 | 330 | 330 | 330 | 330 | 330 | 12 | 7.24 | 1 | 52.3 | 18.7 | 30.2 | 0.13 | 15.9 | 2 | 124 | |
| RICB-3 | | | | 700 | | | | | | | | 16 | 23 | 95 | 270 | 540 | 2.3 | 170 | 4.8 | 1400 | |
| RISD-1 | | 430 J2 | | 380 J2 | 390 J2 | 720 | | | 470 J2 | 940 | | | | | | | | | | | |
| RISD-2 | | | | 320 J2 | | 340 J2 | | | | 420 J2 | | | | | | | 0.13 J2 | | | | |
| RISD-3 | | 480 | 540 | 360 J2 | 460 | 670 | | | | 870 | | | | 27 | 32 | | | | | | |
| RISD-4 | | | 420 J2 | | 350 J2 | 450 J2 | | | | 610 J2 | | | | 25 | | 0.21 | | | | | |
| Duplicate | | | 360 J2 | | | 390 J2 | | | | 510 J2 | | | | 26 | | 0.25 | | | | | |
| RISD-5 | | | | | | | | | | | | | | | | | | | | | |
| RISD-FCBK | | | | | | | | | | | | | | | | | | | | | |
| RISD-WCBK | | 720 | 740 | | 650 | 1100 | | | 550 | 1500 | | | | | | | | | | | |
| RI-WASTE | 15000 | | | 21000 | | | 2100 J2 | 3300 | 4900 | | 32 | 10 | 4 | 180 | 600 | 140 | 1.5 | 140 | 4.2 | 1800 | |

Table 4-8B
 Surface Soil Detections (Across Wildcat Creek) above Screening Criteria

| Location | Depth (feet) | Inorganics |
|----------------------|--------------|------------|
| | | Arsenic |
| | | mg/kg |
| SSLs (DAF 20) | | 29 |
| Industrial Soil PRGs | | 1.6 |
| RI-BCK1 | 3-4 | 1.6 |
| RISS-1 | 0-1 | 2.0 |
| RISS-3 | 0-1 | 2.3 |
| RISS-4 | 0-1 | 2.5 |
| RISS-5 | 0-1 | 2.2 |
| RISS-6 | 0-1 | 1.7 |
| RISS-7 | 0-1 | 2.1 |
| RISS-8 | 0-1 | 1.9 |
| RISS-9 | 0-1 | 2.2 |
| RISS-10 | 0-1 | 1.8 |

Notes:

SVOC - Semi-Volatile Organic Compound
 J2 - Estimated value above the method detection limit but below the reporting limit.
 PRG - EPA Region 9 Preliminary Remediation Goal (10/2004)
 ESV - EPA Region 4 Ecological Screening Value (11/2001)
 SSL - EPA Region 9 Soil Screening Level with a Dilution Attenuation Factor of 20 (10/2004)
 These tables only includes detected results above the ESVs for sediment and above the industrial soil PRG or SSL.

Table 4-9
EW-2 Aquifer Performance Test Results

Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Well ID | Hydraulic Zone | Screen Interval (ft AMSL) | Distance to EW-2 (feet) | Estimated Transmissivity ft²/day* |
|----------------|-----------------------|----------------------------------|--------------------------------|-----------------------------------------------------|
| EW-2 | PWR | 461-481 | - | - |
| MW-118 | Saprolite | 508-518 | 109 | 83 |
| W-2 | PWR | 507-512 | 207 | 83 |
| RIPZ-3 | PWR | 478.5-483.5 | 226 | 620 |
| OB-11 | Saprolite | 504.3-509.3 | 184 | 41 |
| RIMW-14 | Bedrock | 454.8-464.8 | 230 | 124 |

*Estimated transmissivity values obtained from using Theis Method. Detailed analysis results are presented in Appendix E.

Table 4-10
EW-3 Aquifer Performance Test Results

Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Well ID | Hydraulic Zone | Screen Interval (ft AMSL) | Distance to EW-3 (feet) | Estimated Transmissivity ft²/day* |
|----------------|-----------------------|----------------------------------|--------------------------------|-----------------------------------------------------|
| EW-3 | Bedrock | 470.5-497 | - | - |
| BP-1A | PWR | 498-507.4 | 59 | 250 |
| BP-1B | PWR/Bedrock | 482.7-492.7 | 52 | 250 |
| MW-103 | PWR | 493.6-498.6 | 65 | 460 |
| RIMW-15 | PWR | 426.6-456.6 | 225 | N/A |
| MW-120B | Bedrock | 481.3-491.3 | 293 | N/A |

*Estimated transmissivity values obtained from using Theis Method. Detailed analysis results are presented in Appendix E.

Table 4-11

Summary of Biochemical and Geochemical Results

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| Well / Gage ID | Sample Date | ONSITE ANALYSIS | | | | | | | | | | | | | |
|----------------|-------------|-----------------|------------|---------------|-----------------|-----------|----------|-------------------|---------------------|----------------|------------------------|----------------|--------------------|------------|-------------------|
| | | pH | Temp (C) | Cond. (mS/cm) | Turbidity (NTU) | DO (mg/L) | ORP (mV) | Total Iron (mg/L) | Ferrous Iron (mg/L) | Sulfate (mg/L) | Nitrite/Nitrate (mg/L) | Sulfide (mg/L) | Phosphorous (mg/L) | CO2 (mg/L) | Alkalinity (mg/L) |
| MW-115A | 1/24/07 | 5.52 | 12.45 | 0.057 | 75 | 10.21 | 86.5 | 2.16 | 1.5 | 15 | 0.1 | 174 | 0.03 | 25 | 20 |
| MW-115B | 1/24/07 | 6.56 | 15.23 | 0.227 | 5.67 | 6.37 | -84.4 | 5.3 | 1.48 | 24 | 0 | 14 | 0.17 | 35 | 45 |
| MW-123A | 1/26/07 | 6.13 | 19.95 | 3.705 | 33.5 | 2.21 | -62.5 | 56 | 53 | 25 | 1 | 447 | 0.61 | 325 | 235 |
| OB-11 | 1/24/07 | 6.44 | 19.39 | 6.466 | 62 | 1.88 | -55.7 | 293 | 280 | 15 | 0 | 199 | 0.04 | 425 | 75 |
| OB-110A | 1/26/07 | 6.35 | 19.58 | 0.981 | 2.95 | 0.31 | -93.4 | 33 | 28 | 8 | 0 | 2 | 0.17 | 210 | 125 |
| OB-110B | 1/26/07 | 6.37 | 17.66 | 0.27 | 4.65 | 7.29 | 69.2 | 0 | 0 | 19 | 1.4 | 0 | 0.42 | 15 | 35 |
| RIMW-14 | 1/26/07 | 7.6 | 18.33 | 0.322 | 0.27 | 0.35 | -60.2 | 0.11 | 0.13 | 41 | 2.6 | 65 | 0.01 | 20 | 55 |
| RIMW-15 | 1/25/07 | 6.4 | 18.14 | 0.398 | 0.96 | 1.97 | 129.1 | 0.03 | 0.12 | 24 | 4.6 | 0 | 0.26 | 30 | 50 |
| RIMW-5 | 1/26/07 | 6.3 | 18.96 | 1.308 | 1.1 | 1.09 | -9.3 | 0.01 | 0.01 | 25 | 1.2 | 0 | 0.25 | 35 | 55 |
| RIMW-6 | 1/25/07 | 7.4 | 16.8 | 0.274 | 4.49 | 3.82 | -17.2 | 6.3 | 6.17 | 8 | 1.2 | 3 | 0.31 | 130 | 150 |
| RIPZ-1 | 1/25/07 | 6.73 | 17.72 | 0.388 | 0.65 | 2.15 | 53.5 | 1.51 | 2.08 | 150 | 0 | 128 | 0.01 | 20 | 70 |
| W-1 | 1/25/07 | 6.78 | 12.58 | 0.425 | 286 | 7.74 | 21.2 | 0.06 | 0.15 | 43 | 22.7 | 1 | 0.16 | 30 | 40 |

| Well / Gage ID | Sample Date | LABORATORY ANALYSIS | | | |
|----------------|-------------|---------------------|--------------|-------------|-------------|
| | | DOC mg/L | Methane ug/L | Ethene ug/L | Ethane ug/L |
| MW-115A | 1/24/07 | 2 | 1.8 | 0.2 | 0.065 |
| MW-115B | 1/24/07 | 2 | 22 | 0.24 | 0.1 |
| MW-123A | 1/26/07 | 442 | 4700 | 7100 | 27 |
| OB-11 | 1/24/07 | 52 | 15000 | 0.048 | 0.31 |
| OB-110A | 1/26/07 | 11 | 5000 | 2400 | 110 |
| OB-110B | 1/26/07 | 5 | 22 | 1.9 | 0.16 |
| RIMW-14 | 1/26/07 | 2 | 4.2 | 1.3 | <.025 |
| RIMW-15 | 1/25/07 | 1 | 23 | 1.6 | 1.9 |
| RIMW-5 | 1/26/07 | 2 | 28 | 13 | 0.61 |
| RIMW-6 | 1/25/07 | 16 | 81 | 6.5 | 0.73 |
| RIPZ-1 | 1/25/07 | 4 | 0.99 | 0.18 | 0.15 |
| W-1 | 1/25/07 | 2 | 1.9 | 0.026 | <.025 |

Notes:

DO - Dissolved Oxygen

ORP - Oxidation-Reduction Potential

CO2 - Carbon Dioxide

Alk. - Alkalinity

DOC - Dissolved Organic Carbon

Table 4-12**Qualifiers Added Because of Field Duplicate RPD Exceedances**

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| <i>Samples</i> | <i>Analyte</i> | <i>Applied Qualifiers</i> | <i>RPD Outlier</i> |
|-------------------------|----------------------------------------|---------------------------|--------------------|
| RIMW-1 RIMW-51:12-14 | cis-1,2-Dichloroethene | J | -140.11 |
| RIMW-1 RIMW-51:12-14 | Trichloroethene | J | -150.67 |
| RIMW-4 RIMW-54 | trans-1,2-Dichloroethene | J | 119.61 |
| RIMW-8 RIMW-58 | Butyl benzyl phthalate | J | -77.78 |
| RIMW-8 RIMW-58:10-12 | 1,2-Dichloroethane | J | 39.47 |
| RIMW-8 RIMW-58 | 2-Hexanone | J | 48.95 |
| RIMW-8 RIMW-58:10-12 | Toluene | J | 53.97 |
| RIMW-25 DUP-01 | 1,1,2-Trichloro-1,2,2,-trifluoroethane | J | 24.72 |
| RIMW-25 DUP-01 | Chloroform | J | 20.18 |
| RIMW-25 DUP-01 | Trichlorofluoromethane | J | 24.20 |
| RISB-13 RISB-913 | Potassium | J | -40.63 |
| RISB-13 RISB-913 | NDPA/DPA | J | 47.76 |
| RISB-13 RISB-913 | Acetone | J | 172.39 |
| RISB-14 RISB-914 | Barium | J | -37.04 |
| RISB-14 RISB-914 | Cobalt | J | -38.96 |
| RISB-14 RISB-914 | Manganese | J | -73.97 |
| RISB-2 RISB-92 | Copper | J | -49.28 |
| RISB-46 RISB-946 | Calcium | J | 77.23 |
| RISB-46 RISB-946 | Chromium | J | 37.13 |
| RISB-46 RISB-946 | Manganese | J | 142.86 |
| RISB-46 RISB-946 | Potassium | J | 65.49 |

Table 4-12**Qualifiers Added Because of Field Duplicate RPD Exceedances**

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| Samples | Analyte | Applied Qualifiers | RPD Outlier |
|---------------------------|----------------------------|---------------------------|--------------------|
| RISB-46 RISB-946 | Bis(2-ethylhexyl)phthalate | J | -81.25 |
| RISB-46 RISB-946 | 1,2,4-Trichlorobenzene | J | -131.71 |
| RISB-46 RISB-946 | 1,2-Dichlorobenzene | J | -134.09 |
| RISB-46 RISB-946 | 1,3-Dichlorobenzene | J | -144.5 |
| RISB-46 RISB-946 | 1,4-Dichlorobenzene | J | -135.6 |
| RISB-46 RISB-946 | Chlorobenzene | J | -112.5 |
| RISB-46 RISB-946 | Ethylbenzene | J | -118.34 |
| RISB-46 RISB-946 | Toluene | J | -92.68 |
| RISB-46 RISB-946 | Xylenes (Total) | J | -118.7 |
| RISB-51 RISB-951 | Chromium | J | -57.14 |
| RISB-51 RISB-951 | Vanadium | J | -55.67 |
| RISB-62 RISB-562:12-14 | 1,1,2-Trichloroethane | J | -54.55 |
| RISB-62 RISB-562:12-14 | 1,3-Dichlorobenzene | J | -109.84 |
| RISB-62 RISB-562:12-14 | 1,4-Dichlorobenzene | J | -98.04 |
| RISB-62 RISB-562:12-14 | Chlorobenzene | J | -98.31 |
| RISB-62 RISB-562:12-14 | cis-1,2-Dichloroethene | J | -107.06 |
| RISB-62 RISB-562:12-14 | Trichloroethene | J | -142.73 |
| RISD-4 RISD-54 | Calcium | J | 87.27 |
| RISS-10 RISS-510 | Chromium | J | 50 |

Table 4-13**Qualifiers Added Because of Laboratory Precision RPD Exceedances**

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| SDG | Analyte | Applied Qualifiers | Outlier |
|------------|-------------------------------------------------|---------------------------|-------------------------------------------------------------|
| 229079 | Antimony | J/UJ | MS/MSD RPD 64% |
| 229143 | Chromium Iron Vanadium Antimony | J/UJ | Laboratory Duplicate RPD 37% 38% 47% 37% |
| 229143 | Antimony | J/UJ | MS/MSD RPD 46% |
| 229203 | Chromium Iron Vanadium Antimony | J/UJ | Laboratory Duplicate RPD 37% 38% 47% 37% |
| 229204 | Chromium Iron Vanadium Antimony | J/UJ | Laboratory Duplicate RPD 37% 38% 47% 37% |
| 229204 | Potassium | J/UJ | MS/MSD RPD 47% |
| 229401 | Cadmium Chromium Vanadium | J/UJ | Laboratory Duplicate RPD 41% 80% 66% |
| 229401 | Barium Cobalt Copper Manganese Lead | J/UJ | Laboratory Duplicate RPD 58% 51% 36% 92% 41% |
| 229403 | Cadmium Chromium Vanadium | J/UJ | Laboratory Duplicate RPD 41% 80% 66% |
| 229404 | Barium Cobalt Copper Manganese Lead | J/UJ | Laboratory Duplicate RPD 58% 51% 36% 92% 41% |

Table 4-15**Qualifiers Added Because of Laboratory Blank Detections**

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| SDG | Sample | Analyte | Blank Concentration x 5 | Qualifier |
|------------|---------------------------------------------------------------------------------------------------------------|---------------------|------------------------------------|------------------|
| 239274 | RIMW-11 RIMW-18 RIMW-10 | Nickel | 0.02 mg/L | U |
| 239274 | RIMW-11 RIMW-18 RIMW-12 RIMW-9 | Zinc | 0.0185 mg/L | U |
| 239274 | MW-106 RIMW-9 MW-101 RIMW-59 MW-100 MW-105 Trip Blank | Chlorobenzene | 2.95 ug/L | 10 U |
| 239274 | RIMW-9 | 1,2-Dichlorobenzene | 1.45 ug/L | 10 U |
| 239274 | MW-106 RIMW-9 MW-101 RIMW-59 MW-100 MW-105 Trip Blank | Toluene | 1.05 ug/L | 10 U |
| 239341 | RIP2-3 | Nickel | 0.02 mg/L | U |
| 239341 | RIP2-3 | Thallium | 0.0035 mg/L | U |
| 239341 | MW-115A MW-115B OB-900 OB-23 OB-901 OB-902 MW-104 MW-116 MW-119 MW-113A MW-113B | Toluene | 0.55 ug/L | 10 U |
| 239396 | RIMW-6 | Nickel | 0.02 mg/L | U |
| 239396 | RIMW-6 RIMW-7 RIMW-515 | Thallium | 0.035 mg/L | U |

Table 4-15**Qualifiers Added Because of Laboratory Blank Detections**

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| SDG | Sample | Analyte | Blank Concentration x 5 | Qualifier |
|------------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------|------------------|
| 239396 | BP-1A BP-1B MW-103 MW-117 MW-1175 W-4 MW-122B EW-1 RIMW-7 RIMW-13 RIMW-15 RIMW-515 RIMW-16 | Toluene | 0.65 ug/L | 10 U |
| 239401 | RIMW-8 RIMW-58 RIMW-4 RIMW-1 RIMW-5 RIMW-14 RIMW-19 RIMW-3 | Aluminum Beryllium | 0.06 mg/L 0.0025 mg/L | U |
| 239401 | RIMW-58 RIMW-4 RIMW-1 RIMW-5 RIMW-14 RIMW-19 | Zinc | 0.0185 mg/L | U |
| 239401 | P-3 P-1 OB-110B RIMW-4 | Toluene | 4.55 ug/L | 10 U |
| 239401 | RIMW-5 RIMW-55 Trip Blank OB-109B | Vinyl Chloride | 2.3 ug/L | 10 U |
| 239441 | RIMW-21 RIMW-30 TB-01 RIMW-26 MW-122B | Toluene | 1.2 ug/L | 10 U |

Table 4-16**Qualifiers Added Because of MS / MSD %R Exceedances**

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| SDG | Analyte | Applied Qualifiers | Outlier (limit 75-125%) |
|------------|---------------------------------------------------------|---------------------------|--------------------------------------------------------------------------------------------------------------------|
| 229079 | Antimony | J/UJ | 30/15 %R |
| 229143 | Antimony | J/UJ | 30/15 %R 44/39% R 57/53% R |
| 229204 | Sodium Thallium Antimony Potassium Vanadium | J/UJ | 136/102 %R, 213/236 %R 74/68 %R 44/39 %R, 57/53 %R, 42/43 %R 233/63 %R, 135/149 %R, 80/47% 81/47 %R |
| 229206 | Antimony | J/UJ | 42/43 %R |
| 229312 | Antimony | J/UJ | 42/43 %R 45/47 %R |
| 229401 | Antimony | J/UJ | 45/47 %R 43/41 %R |
| 229403 | Antimony | J/UJ | 45/47 %R 47/47 %R |
| 229404 | Antimony | J/UJ | 43/41 %R 47/47 %R |
| 239396 | Thallium | J/UJ | 77/71 %R |

Table 4-17**Qualifiers Added Because of Surrogate %R Exceedances**

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| SDG | Sample | Surrogate | Applied Qualifiers |
|------------|-------------------|------------------------------------|---------------------------|
| 229143 | RISB-946 | Tetrachloro-m-xylene | J/R |
| 229143 | RISB-19-01 | Decachlorobiphenyl | J/UJ |
| 229143 | RISB-29-1-S | Toluene-d8 | J |
| 229203 | RISB-92 | 4-Bromofluorobenzene | J |
| 229206 | RISB21-59 | Toluene-d8 4-Bromofluorobenzene | J |
| 229401 | RISB-34-1113 | Toluene-d8 4-Bromofluorobenzene | J |
| 229404 | RICB-3 | 4-Bromofluorobenzene | J |
| 239341 | P-2 | 4-Bromofluorobenzene Toluene-d8 | J |
| 239396 | RIMW-13 | Nitrobenzene 2-Fluorobiphenyl | J |
| 239401 | RIMW-8 RIMW-58 | Dibromofluoromethane | J/UJ |
| 239401 | RIMW-5 RIMW-55 | 1,2-Dichloroethane-d4 | J/UJ |

Table 4-18**Qualifiers Added Because of Calibration %R Exceedances**

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| SDG | Analyte | RRF/(RSD/%D) Exceedances | Applied Qualifiers |
|------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 229079 | Methyl Acetate | RRF – 0.019, 0.017 RSD/%D – 33.48%, 34.26% | R J/UJ |
| 229079 | 2-Hexanone | RSD/%D – 29.4% | UJ |
| 229079 | Acetone 2-Butanone | RSD/%D – 54.7%, 27.3% | UJ |
| 229143 | Methyl Acetate | RRF – 0.019, 0.017 RSD/%D – 28.44%, 34.16%, 37.7%, 71.52%, 44.52%, 27.58%, 37.9%, 76.44%, 40.16% | R J/UJ |
| 229143 | 4-Methyl-2-pentanone | RSD/%D – 25.1%, 28.3 | J/UJ J/UJ |
| 229143 | 2-Hexanone Acetone | RSD/%D – 25.9%, 31.9%, 28.4 28.2%, 105.2%, 69.3% | J/UJ |
| 229143 | 2-Butanone | RSD/%D – 48.3% | J/UJ |
| 229203 | Methyl Acetate | RRF – 0.019, 0.017 RSD/%D – 71.52%, 44.52%, 76.44%, 48.12% | R J/UJ |
| 229203 | Acetone 2-Butanone | RSD/%D – 105.2%, 36.9% 48.30% | J/UJ |
| 229204 | Atrazine | RSD/%D – 27.4% | UJ |
| 229204 | Bromomethane Methyl Acetate | RRF – 0.035, 0.037, 0.047, 0.041, 0.036 RSD/%D – 26.3%, 33.6% 0.034, 0.026, 0.019, 0.017 RSD/%D – 133%, 71.5% | R J/UJ |
| 229204 | Methylene Chloride | RSD/%D – 28.6%, 34.6% | UJ |
| 229204 | 2-Hexanone | RSD/%D – 25.9% | UJ |
| 229204 | Acetone 2-Butanone | RSD/%D – 105.2% 48.30% | UJ |
| 229206 | Atrazine | RSD/%D – 27.5% | UJ |
| 229206 | Methyl Acetate | RRF – 0.019, 0.017 RSD/%D – 71.52%, 44.52%, 76.44%, 48.12% | R J/UJ |
| 229206 | Acetone 2-Butanone | RSD/%D – 105.2%, 36.9% 48.30% | J/UJ |
| 229312 | Methyl Acetate | RRF – 0.019, 0.017 %D – 54%, 40.1%, 53.5%, 32% | R J |
| 229312 | Chloromethane | RSD/%D – 25.5% | UJ |

Table 4-18**Qualifiers Added Because of Calibration %R Exceedances**

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| SDG | Analyte | RRF/(RSD/%D) Exceedances | Applied Qualifiers |
|------------|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 229401 | Methyl Acetate | RRF – 0.019, 0.017 RSD/%D – 53.5%, 46.6%, 35.62% | R |
| 229403 | Methyl Acetate | RRF – 0.019, 0.017 RSD/%D – 53.5%, 46.6%, 35.62% | R J/UJ |
| 229404 | Methyl Acetate | RRF – 0.019, 0.017, 0.034, 0.026 RSD/%D – 53.5%, 32%, 29.02%, 35.62%, 46.6%, 49.2% | R J/UJ |
| 229404 | Bromomethane | RRF – 0.035, 0.037 RSD/%D – 48.6% | R |
| 229404 | Carbon Disulfide | RSD/%D – 22.6% | UJ |
| 229404 | Chloroethane | RSD/%D – 52.9% | UJ |
| 229404 | Acetone | RSD/%D – 74.6, 95.1% | UJ |
| 229404 | 2-Butanone | RSD/%D – 45.1% | UJ |
| 229404 | 2-Hexanone | RSD/%D – 44.4% | UJ |
| 237552 | Bromomethane Chloroethane Methyl Acetate | RRF – 0.048 RRF – 0.048 RRF – 0.035 | R |
| 237752 | Bromomethane Chloroethane | RRF – 0.048, 0.04, 0.039, 0.045 RRF – 0.048, 0.04, 0.042, 0.036, 0.034 | R |
| 237914 | Bromomethane Chloroethane Methyl Acetate | RRF – 0.048, 0.046, 0.047, 0.049 RRF – 0.048, 0.04, 0.037, 0.033, 0.041, RRF – 0.035 RSD/%D – 30.64%, 37.42%, 28.32%, 28.3% | J/R |
| 237943 | Bromomethane Chloroethane Methyl Acetate | RRF – 0.048, 0.046, 0.047, 0.049 RRF – 0.048, 0.04, 0.037, 0.033, 0.041 RRF – 0.035 RSD/%D – 30.64%, 37.42%, 28.3%, 38.96%, 49.84% | R |
| 237943 | Cyclohexane Methyl Cyclohexane | RSD/%D – 33.42% RSD/%D – 38.7% | UJ |
| 238041 | Bromomethane Chloroethane Methyl Acetate | RRF – 0.048, 0.049 RRF – 0.048, 0.041, 0.04 RRF – 0.035 | J/R |

Table 4-18**Qualifiers Added Because of Calibration %R Exceedances**

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| SDG | Analyte | RRF/(RSD/%D) Exceedances | Applied Qualifiers |
|------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-------------------------------|
| 238119 | Chloroethane Methyl Acetate Bromomethane | RRF – 0.04, 0.041, 0.042 RRF – 0.035 RRF – 0.049 | R |
| 239274 | Pentachlorophenol 2,4-Dinitrophenol | RSD/%D – 35.61%, 40.8% RSD/%D – 32.8% | UJ |
| 239274 | Chloroethane Methyl Acetate | RRF – 0.04, 0.035, 0.039 RRF – 0.035 | J/R |
| 239274 | Bromomethane Cyclohexane Methyl Cyclohexane | RSD/%D – 37.8% RSD/%D – 25.28% RSD/%D – 35.94% | UJ |
| 239341 | Chloroethane Methyl Acetate Bromomethane | RRF – 0.04, 0.034, 0.039, 0.033, 0.031 RRF – 0.035 RRF – 0.047, 0.049 | J/R |
| 239341 | Acetone 2-Butanone Methyl Cyclohexane | RSD/%D – 68.5% RSD/%D – 41.1% RSD/%D – 27.16% | J/UJ |
| 239396 | Acetone Bromomethane 2-Butanone 2-Hexanone | RSD/%D – 88.5% RSD/%D – 31% RSD/%D – 48.4% RSD/%D – 41.9% | J/UJ |
| 239401 | Chloroethane Methylene Chloride Methyl Acetate | RRF – 0.04, 0.031, 0.03 RSD/%D – 29.5%, 32.7% RSD/%D – 25% RRF – 26.84% | J J J |
| 239401 | Bromomethane | RRF – 0.045 | R |
| 249441 | Trans-1, 3- Dichloropropene Methyl Acetate Methyl Cyclohexane Cyclohexanone | RSD/%D – 30.7% RSD/%D – 43.51% RSD/%D – 47.37%, 68.12% RSD/%D – 48.52%, 57.34% | J/UJ |

Table 5-1**Summary of Surface and Subsurface Soil Hot Spot Evaluation**

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| Region 9 Residential Soil Screening Level | | Chemical of Potential Concern | | | | | | | | Basis for Identification as a Hot Spot |
|-------------------------------------------|----------------------|-------------------------------|---------------------------|------------------------------|----------------------------|------------------------|---------------------------|------------------------|------------------------|----------------------------------------|
| | | 1,2-DCA 0.28 (mg/kg) | 1,4-DCB 3.4 (mg/kg) | cis-1,2-DCE 43 (mg/kg) | Benzene 0.64 (mg/kg) | PCE 0.48 (mg/kg) | Toluene 520 (mg/kg) | TCE 0.48 (mg/kg) | VC 0.079 (mg/kg) | |
| <u>Hot Spot Location</u> | <u>Depth (ft)</u> | | | | | | | | | |
| Subsurface Locations | | | | | | | | | | |
| RISB-25 | 17-20 9-13 | 45 24 | | | | | | | | 1,2-DCA |
| RISB-64 | 5-10 10-15 0-5 | 11 9.3 0.93 | | 58 | 2.1 | 7.2 1.2 1.9 | | 150 16 2.7 | 0.086 | chlorinated VOCs |
| RIMW-6 (Hot Spot 2) | 4-6 0-1 | | | | | 3.7 0.8 | | 3.2 | 0.37 | chlorinated VOCs |
| RISB-12 | 12-15 | | | | 5.6 | | 1,900 | | | 650 BTEX |
| RISB-18 | 1-5 | 4.8 | 4.0 | | | | | | | chlorinated VOCs |
| Surface Locations | | | | | | | | | | |
| RISB-16 (Hot Spot 3) | 0-1 1-5 | | | | | 2.8 0.88 | | | | PCE |
| SB-6 (Hot Spot 1) | 0-1 | | | | | 2.7 | | | | PCE |

Notes:

Hot spot selection criteria:

Subsurface soil location was selected as a hot spot if: (1) 2 or more chemicals exceeded screening criteria at a given location or (2) if chemical exceeded criteria, the concentration was 10x greater than the screening level.

Surface soil location was selected as a hot spot if residential criteria exceeded.

Table 5-2
Summary of Key Toxicological Properties for Chronic Noncarcinogenic
Effects of Study Chemicals - Oral / Dermal

Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Study Chemical | ORAL/DERMAL EXPOSURE PATHWAY | | | | | | | | | Modifying Factor/ Uncertainty Factor |
|-------------------------|--------------------------------------------|---------------------------|-----------------------------------------------|--------------------------------------------|----------------------------------|------------------------------------------------------|-----------------------|--------------------------|------|-----------------------------------------|
| | Chronic Reference Dose (RfD) (mg/(kg/day)) | Confidence in Chronic RfD | Subchronic Reference Dose (RfD) (mg/(kg/day)) | Medium of Exposure in Critical Study | Species Tested in Critical Study | Effect of Concern in Critical Study | Source of Chronic RfD | Source of Subchronic RfD | | |
| VOCs | | | | | | | | | | |
| Acetophenone | 1.00E-01 | Low | 1.00E+00 | Oral Subchronic Study | rat | General Toxicity | EPA, 2007 | EPA, 1997 | 3000 | |
| Benzene | 4.00E-03 | medium | na | occupational inhalation study | human | Decreased lymphocyte count | EPA, 2007 | | 300 | |
| Bromodichloromethane | 2.00E-02 | medium | 2.00E-02 | Chronic Mouse Gavage Bioassay | mouse | Renal cytomegaly | EPA, 2007 | EPA, 1997 | 1000 | |
| Chlorobenzene | 2.00E-02 | medium | 2.00E-01 | 13-Week Dog Study, Oral Exposure (capsule) | dog | Histopathologic changes in liver | EPA, 2007 | EPA, 1997 | 1000 | |
| Chloroethane | 4.00E-01 | --- | nl | --- | --- | --- | NCEA | | --- | |
| Chloroform | 1.00E-02 | medium | 1.00E-02 | oral (chronic bioassay) | dog | fatty cyst formations in the liver and elevated SGPT | EPA, 2007 | EPA, 1997 | 1000 | |
| 1,1-Dichloroethane | 2.00E-01 | --- | 1.00E-01 | --- | --- | --- | EPA PPRV | EPA, 1997 | --- | |
| 1,2-Dichlorobenzene | 9.00E-02 | low | 9.00E-01 | Oral Exposure (gavage) | rat | observed | EPA, 2007 | EPA, 1997 | 1000 | |
| 1,1-Dichloroethene | 5.00E-02 | medium | 9.00E-03 | Rat chronic drinking water study | rat | Liver toxicity (fatty change) | EPA, 2007 | EPA, 1997 | 100 | |
| 1,2-Dichloroethane | na | --- | nl | --- | --- | --- | EPA, 2007 | | --- | |
| cis-1,2-Dichloroethene | 1.00E-02 | --- | 1.00E-01 | --- | --- | --- | EPA PPRV | EPA, 1997 | --- | |
| 1,4-Dichlorobenzene | 3.00E-02 | --- | 9.00E-01 | --- | --- | --- | NCEA | EPA, 1997 | --- | |
| Ethylbenzene | 1.00E-01 | low | 1.00E+00 | subchronic to chronic oral bioassay | rat | liver/kidney toxicity | EPA, 2007 | EPA, 1997 | 1000 | |
| 2-Hexanone | -- | --- | na | --- | --- | --- | EPA, 2007 | | --- | |
| | | | | | | Increased kidney weight | | | | |
| Isopropylbenzene | 1.00E-01 | low | nl | oral gavage | rat | | EPA, 2007 | | --- | |
| 4-Methyl-2-pentanone | --- | --- | 8.00E-01 | --- | --- | --- | EPA, 2007 | EPA, 1997 | --- | |
| Methyl tert butyl ether | na | --- | nl | --- | --- | --- | --- | | --- | |
| Methylcyclohexane | na | --- | na | --- | --- | --- | --- | | --- | |
| Methylene chloride | 6.00E-02 | medium | 6.00E-02 | oral water bioassay | rat | liver toxicity | EPA, 2007 | EPA, 1997 | 100 | |
| Tetrachloroethene | 1.00E-02 | medium | 1.00E-01 | oral (gavage) | mouse | Hepatotoxicity in mice, weight gain in rats | EPA, 2007 | EPA, 1997 | 1000 | |
| | | | | | | Increased kidney weight | | | | |
| Toluene | 8.00E-02 | medium | 2.00E+00 | 13-week gavage study | rat | | EPA, 2007 | EPA, 1997 | 3000 | |
| 1,1,1-Trichloroethane | 2.00E+00 | low-medium | 9.00E-01 | 90-Day mouse dietary study | mouse | Reduced body weight | EPA, 2007 | EPA, 1997 | 1000 | |
| | | | | Subchronic | | | | | | |
| 1,1,2-Trichloroethane | 4.00E-03 | medium | 4.00E-02 | Drinking Water Study | mouse | Clinical serum chemistry | EPA, 2007 | EPA, 1997 | 1000 | |
| Trichloroethene | 3.00E-04 | --- | nl | --- | --- | --- | NCEA | | --- | |
| Vinyl chloride | 3.00E-03 | medium | na | Oral | rat/mouse | liver cell polymorphism | EPA, 2007 | | 30 | |
| | | | | | | Decreased body weight, increased mortality | EPA, 2007 | | 1000 | |
| Xylenes (Total) | 2.00E-01 | medium | na | Chronic F344/N rat study (oral) | rat | | EPA, 2007 | | 1000 | |

Table 5-2
Summary of Key Toxicological Properties for Chronic Noncarcinogenic
Effects of Study Chemicals - Oral / Dermal

Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Study Chemical | ORAL/DERMAL EXPOSURE PATHWAY | | | | | | | | |
|----------------------------|--------------------------------------------|---------------------------|-----------------------------------------------|--------------------------------------|----------------------------------|-----------------------------------------------------------|-----------------------|--------------------------|--------------------------------------|
| | Chronic Reference Dose (RfD) (mg/(kg/day)) | Confidence in Chronic RfD | Subchronic Reference Dose (RfD) (mg/(kg/day)) | Medium of Exposure in Critical Study | Species Tested in Critical Study | Effect of Concern in Critical Study | Source of Chronic RfD | Source of Subchronic RfD | Modifying Factor/ Uncertainty Factor |
| SVOCs | | | | | | | | | |
| 2-Chlorophenol | 5.00E-03 | low | 5.00E-02 | Sub-Chronic Drinking Water Study | rat | Reproductive Effects | EPA, 2007 | EPA, 1997 | 1000 |
| Bis(2-ethylhexyl)phthalate | 2.00E-02 | medium | 2.00E-02 | Sub-chronic-to-Chronic Oral Bioassay | Guinea Pig | increased liver weight | EPA, 2007 | EPA, 1997 | 1000 |
| Naphthalene | 2.00E-02 | low | na | oral (subchronic) | rat | decreased terminal body weight | EPA, 2007 | | 3000 |
| Metals | | | | | | | | | |
| Arsenic | 3.00E-04 | medium | 3.00E-04 | oral (drinking water) | human | hyperpigmentation; skin keratosis; vascular complications | EPA, 2007 | EPA, 1997 | 3 |
| Iron | 7.00E-01 | --- | na | --- | --- | --- | NCEA | | --- |
| | | | | | | CNS effects | | | |
| Manganese | 2.00E-02 | medium | 1.40E-01 | Chronic Ingestion Data | human | | EPA, 2007 | EPA, 1997 | 1 |
| Thallium | 7.00E-05 | --- | nl | --- | --- | --- | Other | | --- |
| Vanadium | 1.0E-03 | --- | 7.00E-03 | --- | --- | --- | NCEA | EPA, 1997 | --- |

Notes:

(na): The chemical is listed, value is not available.

(nl): The chemical is not listed by the reference source.

EPA, 2007. Integrated Risk Information System (IRIS). Chemical-specific database.

NCEA: National Center for Environmental Assessment.

EPA PPRV - EPA Provisional Peer-Reviewed Value. EPA Region 3 RBC Table.

ATSDR MRL (chronic). EPA Region 3 RBC Table.

Table 5-3

Summary of Key Toxicological Properties for Chronic Noncarcinogenic Effects of Study Chemicals - Inhalation

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| Study Chemical | INHALATION EXPOSURE PATHWAY | | | | | | | | | | | |
|-------------------------|-----------------------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------|-------------------------------------|--------------------|-------------------|------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| | Inhalation Chronic Reference Concentration (RfC) (mg/m ³) | Inhalation Chronic Reference Dose (RfD) (mg/(kg/day)) | Inhalation Subchronic Reference Concentration (RfC) (mg/m ³) | Inhalation Subchronic Reference Dose (RfD) (mg/(kg/day)) | Source of Chronic Inhalation RfC | Source of Subchronic Inhalation RfC | Date Last Verified | Confidence in RfC | Study Type | Species Tested in Critical Study | Target Organ / Critical Effect | Uncertainty / Modifying Factors |
| VOCs | | | | | | | | | | | | |
| Acetophenone | na | na | na | na | EPA, 2007 | | --- | --- | --- | --- | --- | --- |
| Benzene | 3.00E-02 | 8.57E-03 | na | na | EPA, 2007 | | 1/26/02 | medium | Occupational Inhalation | human | Decreased lymphocyte count | 300 |
| Bromodichloromethane | na | na | na | na | EPA, 2007 | | --- | --- | --- | --- | --- | --- |
| Chlorobenzene | 4.90E-02 | 1.40E-02 | na | na | EPA PPRV | | --- | --- | --- | --- | --- | --- |
| Chloroethane | 1.00E+00 | 2.90E+00 | na | na | EPA, 2007 | | 12/20/90 | medium | developmental Inhalation study | mouse | Delayed fetal ossification | 300 |
| Chloroform | 4.90E-02 | 1.40E-02 | na | na | EPA PPRV ⁽¹⁾ | | --- | --- | --- | --- | --- | --- |
| 1,1-Dichloroethane | 4.90E-01 | 1.40E-01 | na | 5.00E+00 | Heast Alt. | EPA, 1997 | --- | --- | --- | --- | --- | --- |
| 1,2-Dichlorobenzene | 1.40E-01 | 4.00E-02 | na | na | Heast Alt. | | --- | --- | gavage chronic inhalation study | rats/mice | Several tumor types | --- |
| 1,1-Dichloroethene | 2.00E-01 | 5.70E-02 | na | na | EPA, 2007 | | 6/7/02 | medium | chronic inhalation study | Rat | Liver toxicity (fatty change) | 30 |
| 1,2-Dichloroethane | 2.45E+00 | 7.00E-01 | nl | nl | ATSDR MRL (chronic) | | --- | --- | --- | --- | --- | --- |
| cis-1,2-Dichloroethene | 2.00E-01 | 5.71E-02 | na | na | EPA, 2007 | | --- | --- | --- | --- | --- | --- |
| 1,4-Dichlorobenzene | 8.00E-01 | 2.29E-01 | 2.50E+00 | 7.14E-01 | EPA, 2007 | EPA, 1997 | 6/25/92 | medium | Multigeneration Reproductive Study | rat | Increased liver weights in P1 males | 100 |
| Ethylbenzene | 1.00E+00 | 2.90E-01 | na | na | EPA, 2007 | | 3/1/91 | low | inhalation study | rat, rabbit | developmental toxicity | 300 |
| 2-Hexanone | na | na | nl | nl | EPA, 2007 | | --- | --- | --- | --- | --- | --- |
| Isopropylbenzene | 4.00E-01 | 1.10E-01 | nl | nl | EPA, 2007 | | 6/6/97 | medium | inhalation study | rat | increased kidney weights | 1000 |
| 4-Methyl-2-pentanone | 3.00E+00 | 8.57E-01 | na | na | EPA, 2007 | | 4/2/03 | Low-Medium | inhalation study | rat, mice | Reduced fetal body weight, skeletal variations, and increased fetal death in mice, and skeletal variations in rats | 300 |
| Methyl tert butyl ether | 3.00E+00 | 8.57E-01 | nl | nl | EPA, 2007 | | 7/21/93 | medium | inhalation study | rat | Increased liver and kidney weights and increased severity of spontaneous renal lesions (females), increased prostration (females), and swollen pericocular tissue (males and females) | 100 |
| Methylcyclohexane | 3.01E+00 | 8.60E-01 | 3.00E+00 | 8.57E-01 | Heast Alt. | EPA, 1997 | --- | --- | --- | --- | --- | --- |
| Methylene chloride | 1.05E+00 | 3.00E-01 | 3.00E+00 | 8.57E-01 | ATSDR MRL (chronic) | EPA, 1997 | --- | --- | --- | --- | --- | --- |
| Tetrachloroethene | 3.50E-02 | 1.00E-02 | na | na | ATSDR MRL (chronic) | | --- | --- | --- | --- | --- | --- |
| Toluene | 5.00E+00 | 1.43E+00 | na | na | EPA, 2007 | | 8/26/05 | high | Occupational Inhalation | human | Neurological effects | 10 |

Table 5-3

Summary of Key Toxicological Properties for Chronic Noncarcinogenic Effects of Study Chemicals - Inhalation

Remedial Investigation Report

September 2008

PSC Site - Rock Hill, South Carolina

| Study Chemical | INHALATION EXPOSURE PATHWAY | | | | | | | | | | | |
|----------------------------|-----------------------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------|-------------------------------------|--------------------|-------------------|-------------------------|----------------------------------|-----------------------------------------|---------------------------------|
| | Inhalation Chronic Reference Concentration (RfC) (mg/m ³) | Inhalation Chronic Reference Dose (RfD) (mg/(kg/day)) | Inhalation Subchronic Reference Concentration (RfC) (mg/m ³) | Inhalation Subchronic Reference Dose (RfD) (mg/(kg/day)) | Source of Chronic Inhalation RfC | Source of Subchronic Inhalation RfC | Date Last Verified | Confidence in RfC | Study Type | Species Tested in Critical Study | Target Organ / Critical Effect | Uncertainty / Modifying Factors |
| 1,1,1-Trichloroethane | 5.00E+00 | 1.43E+00 | na | na | EPA, 2007 | | 9/28/07 | medium | 2 year inhalation study | rat | Liver histopathologic changes | 100 |
| 1,1,2-Trichloroethane | na | na | na | na | EPA, 2007 | | --- | --- | --- | --- | --- | --- |
| Trichloroethene | 3.50E-02 | 1.00E-02 | nl | nl | NCEA ⁽¹⁾ | | --- | --- | --- | --- | --- | --- |
| Vinyl chloride | 1.00E-01 | 2.86E-02 | na | na | EPA, 2007 | | 8/7/00 | medium | oral feeding study | rat | liver cell polymorphism | 30 |
| Xylenes (Total) | 1.00E-01 | 2.86E-02 | na | na | EPA, 2007 | | 1/30/03 | medium | inhalation study | rat | Impaired motor coordination | 300 |
| SVOCs | | | | | | | | | | | | |
| 2-Chloropheno | na | na | na | na | EPA, 2007 | | --- | --- | --- | --- | --- | --- |
| Bis(2-ethylhexyl)phthalate | na | na | na | na | EPA, 2007 | | --- | --- | --- | --- | --- | --- |
| Naphthalene | 3.00E-03 | 9.00E-04 | na | na | EPA, 2007 | | 7/1/98 | low-med | inhalation study | mouse | Nasal effects | 3000 |
| Metals | | | | | | | | | | | | |
| Arsenic | na | na | na | na | EPA, 2007 | | --- | --- | --- | --- | --- | --- |
| Iron | na | na | na | na | EPA, 2007 | | --- | --- | --- | --- | --- | --- |
| Manganese | 5.0E-05 | 1.4E-05 | na | na | EPA, 2007 | | 9/23/93 | medium | Occupational Inhalation | human | Impairment of neuro-behavioral function | 1000 |
| Thallium | na | na | nl | nl | EPA, 2007 | | --- | --- | --- | --- | --- | --- |
| Vanadium | na | na | na | na | EPA, 2007 | | --- | --- | --- | --- | --- | --- |

Notes:

(1): Chronic oral RfD was used to calculate the oral RfC.

(2): Chronic oral RfC was used to calculate the oral RfD.

(na): The chemical is listed, value is not available.

(nl): The chemical is not listed.

EPA, 2007. Integrated Risk Information System (IRIS). Chemical-specific database.

NCEA: National Center for Environmental Assessment.

EPA PPRV - EPA Provisional Peer-Reviewed Value. EPA Region 3 RBC Table.

ATSDR MRL (chronic). EPA Region 3 RBC Table.

Table 5-4
Summary of Key Toxicological Properties for Carcinogenic
Effects of Study Chemicals - Oral / Dermal

Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Study Chemical | Weight-of-Evidence Classification | ORAL/DERMAL EXPOSURE PATHWAY | | | | | |
|-------------------------|-----------------------------------|------------------------------------------------|------------|--------------------|-------------------------------|----------------------------------|---------------------------------------------------------------|
| | | Oral Cancer Slope Factor (CSF) (mg/(kg/day))-1 | Source | Date Last Verified | Study Type | Species Tested in Critical Study | Tumor Type in Critical Study |
| VOCs | | | | | | | |
| Acetophenone | D | na | EPA, 2007 | --- | --- | --- | --- |
| Benzene | A | 5.50E-02 | EPA, 2007 | 9/30/98 | inhalation occupational study | human | leukemia |
| Bromodichloromethane | B2 | 6.20E-02 | EPA, 2007 | 4/2/92 | gavage | mouse | Kidney (tubular cell adenoma and tubular cell adenocarcinoma) |
| Chlorobenzene | D | na | EPA, 2007 | --- | --- | --- | --- |
| Chloroethane | ne | 2.90E-03 | NCEA | --- | --- | --- | --- |
| Chloroform | B2 | 1.00E-02 | EPA, 2007 | --- | --- | --- | --- |
| 1,1-Dichloroethane | C | na | EPA, 2007 | 12/7/89 | bioassay | female rat | mammary gland adenocarcinomas and hemangiosarcomas |
| 1,2-Dichlorobenzene | D | na | EPA, 2007 | 12/6/89 | --- | --- | --- |
| 1,1-Dichloroethene | C | na | EPA, 2007 | --- | --- | --- | --- |
| 1,2-Dichloroethane | B2 | 9.10E-02 | EPA, 2007 | 12/5/86 | gavage | rat/Osborne-Mendel, male | hemangiosarcomas |
| cis 1,2-Dichloroethene | D | na | EPA, 2007 | 9/7/89 | --- | --- | --- |
| 1,4-Dichlorobenzene | ne | 2.40E-02 | Heast Alt. | --- | --- | --- | --- |
| Ethylbenzene | D | na | EPA, 2007 | 10/7/87 | --- | --- | --- |
| 2-Hexanone | na | na | EPA, 2007 | --- | --- | --- | --- |
| Isopropylbenzene | D | na | EPA, 2007 | 6/6/97 | --- | --- | --- |
| 4-Methyl-2-pentanone | na | na | EPA, 2007 | --- | --- | --- | --- |
| Methyl tert butyl ether | na | 4.00E-03 | Other | --- | --- | --- | --- |
| Methylcyclohexane | na | na | EPA, 2007 | --- | --- | --- | --- |
| Methylene chloride | B2 | 7.50E-03 | EPA, 2007 | 1/31/91 | Drinking water | rats | hepatocellular carcinoma and neoplastic nodules |
| Tetrachloroethene | na | 5.40E-01 | Other | --- | --- | --- | --- |
| Toluene | na | ne | EPA, 2007 | --- | --- | --- | --- |

Table 5-4
Summary of Key Toxicological Properties for Carcinogenic
Effects of Study Chemicals - Oral / Dermal

Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Study Chemical | Weight-of-Evidence Classification | ORAL/DERMAL EXPOSURE PATHWAY | | | | | |
|----------------------------|-----------------------------------|------------------------------------------------|-----------|--------------------|-----------------------|----------------------------------|--------------------------------------|
| | | Oral Cancer Slope Factor (CSF) (mg/(kg/day))-1 | Source | Date Last Verified | Study Type | Species Tested in Critical Study | Tumor Type in Critical Study |
| 1,1,1-Trichloroethane | D | na | EPA, 2007 | 8/5/87 | --- | --- | --- |
| 1,1,2-Trichloroethane | C | 5.70E-02 | EPA, 2007 | 7/23/86 | gavage | Mouse/B6C3F1 | hepatocellular carcinoma |
| Trichloroethene | na | 4.00E-01 | NCEA | --- | --- | --- | --- |
| Vinyl chloride | A | 7.20E-01 | EPA, 2007 | 8/6/96 | occupational | human | angiosarcoma |
| Xylenes (Total) | ne | na | EPA, 2007 | --- | --- | --- | --- |
| SVOCs | | | | | | | |
| 2-Chlorophenol | na | ne | EPA, 2007 | --- | --- | --- | --- |
| Bis(2-ethylhexyl)phthalate | B2 | 1.40E-02 | EPA, 2007 | 10/7/87 | diet | mouse | hepatocellular carcinoma and adenoma |
| Naphthalene | C | na | EPA, 2007 | --- | --- | --- | --- |
| Metals | | | | | | | |
| Arsenic | A | 1.50E+00 | EPA, 2007 | 4/9/84 | oral (drinking water) | human | skin cancer |
| Iron | na | na | EPA, 2007 | --- | --- | --- | --- |
| Manganese | D | na | EPA, 2007 | --- | --- | --- | --- |
| Thallium | na | na | EPA, 2007 | --- | --- | --- | --- |
| Vanadium | ne | na | EPA, 2007 | --- | --- | --- | --- |

Notes:

(na): The chemical is listed, value is not available.
 (ne): The compound has not been evaluated by EPA for evidence of human carcinogenicity.
 (nl): The chemical is not listed by the reference source.
 EPA, 2007. Integrated Risk Information System (IRIS). Chemical-specific database.
 NCEA: National Center for Environmental Assessment.
 EPA PPRV - EPA Provisional Peer-Reviewed Value. EPA Region 3 RBC Table.
 ATSDR MRL (chronic). EPA Region 3 RBC Table.

Table 5-5
Summary of Key Toxicological Properties for Carcinogenic
Effects of Study Chemicals - Inhalation

Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Study Chemical | Weight-of-Evidence Classification | INHALATION EXPOSURE PATHWAY | | | | | |
|-------------------------|-----------------------------------|--------------------------------------------------------|-------------------------------------------------------|--------------------------|----------------------------------|--------------------------------------|-----------------------------|
| | | Inhalation Unit Risk Factor (UR) (ug/m3) ⁻¹ | Cancer Slope Factor (CSF) (mg/(kg/day)) ⁻¹ | Medium of Exposure Study | Species Tested in Critical Study | Type of Cancer in Critical Study | Inhalation Unit Risk Source |
| VOCs | | | | | | | |
| Acetophenone | D | na | na | --- | --- | --- | EPA, 2007 |
| Benzene | A | 5.00E-06 | 2.70E-02 | inhalation | human | leukemia | EPA, 2007 |
| Bromodichloromethane | B2 | na | na | --- | --- | --- | EPA, 2007 |
| Chlorobenzene | D | na | na | --- | --- | --- | EPA, 2007 |
| Chloroethane | ne | na | na | --- | --- | --- | EPA, 2007 |
| Chloroform | B2 | 2.30E-05 | 8.10E-02 | Oral (gavage) | mouse | hepatocellular carcinoma | EPA, 2007 |
| 1,1-Dichloroethane | C | na | na | bioassay | female rat | adenocarcinomas and hemangiosarcomas | EPA, 2007 |
| 1,2-Dichlorobenzene | D | na | na | --- | --- | --- | EPA, 2007 |
| 1,1-Dichloroethene | C | na | na | --- | --- | --- | EPA, 2007 |
| 1,2-Dichloroethane | B2 | 2.60E-05 | 9.10E-02 | gavage | male | hemangiosarcomas | EPA, 2007 |
| cis-1,2-Dichloroethene | D | na | na | --- | --- | --- | EPA, 2007 |
| 1,4-Dichlorobenzene | ne | 6.29E-06 | 2.20E-02 | --- | --- | --- | NCEA |
| Ethylbenzene | D | na | na | --- | --- | --- | EPA, 2007 |
| 2-Hexanone | na | na | na | --- | --- | --- | EPA, 2007 |
| Isopropylbenzene | D | na | na | --- | --- | --- | EPA, 2007 |
| 4-Methyl-2-pentanone | na | na | na | --- | --- | --- | EPA, 2007 |
| Methyl tert butyl ether | na | na | na | --- | --- | --- | EPA, 2007 |
| Methylcyclohexane | na | na | na | --- | --- | --- | EPA, 2007 |
| Methylene chloride | B2 | 4.70E-07 | 1.65E-03 | inhalation | mouse | carcinomas | EPA, 2007 |
| Tetrachloroethene | na | 6.00E-06 | 2.10E-02 | --- | --- | --- | Other |
| Toluene | na | ne | na | --- | --- | --- | EPA, 2007 |
| 1,1,1-Trichloroethane | D | na | na | --- | --- | --- | EPA, 2007 |
| 1,1,2-Trichloroethane | C | 1.60E-05 | 5.60E-02 | gavage | Mouse/B6C3F1 | hepatocellular carcinoma | EPA, 2007 |
| Trichloroethene | na | 1.10E-04 | 3.85E-01 | --- | --- | --- | NCEA ⁽¹⁾ |
| Vinyl chloride | A | 4.40E-06 | 1.54E-02 | inhalation | rats | liver angiosarcomas, | EPA, 2007 |
| Xylenes (Total) | ne | na | na | --- | --- | --- | EPA, 2007 |

Table 5-5
Summary of Key Toxicological Properties for Carcinogenic
Effects of Study Chemicals - Inhalation

Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Study Chemical | Weight-of-Evidence Classification | INHALATION EXPOSURE PATHWAY | | | | | |
|----------------------------|-----------------------------------|--------------------------------------------------------|-------------------------------------------------------|--------------------------|----------------------------------|----------------------------------|-----------------------------|
| | | Inhalation Unit Risk Factor (UR) (ug/m3) ⁻¹ | Cancer Slope Factor (CSF) (mg/(kg/day)) ⁻¹ | Medium of Exposure Study | Species Tested in Critical Study | Type of Cancer in Critical Study | Inhalation Unit Risk Source |
| SVOCs | | | | | | | |
| 2-Chlorophenol | na | ne | na | --- | --- | --- | EPA, 2007 |
| Bis(2-ethylhexyl)phthalate | B2 | na | na | --- | --- | --- | EPA, 2007 |
| Naphthalene | C | na | na | --- | --- | --- | EPA, 2007 |
| Metals | | | | | | | |
| Arsenic | A | 4.30E-03 | 1.51E+01 | Occupational inhalation | human, male | lung cancer | EPA, 2007 |
| Iron | na | na | na | --- | --- | --- | EPA, 2007 |
| Manganese | D | na | na | --- | --- | --- | EPA, 2007 |
| Thallium | na | na | na | --- | --- | --- | EPA, 2007 |
| Vanadium | ne | na | na | --- | --- | --- | EPA, 2007 |

Notes:

- (1): The Inhalation Unit Risk factor was extrapolated from the Cancer Slope Factor.
 - (2): The Cancer Slope Factor was extrapolated from the Inhalation Unit Risk factor.
 - (na): The chemical is listed, value is not available.
 - (nl): The chemical is not listed by the reference source.
- EPA, 2007. Integrated Risk Information System (IRIS). Chemical-specific database.
 NCEA: National Center for Environmental Assessment.
 EPA PPRV - EPA Provisional Peer-Reviewed Value. EPA Region 3 RBC Table.
 ATSDR MRL (chronic). EPA Region 3 RBC Table.

Table 5-6
Risk and Hazard Evaluation
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| | Excess Lifetime Cancer Risk ⁽¹⁾ | Percent Distribution of Risk by Pathway | Exceeds Acceptable Risk Range? | Hazard Index ⁽²⁾ | Percent Distribution of Risk by Pathway | Exceeds Noncancer HI Threshold? |
|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------|--------------------------------------|--------------------------------|--------------------------------------------------|---------------------------------------|
| CURRENT EXPOSURE TO CHEMICALS SURFACE SOIL (EXCLUDING HOT SPOTS AND BENEATH STRUCTURES) AND GROUNDWATER | | | | | | |
| <u>O&M Worker</u> | | | | | | |
| Ingestion of Surface Soil | 5E-07 | 0% | | 3E-01 | 33% | |
| Dermal Contact with Surface Soil | 2E-07 | 0% | | 2E-01 | 22% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 6E-10 | 0% | | 3E-03 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | NA | 0% | | NA | 0% | |
| Dermal Contact with All Groundwater | NA | 0% | | NA | 0% | |
| Inhalation of Indoor Air, Shallow Groundwater | <u>9E-05</u> | 99% | | <u>3E-01</u> | 45% | |
| Total Risk = | 9E-05 | | No | 0.8 | | No |
| <u>Trespasser</u> | | | | | | |
| Ingestion of Surface Soil | 7E-07 | 67% | | 8E-01 | 57% | |
| Dermal Contact with Surface Soil | 3E-07 | 32% | | 6E-01 | 43% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 7E-10 | 0% | | 1E-03 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | NA | 0% | | NA | 0% | |
| Dermal Contact with All Groundwater | NA | 0% | | NA | 0% | |
| Inhalation of Indoor Air, Shallow Groundwater | <u>NA</u> | 0% | | <u>NA</u> | 0% | |
| Total Risk = | 1E-06 | | No | 1 | | No |
| CURRENT EXPOSURE TO CHEMICALS IN HOT SPOT 1 SURFACE SOIL AND GROUNDWATER | | | | | | |
| <u>O&M Worker</u> | | | | | | |
| Ingestion of Surface Soil | 5E-07 | 0% | | 3.E-01 | 35% | |
| Dermal Contact with Surface Soil | 2E-07 | 0% | | 2E-01 | 23% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 4E-10 | 0% | | 1E-02 | 2% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | NA | 0% | | NA | 0% | |
| Dermal Contact with All Groundwater | NA | 0% | | NA | 0% | |
| Inhalation of Indoor Air, Shallow Groundwater | <u>9E-05</u> | 99% | | <u>3E-01</u> | 41% | |
| Total Risk = | 9E-05 | | No | 0.8 | | No |
| FUTURE EXPOSURE TO CHEMICALS IN HOT SPOT 1 SURFACE SOIL AND GROUNDWATER | | | | | | |
| <u>Industrial Worker</u> | | | | | | |
| Ingestion of Surface Soil | 8E-07 | 0% | | 5E-01 | 1% | |
| Dermal Contact with Surface Soil | 3E-07 | 0% | | 3E-01 | 1% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 6E-07 | 0% | | 2E-02 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 5E-03 | 49% | | 3E+01 | 49% | |
| Dermal Contact with All Groundwater | 5E-03 | 49% | | 3E+01 | 49% | |
| Inhalation of Indoor Air, Shallow Groundwater | <u>2E-04</u> | 2% | | <u>6E-01</u> | 1% | |
| Total Risk = | 9E-03 | | Yes | 63 | | Yes |
| <u>Resident</u> | | | | | | |
| Ingestion of Surface Soil | 7E-06 | 0% | | 1E+01 | 3% | |
| Dermal Contact with Surface Soil | 7E-07 | 0% | | 2E+00 | 0% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 2E-06 | 0% | | 7E-02 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 2E-02 | 50% | | 2E+02 | 48% | |
| Dermal Contact with All Groundwater | 2E-02 | 50% | | 2E+02 | 48% | |
| Inhalation of Indoor Air, Shallow Groundwater | <u>3E-04</u> | 1% | | <u>8E-01</u> | 0% | |
| Total Risk = | 3E-02 | | Yes | 409 | | Yes |

Table 5-6
Risk and Hazard Evaluation
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| | Excess Lifetime Cancer Risk ⁽¹⁾ | Percent Distribution of Risk by Pathway | Exceeds Acceptable Risk Range? | Hazard Index ⁽²⁾ | Percent Distribution of Risk by Pathway | Exceeds Noncancer HI Threshold? |
|----------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------|--------------------------------------|--------------------------------|--------------------------------------------------|---------------------------------------|
| CURRENT/FUTURE EXPOSURE TO CHEMICALS IN HOT SPOT 1 SURFACE SOIL AND GROUNDWATER | | | | | | |
| <u>Trespasser / Recreational</u> | | | | | | |
| Ingestion of Surface Soil | 7E-07 | 62% | | 9E-01 | 57% | |
| Dermal Contact with Surface Soil | 4E-07 | 32% | | 7E-01 | 43% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 7E-08 | 7% | | 5E-03 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | NA | 0% | | NA | 0% | |
| Dermal Contact with All Groundwater | NA | 0% | | NA | 0% | |
| Inhalation of Indoor Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Total Risk = | 1E-06 | | No | 2 | | Yes |
| CURRENT EXPOSURE TO CHEMICALS IN HOT SPOT 2 SURFACE SOIL AND GROUNDWATER | | | | | | |
| <u>O&M Worker</u> | | | | | | |
| Ingestion of Surface Soil | 5E-08 | 0% | | 2.E-05 | 0% | |
| Dermal Contact with Surface Soil | 2E-08 | 0% | | 1E-05 | 0% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 2E-13 | 0% | | 1E-03 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | NA | 0% | | NA | 0% | |
| Dermal Contact with All Groundwater | NA | 0% | | NA | 0% | |
| Inhalation of Indoor Air, Shallow Groundwater | 9E-05 | 100% | | 3E-01 | 100% | |
| Total Risk = | 9E-05 | | No | 0.3 | | No |
| FUTURE EXPOSURE TO CHEMICALS IN HOT SPOT 2 SURFACE SOIL AND GROUNDWATER | | | | | | |
| <u>Industrial Worker</u> | | | | | | |
| Ingestion of Surface Soil | 8E-08 | 0% | | 4E-05 | 0% | |
| Dermal Contact with Surface Soil | 4E-08 | 0% | | 2E-05 | 0% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 2E-07 | 0% | | 2E-03 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 5E-03 | 49% | | 3E+01 | 50% | |
| Dermal Contact with All Groundwater | 5E-03 | 49% | | 3E+01 | 50% | |
| Inhalation of Indoor Air, Shallow Groundwater | 2E-04 | 2% | | 6E-01 | 1% | |
| Total Risk = | 9E-03 | | Yes | 62 | | Yes |
| <u>Resident</u> | | | | | | |
| Ingestion of Surface Soil | 7E-07 | 0% | | 1E-03 | 0% | |
| Dermal Contact with Surface Soil | 8E-08 | 0% | | 1E-04 | 0% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 6E-07 | 0% | | 8E-03 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 2E-02 | 50% | | 2E+02 | 50% | |
| Dermal Contact with All Groundwater | 2E-02 | 50% | | 2E+02 | 50% | |
| Inhalation of Indoor Air, Shallow Groundwater | 3E-04 | 1% | | 8E-01 | 0% | |
| Total Risk = | 3E-02 | | Yes | 395 | | Yes |
| CURRENT/FUTURE EXPOSURE TO CHEMICALS IN HOT SPOT 2 SURFACE SOIL AND GROUNDWATER | | | | | | |
| <u>Trespasser / Recreational</u> | | | | | | |
| Ingestion of Surface Soil | 7E-08 | 46% | | 8E-05 | 10% | |
| Dermal Contact with Surface Soil | 6E-08 | 39% | | 4E-05 | 6% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 2E-08 | 15% | | 6E-04 | 84% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | NA | 0% | | NA | 0% | |
| Dermal Contact with All Groundwater | NA | 0% | | NA | 0% | |
| Inhalation of Indoor Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Total Risk = | 2E-07 | | No | 0.0007 | | No |

Table 5-6
Risk and Hazard Evaluation
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| | Excess Lifetime Cancer Risk ⁽¹⁾ | Percent Distribution of Risk by Pathway | Exceeds Acceptable Risk Range? | Hazard Index ⁽²⁾ | Percent Distribution of Risk by Pathway | Exceeds Noncancer HI Threshold? |
|-------------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------|--------------------------------------|--------------------------------|--------------------------------------------------|---------------------------------------|
| FUTURE EXPOSURE TO CHEMICALS IN HOT SPOT 3 SURFACE SOIL AND GROUNDWATER | | | | | | |
| <u>Trespasser / Recreational</u> | | | | | | |
| Ingestion of Surface Soil | 7E-07 | 61% | | 2E+00 | 57% | |
| Dermal Contact with Surface Soil | 3E-07 | 32% | | 2E+00 | 43% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 8E-08 | 7% | | 7E-03 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | NA | 0% | | NA | 0% | |
| Dermal Contact with All Groundwater | NA | 0% | | NA | 0% | |
| Inhalation of Indoor Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Total Risk = | 1E-06 | | No | 4 | | Yes |
| <u>Industrial Worker</u> | | | | | | |
| Ingestion of Surface Soil | 7E-07 | 0% | | 1E+00 | 2% | |
| Dermal Contact with Surface Soil | 3E-07 | 0% | | 7E-01 | 1% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 6E-07 | 0% | | 3E-02 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 5E-03 | 49% | | 3E+01 | 48% | |
| Dermal Contact with All Groundwater | 5E-03 | 49% | | 3E+01 | 48% | |
| Inhalation of Indoor Air, Shallow Groundwater | 2E-04 | 2% | | 6E-01 | 1% | |
| Total Risk = | 9E-03 | | Yes | 63 | | Yes |
| <u>Resident</u> | | | | | | |
| Ingestion of Surface Soil | 7E-06 | 0% | | 2E+01 | 5% | |
| Dermal Contact with Surface Soil | 7E-07 | 0% | | 3E+00 | 1% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 2E-06 | 0% | | 9E-02 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 2E-02 | 50% | | 2E+02 | 47% | |
| Dermal Contact with All Groundwater | 2E-02 | 50% | | 2E+02 | 47% | |
| Inhalation of Indoor Air, Shallow Groundwater | 3E-04 | 1% | | 8E-01 | 0% | |
| Total Risk = | 3E-02 | | Yes | 419 | | Yes |
| FUTURE EXPOSURE TO CHEMICALS IN SURFACE SOIL (EXCLUDING HOT SPOTS) AND GROUNDWATER | | | | | | |
| <u>Industrial Worker</u> | | | | | | |
| Ingestion of Surface Soil | 7E-07 | 0% | | 4E-01 | 1% | |
| Dermal Contact with Surface Soil | 3E-07 | 0% | | 3E-01 | 0% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 2E-07 | 0% | | 6E-03 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 5E-03 | 49% | | 3E+01 | 49% | |
| Dermal Contact with All Groundwater | 5E-03 | 49% | | 3E+01 | 49% | |
| Inhalation of Indoor Air, Shallow Groundwater | 2E-04 | 2% | | 6E-01 | 1% | |
| Total Risk = | 9E-03 | | Yes | 62 | | Yes |
| <u>Trespasser / Recreational</u> | | | | | | |
| Ingestion of Surface Soil | 7E-07 | 62% | | 8E-01 | 57% | |
| Dermal Contact with Surface Soil | 3E-07 | 32% | | 6E-01 | 43% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 6E-08 | 6% | | 2E-03 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | NA | 0% | | NA | 0% | |
| Dermal Contact with All Groundwater | NA | 0% | | NA | 0% | |
| Inhalation of Indoor Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Total Risk = | 1E-06 | | No | 1 | | No |
| <u>Resident</u> | | | | | | |
| Ingestion of Surface Soil | 7E-06 | 0% | | 1E+01 | 3% | |
| Dermal Contact with Surface Soil | 1E-06 | 0% | | 2E+00 | 0% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 2E-06 | 0% | | 2E-02 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 2E-02 | 50% | | 2E+02 | 48% | |
| Dermal Contact with All Groundwater | 2E-02 | 50% | | 2E+02 | 48% | |
| Inhalation of Indoor Air, Shallow Groundwater | 3E-04 | 1% | | 8E-01 | 0% | |
| Total Risk = | 3E-02 | | Yes | 408 | | Yes |

Table 5-6
Risk and Hazard Evaluation
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| | Excess Lifetime Cancer Risk ⁽¹⁾ | Percent Distribution of Risk by Pathway | Exceeds Acceptable Risk Range? | Hazard Index ⁽²⁾ | Percent Distribution of Risk by Pathway | Exceeds Noncancer HI Threshold? |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------|--------------------------------------|--------------------------------|--------------------------------------------------|---------------------------------------|
| FUTURE EXPOSURE TO CHEMICALS IN SUBSURFACE SOIL (EXCLUDING HOT SPOTS) AND GROUNDWATER | | | | | | |
| <u>Excavation Worker</u> | | | | | | |
| Ingestion of Subsurface Soil | 1E-07 | 45% | | 5E+00 | 90% | |
| Dermal Contact with Subsurface Soil | 8E-09 | 3% | | 5E-01 | 9% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 3E-08 | 11% | | 1E-02 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | 1E-07 | 42% | | 4E-02 | 1% | |
| Ingestion of All Groundwater | NA | 0% | | NA | 0% | |
| Dermal Contact with All Groundwater | NA | 0% | | NA | 0% | |
| Inhalation of Indoor Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Total Risk = | 3E-07 | | No | 5 | | Yes |
| <u>Industrial Worker</u> | | | | | | |
| Ingestion of Subsurface Soil | 5E-07 | 0% | | 3E+00 | 5% | |
| Dermal Contact with Subsurface Soil | 2E-07 | 0% | | 2E+00 | 3% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 7E-07 | 0% | | 1E-02 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 5E-03 | 49% | | 3E+01 | 46% | |
| Dermal Contact with All Groundwater | 5E-03 | 49% | | 3E+01 | 46% | |
| Inhalation of Indoor Air, Shallow Groundwater | 2E-04 | 2% | | 6E-01 | 1% | |
| Total Risk = | 9E-03 | | Yes | 67 | | Yes |
| <u>Resident</u> | | | | | | |
| Ingestion of Subsurface Soil | 4E-06 | 0% | | 8E+01 | 16% | |
| Dermal Contact with Subsurface Soil | 1E-06 | 0% | | 1E+01 | 2% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 4E-06 | 0% | | 5E-02 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 2E-02 | 50% | | 2E+02 | 41% | |
| Dermal Contact with All Groundwater | 2E-02 | 50% | | 2E+02 | 41% | |
| Inhalation of Indoor Air, Shallow Groundwater | 3E-04 | 1% | | 8E-01 | 0% | |
| Total Risk = | 3E-02 | | Yes | 486 | | Yes |
| FUTURE EXPOSURE TO CHEMICALS IN HOT SPOT RIMW-6 SUBSURFACE SOIL AND GROUNDWATER | | | | | | |
| <u>Industrial Worker</u> | | | | | | |
| Ingestion of Subsurface Soil | 6E-07 | 0% | | 7E-03 | 0% | |
| Dermal Contact with Subsurface Soil | 3E-07 | 0% | | 3E-03 | 0% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 1E-05 | 0% | | 3E-02 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 5E-03 | 49% | | 3E+01 | 50% | |
| Dermal Contact with All Groundwater | 5E-03 | 49% | | 3E+01 | 50% | |
| Inhalation of Indoor Air, Shallow Groundwater | 2E-04 | 2% | | 6E-01 | 1% | |
| Total Risk = | 9E-03 | | Yes | 62 | | Yes |
| <u>Excavation Worker</u> | | | | | | |
| Ingestion of Subsurface Soil | 2E-07 | 22% | | 4E-02 | 33% | |
| Dermal Contact with Subsurface Soil | 1E-08 | 2% | | 3E-03 | 2% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 5E-07 | 62% | | 3E-02 | 29% | |
| Inhalation of Ambient Air, Shallow Groundwater | 1E-07 | 15% | | 4E-02 | 36% | |
| Ingestion of All Groundwater | NA | 0% | | NA | 0% | |
| Dermal Contact with All Groundwater | NA | 0% | | NA | 0% | |
| Inhalation of Indoor Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Total Risk = | 8E-07 | | No | 0.1 | | No |
| <u>Resident</u> | | | | | | |
| Ingestion of Subsurface Soil | 6E-06 | 0% | | 2E-01 | 0% | |
| Dermal Contact with Subsurface Soil | 3E-06 | 0% | | 1E-02 | 0% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 8E-05 | 0% | | 1E-01 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 2E-02 | 49% | | 2E+02 | 50% | |
| Dermal Contact with All Groundwater | 2E-02 | 49% | | 2E+02 | 50% | |
| Inhalation of Indoor Air, Shallow Groundwater | 3E-04 | 1% | | 8E-01 | 0% | |
| Total Risk = | 3E-02 | | Yes | 395 | | Yes |

Table 5-6
Risk and Hazard Evaluation
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| | Excess Lifetime Cancer Risk ⁽¹⁾ | Percent Distribution of Risk by Pathway | Exceeds Acceptable Risk Range? | Hazard Index ⁽²⁾ | Percent Distribution of Risk by Pathway | Exceeds Noncancer HI Threshold? |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------|--------------------------------------|--------------------------------|--------------------------------------------------|---------------------------------------|
| FUTURE EXPOSURE TO CHEMICALS IN HOT SPOT RISB-12 SUBSURFACE SOIL AND GROUNDWATER | | | | | | |
| <u>Industrial Worker</u> | | | | | | |
| Ingestion of Subsurface Soil | 5E-07 | 0% | | 5E-01 | 1% | |
| Dermal Contact with Subsurface Soil | 2E-07 | 0% | | 4E-01 | 1% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 2E-06 | 0% | | 3E-01 | 1% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 5E-03 | 49% | | 3E+01 | 49% | |
| Dermal Contact with All Groundwater | 5E-03 | 49% | | 3E+01 | 49% | |
| Inhalation of Indoor Air, Shallow Groundwater | <u>2E-04</u> | 2% | | <u>6E-01</u> | 1% | |
| Total Risk = | 9E-03 | | Yes | 63 | | Yes |
| <u>Excavation Worker</u> | | | | | | |
| Ingestion of Subsurface Soil | 1E-07 | 37% | | 3E+00 | 81% | |
| Dermal Contact with Subsurface Soil | 7E-09 | 2% | | 3E-01 | 8% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 1E-07 | 28% | | 3E-01 | 10% | |
| Inhalation of Ambient Air, Shallow Groundwater | 1E-07 | 33% | | 4E-02 | 1% | |
| Ingestion of All Groundwater | NA | 0% | | NA | 0% | |
| Dermal Contact with All Groundwater | NA | 0% | | NA | 0% | |
| Inhalation of Indoor Air, Shallow Groundwater | <u>NA</u> | 0% | | <u>NA</u> | 0% | |
| Total Risk = | 3E-07 | | No | 3 | | Yes |
| <u>Resident</u> | | | | | | |
| Ingestion of Subsurface Soil | 4E-06 | 0% | | 1E+01 | 3% | |
| Dermal Contact with Subsurface Soil | 4E-07 | 0% | | 2E+00 | 0% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 8E-06 | 0% | | 1E+00 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 2E-02 | 50% | | 2E+02 | 48% | |
| Dermal Contact with All Groundwater | 2E-02 | 50% | | 2E+02 | 48% | |
| Inhalation of Indoor Air, Shallow Groundwater | <u>3E-04</u> | 1% | | <u>8E-01</u> | 0% | |
| Total Risk = | 3E-02 | | Yes | 412 | | Yes |
| FUTURE EXPOSURE TO CHEMICALS IN HOT SPOT RISB-18 SUBSURFACE SOIL AND GROUNDWATER | | | | | | |
| <u>Industrial Worker</u> | | | | | | |
| Ingestion of Subsurface Soil | 3E-07 | 0% | | 2E-01 | 0% | |
| Dermal Contact with Subsurface Soil | 1E-07 | 0% | | 1E-01 | 0% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 5E-06 | 0% | | 8E-03 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 5E-03 | 49% | | 3E+01 | 49% | |
| Dermal Contact with All Groundwater | 5E-03 | 49% | | 3E+01 | 49% | |
| Inhalation of Indoor Air, Shallow Groundwater | <u>2E-04</u> | 2% | | <u>6E-01</u> | 1% | |
| Total Risk = | 9E-03 | | Yes | 62 | | Yes |
| <u>Excavation Worker</u> | | | | | | |
| Ingestion of Subsurface Soil | 1E-07 | 24% | | 1E+00 | 88% | |
| Dermal Contact with Subsurface Soil | 5E-09 | 1% | | 1E-01 | 9% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 2E-07 | 47% | | 8E-03 | 1% | |
| Inhalation of Ambient Air, Shallow Groundwater | 1E-07 | 28% | | 4E-02 | 3% | |
| Ingestion of All Groundwater | NA | 0% | | NA | 0% | |
| Dermal Contact with All Groundwater | NA | 0% | | NA | 0% | |
| Inhalation of Indoor Air, Shallow Groundwater | <u>NA</u> | 0% | | <u>NA</u> | 0% | |
| Total Risk = | 4E-07 | | No | 1 | | No |
| <u>Resident</u> | | | | | | |
| Ingestion of Subsurface Soil | 6E-06 | 0% | | 6E+00 | 1% | |
| Dermal Contact with Subsurface Soil | 8E-06 | 0% | | 8E-01 | 0% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 3E-05 | 0% | | 3E-02 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 2E-02 | 50% | | 2E+02 | 49% | |
| Dermal Contact with All Groundwater | 2E-02 | 50% | | 2E+02 | 49% | |
| Inhalation of Indoor Air, Shallow Groundwater | <u>3E-04</u> | 1% | | <u>8E-01</u> | 0% | |
| Total Risk = | 3E-02 | | Yes | 401 | | Yes |

Table 5-6
Risk and Hazard Evaluation
 Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| | Excess Lifetime Cancer Risk ⁽¹⁾ | Percent Distribution of Risk by Pathway | Exceeds Acceptable Risk Range? | Hazard Index ⁽²⁾ | Percent Distribution of Risk by Pathway | Exceeds Noncancer HI Threshold? |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------|--------------------------------------|--------------------------------|--------------------------------------------------|---------------------------------------|
| FUTURE EXPOSURE TO CHEMICALS IN HOT SPOT RISB-25 SUBSURFACE SOIL AND GROUNDWATER | | | | | | |
| <u>Industrial Worker</u> | | | | | | |
| Ingestion of Subsurface Soil | 8E-07 | 0% | | 2E-01 | 0% | |
| Dermal Contact with Subsurface Soil | 3E-07 | 0% | | 2E-01 | 0% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 3E-05 | 0% | | 1E-02 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 5E-03 | 49% | | 3E+01 | 49% | |
| Dermal Contact with All Groundwater | 5E-03 | 49% | | 3E+01 | 49% | |
| Inhalation of Indoor Air, Shallow Groundwater | <u>2E-04</u> | 2% | | <u>6E-01</u> | 1% | |
| Total Risk = | 9E-03 | | Yes | 62 | | Yes |
| <u>Excavation Worker</u> | | | | | | |
| Ingestion of Subsurface Soil | 4E-07 | 22% | | 1E+00 | 88% | |
| Dermal Contact with Subsurface Soil | 3E-08 | 2% | | 1E-01 | 9% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 1E-06 | 70% | | 1E-02 | 1% | |
| Inhalation of Ambient Air, Shallow Groundwater | 1E-07 | 6% | | 4E-02 | 3% | |
| Ingestion of All Groundwater | NA | 0% | | NA | 0% | |
| Dermal Contact with All Groundwater | NA | 0% | | NA | 0% | |
| Inhalation of Indoor Air, Shallow Groundwater | <u>NA</u> | 0% | | <u>NA</u> | 0% | |
| Total Risk = | 2E-06 | | No | 2 | | Yes |
| <u>Resident</u> | | | | | | |
| Ingestion of Subsurface Soil | 4E-05 | 0% | | 6E+00 | 2% | |
| Dermal Contact with Subsurface Soil | 7E-05 | 0% | | 9E-01 | 0% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 2E-04 | 1% | | 3E-02 | 0% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 2E-02 | 49% | | 2E+02 | 49% | |
| Dermal Contact with All Groundwater | 2E-02 | 49% | | 2E+02 | 49% | |
| Inhalation of Indoor Air, Shallow Groundwater | <u>3E-04</u> | 1% | | <u>8E-01</u> | 0% | |
| Total Risk = | 3E-02 | | Yes | 402 | | Yes |
| FUTURE EXPOSURE TO CHEMICALS IN HOT SPOT RISB-64 SUBSURFACE SOIL AND GROUNDWATER | | | | | | |
| <u>Industrial Worker</u> | | | | | | |
| Ingestion of Subsurface Soil | 2E-05 | 0% | | 3E-01 | 0% | |
| Dermal Contact with Subsurface Soil | 9E-06 | 0% | | 1E-01 | 0% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 5E-04 | 5% | | 7E-01 | 1% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 5E-03 | 46% | | 3E+01 | 49% | |
| Dermal Contact with All Groundwater | 5E-03 | 46% | | 3E+01 | 49% | |
| Inhalation of Indoor Air, Shallow Groundwater | <u>2E-04</u> | 2% | | <u>6E-01</u> | 1% | |
| Total Risk = | 1E-02 | | Yes | 63 | | Yes |
| <u>Excavation Worker</u> | | | | | | |
| Ingestion of Subsurface Soil | 5E-06 | 18% | | 2E+00 | 66% | |
| Dermal Contact with Subsurface Soil | 3E-07 | 1% | | 1E-01 | 5% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 2E-05 | 81% | | 7E-01 | 28% | |
| Inhalation of Ambient Air, Shallow Groundwater | 1E-07 | 0% | | 4E-02 | 2% | |
| Ingestion of All Groundwater | NA | 0% | | NA | 0% | |
| Dermal Contact with All Groundwater | NA | 0% | | NA | 0% | |
| Inhalation of Indoor Air, Shallow Groundwater | <u>NA</u> | 0% | | <u>NA</u> | 0% | |
| Total Risk = | 3E-05 | | No | 2 | | Yes |
| <u>Resident</u> | | | | | | |
| Ingestion of Subsurface Soil | 2E-04 | 0% | | 7E+00 | 2% | |
| Dermal Contact with Subsurface Soil | 4E-05 | 0% | | 7E-01 | 0% | |
| Inhalation of Fugitive Dust and Vapors of Soil Origin | 2E-03 | 5% | | 2E+00 | 1% | |
| Inhalation of Ambient Air, Shallow Groundwater | NA | 0% | | NA | 0% | |
| Ingestion of All Groundwater | 2E-02 | 47% | | 2E+02 | 49% | |
| Dermal Contact with All Groundwater | 2E-02 | 47% | | 2E+02 | 49% | |
| Inhalation of Indoor Air, Shallow Groundwater | <u>3E-04</u> | 1% | | <u>8E-01</u> | 0% | |
| Total Risk = | 4E-02 | | Yes | 405 | | Yes |

1: EPA's target risk range is 1E⁻⁶ to 1E⁻⁴.

2: EPA's noncancer threshold is 1.

Table 5-7
Final Chemicals of Concern (COCs)

Remedial Investigation Report
 September 2008
 PSC Site - Rock Hill, South Carolina

| Soil COCs | Selection Rationale |
|------------------------|------------------------------|
| Metals | |
| Chromium | Exceeds SSL |
| Iron | Exceeds Non-Cancer HI of 1.0 |
| Manganese | Exceeds Non-Cancer HI of 1.0 |
| Nickel | Exceeds SSL |
| Thallium | Exceeds Non-Cancer HI of 1.0 |
| Vanadium | Exceeds Non-Cancer HI of 1.0 |
| SVOCs | |
| N-Nitrosodiphenylamine | Exceeds SSL |
| VOCs | |
| 1,1,1-Trichloroethane | Exceeds SSL |
| 1,1,2-Trichloroethane | Exceeds SSL |
| 1,1-Dichloroethene | Exceeds SSL |
| 1,2,4-Trichlorobenzene | Exceeds SSL |
| 1,2-Dichlorobenzene | Exceeds SSL |
| 1,2-Dichloroethane | Exceeds Cancer Risk Range |
| 1,4-Dichlorobenzene | Exceeds SSL |
| Acetone | Exceeds SSL |
| Benzene | Exceeds SSL |
| Chlorobenzene | Exceeds SSL |
| Chloroform | Exceeds SSL |
| cis-1,2-Dichloroethene | Exceeds SSL |
| Ethylbenzene | Exceeds SSL |
| Methylene chloride | Exceeds SSL |
| Tetrachloroethene | Exceeds Cancer Risk Range |
| Toluene | Exceeds SSL |
| Trichloroethene | Exceeds Cancer Risk Range |
| Vinyl chloride | Exceeds SSL |
| Xylenes (Total) | Exceeds SSL |

| Groundwater COCs | Selection Rationale |
|------------------------|------------------------------|
| Metals | |
| Manganese | Exceeds Non-Cancer HI of 1.0 |
| VOCs | |
| 1,1,1-Trichloroethane | Exceeds MCL |
| 1,1,2-Trichloroethane | Exceeds MCL |
| 1,1-Dichloroethene | Exceeds MCL |
| 1,2,4-Trichlorobenzene | Exceeds MCL |
| 1,2-Dichlorobenzene | Exceeds MCL |
| 1,2-Dichloroethane | Exceeds Cancer Risk Range |
| 1,4-Dichlorobenzene | Exceeds Cancer Risk Range |
| Benzene | Exceeds Cancer Risk Range |
| Carbon Tetrachloride | Exceeds MCL |
| Chloroethane | Exceeds Non-Cancer HI of 1.0 |
| cis-1,2-Dichloroethene | Exceeds Cancer Risk Range |
| Ethylbenzene | Exceeds Non-Cancer HI of 1.0 |
| Isopropylbenzene | Exceeds Non-Cancer HI of 1.0 |
| Methylene chloride | Exceeds Cancer Risk Range |
| Tetrachloroethene | Exceeds Cancer Risk Range |
| Toluene | Exceeds Non-Cancer HI of 1.0 |
| Trichloroethene | Exceeds Cancer Risk Range |
| Vinyl chloride | Exceeds Cancer Risk Range |
| Xylenes (Total) | Exceeds Non-Cancer HI of 1.0 |

Notes:

HI - Hazard Index

MCL - EPA Maximum Contaminant Level

SSL - EPA Region 9 Soil Screening Level with a Dilution Attenuation Factor of 20

SVOCs - Semi-Volatile Organic Compounds

VOCs - Volatile Organic Compounds

Remedial Investigation Report

**Former Philip Services Corporation Site
Rock Hill, South Carolina**

**Prepared For: South Carolina Department of Health &
Environmental Control**

September 2008

Appendices

Appendix A

Soil Boring Logs

Phase I Boring Logs

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/1/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/1/06 |
| Logged By: | M.Walters | Total Depth: | 11 ft |
| Location Code: | RISB-1 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-----------------------------------------------------------------|-------------|-------------------------|-----------------------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Clayey silt, reddish brown, dense | 0 | 11:30 | 0-1 ft |
| 2 3 | Silty sand, brownish gray with black mottling, medium dense | 0 | 11:35 | 1-5 ft |
| 4 5 | Sand, brownish gray, fine to medium, loose | 0 | | |
| 6 7 | Sand, brownish gray, fine to medium, mottled with orange, soft | 0 | 11:40 | 5-9 ft |
| 8 9 | Same as Above | 0 | | |
| 10 11 | Sand, brownish gray, fine to medium, mottled with orange, loose | 0 | 11:50 | Refusal at 11 ft, sample 9-11 ft. |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/1/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/1/06 |
| Logged By: | J. Weeber | Total Depth: | 24.3 ft |
| Location Code: | RISB-2 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|----------------------------------------------------------------------|-------------|-------------------------|-----------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Silty clay, dark red, some surface rock | 2 | 10:41 | 0-1 ft, Dup (RISB-92) |
| 2 | Same as Above, Clay competent red and dense. | 4 | 11:00 | 1-5 ft |
| 3 | | | | |
| 4 | | | | |
| 5 | Same as Above, Clay competent red and dense going orange with depth. | 4 | | |
| 6 | Same as Above | 3 | 11:10 | 5-9 ft |
| 7 | | | | |
| 8 | Sandy clay, orange with white mottling, sand medium to fine | 3 | | |
| 9 | | | | |
| 10 | Sandy clay, orange with grey mottling, sand medium to fine | 13 | 11:15 | 9-13 ft |
| 11 | | | | |
| 12 | Clayey silt, grey, damp | 13 | | |
| 13 | | | | |
| 14 | Same as Above | 10 | 11:25 | 13-17 ft |
| 15 | | | | |
| 16 | Clay, greenish grey, some silt | 10 | | |
| 17 | | | | |
| 18 | Same as Above with sand | 60 | | |
| 19 | | | | |
| 20 | Same as Above | 60 | | |
| 21 | | | | |
| 22 | Same as Above | 60 | | Refusal at 24.3 ft |
| 23 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/1/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/1/06 |
| Logged By: | J. Weeber | Total Depth: | 17.2 ft |
| Location Code: | RISB-3 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-------------------------------------------|-------------|-------------------------|------------------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Silty clay, reddish brown, dense | 0 | 9:35 | 0-1 ft |
| 2 3 | Clay, reddish brown, moderately dense | 0 | 9:40 | 1-5 ft |
| 4 5 | Clayey sand, brown, medium to fine | 0 | | |
| 6 7 | Same as Above | 0 | 9:45 | 5-9 ft |
| 8 9 | Same as Above | 0 | | |
| 10 11 | Sand, greyish brown, loose medium to fine | 0 | 9:48 | 5-9 ft |
| 12 13 | Same as Above | 0 | | |
| 14 15 | Same as Above | 0 | 9:52 | 14-17 ft, Refusal at 17.2 ft |
| 16 17 | Same as Above | 0 | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/6/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/6/06 |
| Logged By: | P. Nicholson | Total Depth: | 25.0 ft |
| Location Code: | RISB-4 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------|------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Clay, orange brown, dry dense | See ColorTec results (Appendix C of Phase I Technical Memorandum) | 12:50 | 0-1 ft |
| 2 | Clay, orange brown, then silt, medium soft, moist | | | |
| 3 | | | | |
| 4 | Same as Above | | 12:55 | 1-5 ft |
| 5 | | | | |
| 6 | Clayey silt, dark brown, soft, moist | | | |
| 7 | | | | |
| 8 | Same as Above | | 13:00 | 5-9 ft |
| 9 | | | | |
| 10 | Same as Above | | | |
| 11 | | | | |
| 12 | Silt, sand and clay, grey soft wet | | 13:05 | 9-13 ft |
| 13 | | | | |
| 14 | Silty sand, grey, saturated, very fine, | | | |
| 15 | | | | |
| 16 | Sand, some silt, grey saturated, medium to coarse | | 13:10 | 13-17 ft |
| 17 | | | | |
| 18 | Sand, greyish brown, medium to coarse, saturated | | | |
| 19 | | | | |
| 20 | Saprolite, brown, greyish yellow with black mottling, very dense, moist | | 13:15 | 13-17 ft |
| 21 | | | | |
| 22 | Same as Above | | | |
| 23 | | | | |
| 24 | Same as Above | | 13:20 | Refusal at 25 ft |
| 25 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/1/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/1/06 |
| Logged By: | M.Walters | Total Depth: | 17.2 ft |
| Location Code: | RISB-5 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-----------------------------------------------------------------------|-------------|-------------------------|------------------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Silty clay, reddish brown, dense | 2 | 9:00 | 0-1 ft |
| 2 | Clay, red, dense | 1.5 | 9:07 | 1-5 ft |
| 3 | | | | |
| 4 | | | | |
| 5 | Clay, reddish brown, moderately dense, some sand with depth | 0 | | |
| 6 | Same as Above, then more Sandy clay, with black/white mottling, tight | 0 | 9:10 | 5-9 ft |
| 7 | | | | |
| 8 | Clayey sand, brown, loose. | 0 | 9:15 | 5-9 ft |
| 9 | | | | |
| 10 | Same as Above | 0 | 9:20 | 14-17 ft, Refusal at 17.2 ft |
| 11 | | | | |
| 12 | Same as Above | 0 | 9:20 | 14-17 ft, Refusal at 17.2 ft |
| 13 | | | | |
| 14 | Sand, brownish grey, medium to fine, trace clays | 0 | 9:20 | 14-17 ft, Refusal at 17.2 ft |
| 15 | | | | |
| 16 | Same as Above | 0 | 9:20 | 14-17 ft, Refusal at 17.2 ft |
| 17 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/5/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/5/06 |
| Logged By: | P. Nicholson | Total Depth: | 15.0 ft |
| Location Code: | RISB-6 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|---------------------------------------------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Clayey silt, brownish red, dry dense | 2.9 | 17:20 | 0-1 ft |
| 2 | Clay, orange brown, dense | 9 | 17:30 | 1-5 ft |
| 3 | | | | |
| 4 | Silt and some clay, yellowish brown | 13 | 17:40 | 5-9 ft |
| 5 | | | | |
| 6 | Same as Above | 3 | 17:45 | 9-13 ft |
| 7 | | | | |
| 8 | Weathered rock starting at 8.5 ft | 1 | 17:50 | 13-15 ft |
| 9 | | | | |
| 10 | Weathered rock - saprolite - orange brown and yellowish grey, tan, dense, moist | 3 | 17:50 | 13-15 ft |
| 11 | | | | |
| 12 | | 12 | | |
| 13 | | | | |
| 14 | Same as Above. Hard at 15'. Refusal at 15'. | 38 | 17:50 | 13-15 ft |
| 15 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/5/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/5/06 |
| Logged By: | P. Nicholson | Total Depth: | 12.75 ft |
| Location Code: | RISB-7 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|------------------------------------------------|-------------------------------------------------------------------|-------------------------|---------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Silty clay, tan to brownish orange, stiff, dry | See ColorTec results (Appendix C of Phase I Technical Memorandum) | 16:30 | 0-1 ft |
| 2 | Silt, tan/brown, very fine, dry | | 16:40 | 1-5 ft |
| 3 | | | | |
| 4 | Same as Above | | 16:50 | 5-9 ft |
| 5 | | | | |
| 6 | Clayey silt, tan/brown | | 16:55 | Refusal at 12.75 ft |
| 7 | | | | |
| 8 | Same as Above | | 16:55 | Refusal at 12.75 ft |
| 9 | | | | |
| 10 | Silt, brown, weathered rock at 11 ft | | 16:55 | Refusal at 12.75 ft |
| 11 | | | | |
| 12 | Refusal at 12.75 ft | | 16:55 | Refusal at 12.75 ft |
| 13 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/6/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/6/06 |
| Logged By: | P. Nicholson | Total Depth: | 8.0 ft |
| Location Code: | RISB-8 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Silt, clay, and gravel, dark brown | See ColorTec results (Appendix C of Phase I Technical Memorandum) | 10:40 | 0-1 ft |
| 2 3 | Silt, greyish yellow | | 10:45 | 1-5 ft |
| 4 5 | Same as Above with light brown/orange mottling with black specks | | 10:50 | 6-7 ft |
| 6 7 | Same as Above with more weather rock | | | |
| 8 | Refusal at 8 ft | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/6/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/6/06 |
| Logged By: | P. Nicholson | Total Depth: | 17.0 ft |
| Location Code: | RISB-9 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|----------------------------------------------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Silt, clay, and gravel, dark brown | 0 | 10:00 | 0-1 ft |
| 2 | Silt, light brown to yellowish brown, some weathered rock soft to medium density | 0 | 10:05 | 1-5 ft |
| 3 | | | | |
| 4 | | | | |
| 5 | Same as Above with more weather rock | 0 | 10:05 | 5-9 ft |
| 6 | | | | |
| 7 | | | | |
| 8 | Same as Above to 12 ft bls | 0 | 10:10 | 9-13 ft |
| 9 | | | | |
| 10 | | | | |
| 11 | Weathered rock, brown and yellowish grey with black speckles | 0 | 10:20 | 13-17 ft |
| 12 | | | | |
| 13 | | | | |
| 14 | Same as Above with more weather rock and refusal at 17 ft | 0 | 10:20 | 13-17 ft |
| 15 | | | | |
| 16 | | | | |
| 17 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/6/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/6/06 |
| Logged By: | P. Nicholson | Total Depth: | 15 ft |
| Location Code: | RISB-10 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------|-------------|
| Depth (ft) | Sample Description | | | |
| 1 | | See ColorTec results (Appendix C of Phase I Technical Memorandum) | | No Recovery |
| 2 | | | | |
| 3 | Very soft - no recovery 0-5 ft bls | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | 5-8' Clay, silty, yellow to light orange brown, hard | | | 9:25 |
| 8 | 8-9' Silt, light brown, very hard | | | |
| 9 | | | | |
| 10 | | | | |
| 11 | 9-12' silt, slightly sandy and clayey, light brown, med. dense moist | | | 9:30 |
| 12 | 12-13' weathered rock, saprolite | | | |
| 13 | | | | |
| 14 | | | | |
| 15 | 13-15' weathered rock, saprolite. Refusal at 15' bls | | | 9:35 |
| 16 | | | | |
| 17 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/1/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/1/06 |
| Logged By: | J. Weeber | Total Depth: | 14.4 ft |
| Location Code: | RISB-11 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-----------------------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Rock, gray clayey sand | 0 | 17:35 | |
| 2 | Red, moderately stiff clay, moist | 0 | 17:45 | |
| 3 | | | | |
| 4 | | | | |
| 5 | | 0 | | |
| 6 | 5-6' Same as Above | 0 | 18:00 | |
| 7 | 6-7' Clayey orange sand - start of weathered rock | | | |
| 8 | Orange sand w/ black and white mottling, weathered rock | 0 | | |
| 9 | | | | |
| 10 | Gray-orange sand, medium fine, weathered rock - saprolite | 0.5 | 18:05 | |
| 11 | | | | |
| 12 | Same as Above. Refusal at 14.4' bls | 0.5 | | |
| 13 | | | | |

Boring Log

| | | | |
|----------------|-----------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/5/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/5/06 |
| Logged By: | P. Nicholson / A. Tartaglia | Total Depth: | 21' |
| Location Code: | RISB-12 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-----------------------------------------------------------|-------------|-------------------------|-------------|
| Depth (ft) | Sample Description | | | |
| 1 | Silt w/ little clay, red brown, some gravel, dry | 12 | 14:35 | Strong odor |
| 2 | Brown silt | 533 | 14:50 | Strong odor |
| 3 | | 498 | | |
| 4 | | | | |
| 5 | | | | |
| 6 | Silt, very fine, medium density, light brown to tan | 563 | 15:00 | Strong odor |
| 7 | | | | |
| 8 | Same as Above. Slightly sandy, very fine | 441 | | |
| 9 | | | | |
| 10 | Silt, light brownish to yellow gray, mottled | 253 | | Strong odor |
| 11 | | 319 | | |
| 12 | | | | |
| 13 | | | | |
| 14 | Same As Above | 140 | | Strong odor |
| 15 | | | | |
| 16 | Silt, brownish gray and yellow weathered rock, dense | 78 | | |
| 17 | | | | |
| 18 | Gray-orange sand, medium fine, weathered rock - saprolite | 18 | | |
| 19 | | | | |
| 20 | Same as Above. Refusal at 14.4' bls | 11 | | |
| 21 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/5/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/5/06 |
| Logged By: | M. Walters | Total Depth: | 14.5' |
| Location Code: | RISB-13 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|--------------------------------------------|-------------|-------------------------|---------------------------------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Clayey silt, orange brown | 12 | 15:05 | Organic odor |
| 2 | Silty clay, light brown | 0 | 15:10 | Slight odor |
| 3 | | | | |
| 4 | Silty clay, dark gray | 0 | 15:25 | Slight odor Duplicate sample collected |
| 5 | | | | |
| 6 | Clayey silt, dark gray to brown | 12 | 15:40 | ColorTec only, per DHEC Refusal at 14.5' |
| 7 | | | | |
| 8 | Same as Above | 4 | 15:45 | ColorTec only, per DHEC Refusal at 14.5' |
| 9 | | | | |
| 10 | Silty sand, fine to medium, gray green | 0 | 15:45 | ColorTec only, per DHEC Refusal at 14.5' |
| 11 | | | | |
| 12 | Clayey silt, gray green | 0 | 15:45 | ColorTec only, per DHEC Refusal at 14.5' |
| 13 | | | | |
| 14 | 13'-13.5' Rock, dry, gray | 0 | 15:45 | ColorTec only, per DHEC Refusal at 14.5' |
| 15 | 13.5'-14' Clayey silt, moist, yellow brown | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/1/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/1/06 |
| Logged By: | M. Walters | Total Depth: | 17' |
| Location Code: | RISB-14 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-----------------------------------------------------------------|-------------|-------------------------|-----------------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Sandy silt, reddish brown, firm | 0 | 17:45 | |
| 2 | Clayey silt, reddish brown, firm | 0 | 17:50 | |
| 3 | | | | |
| 4 | Same as Above | 0 | | |
| 5 | | | | |
| 6 | Silty sand, gray with black mottling, firm | 0 | 18:00 | Duplicate sample collected. |
| 7 | | | | |
| 8 | Same as Above | 0 | | |
| 9 | | | | |
| 10 | Silty sand, fine to medium, tan brown, mottled orange and black | 0 | 18:15 | |
| 11 | | | | |
| 12 | Same as Above | 0 | | |
| 13 | | | | |
| 14 | Silty sand, gray to brown | 0 | 18:20 | |
| 15 | | | | |
| 16 | Same as Above | 0 | | Refusal at 17' |
| 17 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/1/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/1/06 |
| Logged By: | M. Walters | Total Depth: | 21' |
| Location Code: | RISB-15 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|---------------------------------------------------------|-------------|-------------------------|-----------------------------------------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Clayey silt, reddish brown | 0 | 15:55 | |
| 2 | Clayey silt, brown | 0 | 16:05 | |
| 3 | | | | |
| 4 | | | | |
| 5 | Clayey silt, yellow brown, mottled with black | 0 | | |
| 6 | Clayey silt, brown orange, dense | 0 | 16:10 | |
| 7 | | | | |
| 8 | Same as Above | 0 | | |
| 9 | | | | |
| 10 | Silty sand, orange brown, with black mottling, firm | 0 | 16:30 | |
| 11 | | | | |
| 12 | Same as Above | 0 | | |
| 13 | | | | |
| 14 | Sand, fine to medium, orange brown | 0 | 16:35 | |
| 15 | | | | |
| 16 | Same as Above | 0 | | |
| 17 | | | | |
| 18 | Sand, fine to medium, orange brown, with black mottling | 0 | 16:40 | Refusal at 21' Set temp well with 15' screen. |
| 19 | | | | |
| 20 | Same as Above | 0 | | |
| 21 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/1/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/1/06 |
| Logged By: | M. Walters | Total Depth: | 15' |
| Location Code: | RISB-16 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-----------------------------------------------------|-------------|-------------------------|----------------|
| Depth (ft) | Sample Description | | | |
| 1 | Clayey silt, reddish brown, dense | 0 | 18:35 | |
| 2 | Same as Above | 0 | 18:40 | |
| 3 | | | | |
| 4 | | | | |
| 5 | Same as Above | 0 | | |
| 6 | Silty sand, fine to medium, tan with black mottling | 0 | 18:45 | |
| 7 | | | | |
| 8 | Same as Above | 0 | | |
| 9 | | | | |
| 10 | Silty sand, light tan to gray | 0 | 18:50 | |
| 11 | | | | |
| 12 | Same as Above | 0 | | |
| 13 | | | | |
| 14 | Same as Above | 0 | 18:55 | Refusal at 15' |
| 15 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/2/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/2/06 |
| Logged By: | J. Weeber | Total Depth: | 20' |
| Location Code: | RISB-17 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|------------------------------------------------------------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Stone on top w/ red brown, moderately firm clay | 2 | 8:35 | |
| 2 | Silty clay, reddish brown, moderate firm, med. Moist | 0 | 8:40 | |
| 3 | | | | |
| 4 | Same as Above | 0 | | |
| 5 | | | | |
| 6 | Silty clay, red orange, moderate firm, med. Moist, becoming lighter w/ depth | 0 | 8:45 | |
| 7 | | | | |
| 8 | Silty sandy clay, dark brown to black gray, becoming darker w/ depth | 0 | | |
| 9 | | | | |
| 10 | Clay, gray green, firm, some discolored black material interspersed, becoming lighter w/ depth | 0 | 8:50 | |
| 11 | | | | |
| 12 | Clay, gray green, firm | 0 | | |
| 13 | | | | |
| 14 | Sandy clay with some silt, light gray and green color | 1.5 | 8:55 | |
| 15 | | | | |
| 16 | Same as Above; darker gray green color w/ more sand (med-fine grained) | 1.5 | | |
| 17 | | | | |
| 18 | Sand, medium-fine grained w/ black mottling, material becoming lighter with depth | 0 | 9:00 | |
| 19 | | | | |
| 20 | Refusal at 20' | | | |
| 21 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 5/31/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 5/31/06 |
| Logged By: | J. Weeber | Total Depth: | 17' |
| Location Code: | RISB-18 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|----------------------------------------------|-------------|-------------------------|-----------------------------------------------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Clay, red with purple staining | 0 | 16:00 | |
| 2 | Clay, purple | 0 | | Core through concrete, drove 0-5 ft. No sample collected. |
| 3 | | | | |
| 4 | | | | |
| 5 | Sandy clay, purple | 0 | | |
| 6 | Same as Above | 3 | 16:30 | |
| 7 | | | | |
| 8 | Sand, gray yellow, with white mottling, odor | 14 | | |
| 9 | | | | |
| 10 | Same as Above - odor | 10.3 | 16:45 | |
| 11 | | | | |
| 12 | Same as Above - odor | 14.2 | | |
| 13 | | | | |
| 14 | Sand, gray, medium-fine | 3 | 17:10 | |
| 15 | | | | |
| 16 | Same as Above - Refusal at 17' | 0.5 | | |
| 17 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 5/31/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 5/31/06 |
| Logged By: | M. Walters | Total Depth: | 20' |
| Location Code: | RISB-19 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|---------------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Silty clay, reddish brown, moist | 0 | 17:30 | |
| 2 | Silty clay, grayish green, moist | 0 | 17:40 | |
| 3 | | | | |
| 4 | Same as Above, with purple mottling | 10 | | |
| 5 | | | | |
| 6 | Silty sand, brown, dry | 6 | 17:45 | |
| 7 | | | | |
| 8 | Same as Above | 8 | | |
| 9 | | | | |
| 10 | Silty sand, light brown, with black mottling, dry | 11 | 17:48 | |
| 11 | | | | |
| 12 | Silty sand, grayish green, dry | 7 | | |
| 13 | | | | |
| 14 | Silty sand, light gray with black mottling, dry | 10 | 17:50 | |
| 15 | | | | |
| 16 | Same as Above | 30 | | |
| 17 | | | | |
| 18 | Sand, fine to medium, greenish gray | 10 | 17:54 | |
| 19 | | | | |
| 20 | Same as Above - Refusal at 20' | 12 | | |
| 21 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/2/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/2/06 |
| Logged By: | J. Weeber | Total Depth: | 17' |
| Location Code: | RISB-20 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|---------------------------------------------------------------------------------|-------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Depth (ft) | Sample Description | | | |
| 1 | N/A | | | Pushed 0-5'. No recovery because there is apparently another concrete slab under the top slab. Will run full analytical on 5-9' sample |
| 2 | N/A | | | |
| 3 | | | | |
| 4 | N/A | | | 10:55 |
| 5 | | | | |
| 6 | Silty clay, orange, very firm | 23 | | |
| 7 | | | | 11:00 |
| 8 | Clay, dark orange to brown, looser, sl. Moist, with black mottling | 23 | | |
| 9 | | | | 11:05 |
| 10 | Sand, orange-brown, loose, with black mottling | 3.2 | | |
| 11 | | | | 11:05 |
| 12 | Sand, gray, medium to fine, becoming looser with depth, apparent weathered rock | 3.2 | | |
| 13 | | | | 11:05 |
| 14 | Same as Above - weathered rock | 8 | | |
| 15 | | | | 11:05 |
| 16 | Same as Above. Refusal at 17'. | 8 | | |
| 17 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/2/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/2/06 |
| Logged By: | J. Weeber | Total Depth: | 19' |
| Location Code: | RISB-21 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-------------------------------------------------------------------------------------------|-------------|-------------------------|------------------------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Silty clay, red-orange, med. Moist | 0 | 9:35 | |
| 2 3 | Same as Above | 0 | 9:38 | |
| 4 5 | Clay, with some silt and sand, dark red-brown, firm, color becoming lighter with depth | 0 | | |
| 6 7 | Silty clay, red brown, med. Moist, mod. Firm, slight solvent-like odor | 110 | 9:40 | Collect SVOCs and metals from 5-9' |
| 8 9 | Same as Above, lightening to a gray color with depth, odor | 110 | | |
| 10 11 | Clay, gray with some light green, very firm, dry | 40 | 9:45 | |
| 12 13 | Sandy clay, red-brown to dark gray | 40 | | |
| 14 15 | Sand, gray brown, medium to fine, moist, becoming dark gray and purple clayey sand at 15' | 1 | 9:50 | |
| 16 17 | Sand, red brown, med. Moist, with black and white mottling | 1 | | |
| 18 19 | Sand, brown to dark gray, medium dense, becoming looser with depth. Refusal at 19'. | 0 | 9:55 | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 5/31/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 5/31/06 |
| Logged By: | J. Weeber | Total Depth: | 10' |
| Location Code: | RISB-22 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-------------------------------------------------------------|-------------|-------------------------|-----------------------------------------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Coarse stone and clayey sand, reddish brown | 0 | 10:00 | |
| 2 | Same as Above | 0 | 10:15 | |
| 3 | | | | |
| 4 | 3-4' Same as Above | 0 | | |
| 5 | 4-5' Silty Clay, red-brown | | | |
| 6 | Clay, red, very soft | 0.2 | 10:25 | Very little recovery 6-8' because of soft material. |
| 7 | | | | |
| 8 | 7-8' Same as Above | 0 | | |
| 9 | 8-9' Sand, dark gray, medium to fine grained, dry | | | |
| 10 | Sand, gray brown, medium to fine Saprolite. Refusal at 10'. | 0 | | |
| 11 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 5/31/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 5/31/06 |
| Logged By: | J. Weeber | Total Depth: | 11' |
| Location Code: | RISB-23 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-----------------------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Sand, red gray, medium to fine, with stone | 0 | 11:05 | |
| 2 | Same as Above | 0 | 11:20 | |
| 3 | | | | |
| 4 | 3-4' Clay, red brown, stiff | 0 | | |
| 5 | 4-5' Clayey sand, red brown, medium to fine | | | |
| 6 | Same as Above, with black and white mottling | 0 | 11:28 | |
| 7 | | | | |
| 8 | Same as Above | 0 | | |
| 9 | | | | |
| 10 | Clayey sand, brown, with black mottling. Refusal at 11.2' | 0 | 11:43 | |
| 11 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 5/31/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 5/31/06 |
| Logged By: | J. Weeber | Total Depth: | 15' |
| Location Code: | RISB-24 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-----------------------------------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Stone and sand, brown, medium grained | 0 | 12:00 | |
| 2 | 1-2' Same as Above | 0 | 12:15 | |
| 3 | 2-3' Clayey sand, dark red, moist | | | |
| 4 | 3-4' Clay with some silt, orange | 0 | 12:30 | |
| 5 | 4-5' Sand, brownish yellow, sl. Moist, with green mottling | | | |
| 6 | Same as Above | 0 | 12:38 | |
| 7 | | | | |
| 8 | Same as Above | 0 | 12:50 | |
| 9 | | | | |
| 10 | Same as Above, becoming more dense and dry with depth | 0 | 12:50 | |
| 11 | | | | |
| 12 | Sand, gray, medium to fine, soft, with black mottling. Refusal at 15' | 0 | 12:50 | |
| 13 | | | | |
| 14 | | 0 | 12:50 | |
| 15 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 5/31/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 5/31/06 |
| Logged By: | J. Weeber | Total Depth: | 15' |
| Location Code: | RISB-25 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|------------------------------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Stone with sand, gray brown | 0 | 17:25 | |
| 2 | Same as Above | 0 | 17:37 | |
| 3 | | | | |
| 4 | Silty clay, stiff, red, moist | 0 | 17:45 | |
| 5 | | | | |
| 6 | Same as Above, slight odor | 2 | 17:45 | |
| 7 | | | | |
| 8 | 7-8' Same as Above | 2 | 18:00 | |
| 9 | 8-9' Sand, gray with white mottling | | | |
| 10 | 9-10' Same as Above | 3 | 18:10 | |
| 11 | 10-11' Silty clay, red gray | | | |
| 12 | Silty clay, gray | 3 | 18:10 | |
| 13 | | | | |
| 14 | Silty clay, red-gray, moist, with black and white mottling, odor | 7 | 18:20 | |
| 15 | | | | |
| 16 | Silty clay, gray, moist, with black and white mottling, odor | 7 | 18:20 | |
| 17 | | | | |
| 18 | No description. Refusal at 19.8'. | 10 | 18:20 | |
| 19 | | | | |
| 20 | | | | |
| 21 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 5/31/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 5/31/06 |
| Logged By: | J. Weeber | Total Depth: | 19.3' |
| Location Code: | RISB-26 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|--------------------------------------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Sandy clay, dark brown, with concrete | 0 | 14:40 | |
| 2 | Clay, red brown, stiff, with trace silt | 0 | 14:50 | |
| 3 | | | | |
| 4 | Same as Above | 0 | | |
| 5 | | | | |
| 6 | Same as Above | 0 | 15:00 | |
| 7 | | | | |
| 8 | Sandy clay, dark gray, fine | 0 | | |
| 9 | | | | |
| 10 | Sandy to silty clay, dark gray to red, with green mottling | 0 | 15:15 | |
| 11 | | | | |
| 12 | 11-12' Same as Above | 0 | | |
| 13 | 12-13' Sand, gray-green, fine, with white mottling, Saprolite | | | |
| 14 | Same as Above | 0 | 15:27 | |
| 15 | | | | |
| 16 | Same as Above | 0 | | |
| 17 | | | | |
| 18 | Silty clay, brown-green, green is nickel-like in color. Refusal at 19.3' | 0 | 15:40 | |
| 19 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 5/31/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 5/31/06 |
| Logged By: | M. Walters | Total Depth: | 15.0 ft |
| Location Code: | RISB-27 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|--------------------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Clayey silt, reddish brown, dry | 0 | 14:05 | 0-1 ft |
| 2 | Same as Above | 0 | 14:25 | 1-5 ft |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | Clayey silt, yellowish brown, with black mottling, dry | 0 | 14:30 | 5-9 ft |
| 7 | | | | |
| 8 | Sand, medium to fine, yellowish brown | 0 | 14:40 | 9-13 ft |
| 9 | | | | |
| 10 | Silty sand, reddish brown with black mottling | 0 | 14:50 | 13-15 ft |
| 11 | | | | |
| 12 | | | | |
| 13 | Same as Above | | | |
| 14 | Same as Above | 0 | 14:50 | 13-15 ft |
| 15 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------------|
| Project: | Former PSC Site | Start Date: | 5/31/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 5/31/06 |
| Logged By: | M. Walters | Total Depth: | 16.5 ft |
| Location Code: | RISB-28 | Abandonment Details: | Convert to monitor well |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-----------------------------------------------------|-------------|-------------------------|--------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Silty clay, reddish brown | 0 | 11:50 | 0-1 ft |
| 2 | Same as Above with some black mottling | 2 | 11:55 | 1-5 ft |
| 3 | | | | |
| 4 | Same as Above | 2 | 12:05 | 5-9 ft |
| 5 | | | | |
| 6 | Sandy silt, brown to grey | 0 | 12:15 | 9-13 ft |
| 7 | | | | |
| 8 | Sand, medium to fine, lite grey with black mottling | 0 | 12:20 | 13-16.5 ft |
| 9 | | | | |
| 10 | Same as Above | 0 | 12:20 | Refusal at 16.5 ft |
| 11 | | | | |
| 12 | Same as Above | 0 | | |
| 13 | | | | |
| 14 | Same as Above | 0 | | |
| 15 | | | | |
| 16 | Same as Above | 0 | | |
| 17 | Refusal at 16.5 ft | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 5/31/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 5/31/06 |
| Logged By: | M. Walters | Total Depth: | 16.5 ft |
| Location Code: | RISB-29 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|--------------------------------------------------------------|-------------|-------------------------|--------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Clayey silt, reddish brown | 2 | 10:55 | 0-1 ft |
| 2 | Clayey silt, reddish brown with black mottling | 4 | 11:05 | 1-5 ft |
| 3 | | | | |
| 4 | Same as Above | 0 | 11:15 | 5-9 ft |
| 5 | | | | |
| 6 | Silty sand, medium to fine, orange brown | 15 | 11:20 | 9-13 ft |
| 7 | | | | |
| 8 | Same as Above, greyish brown | 10 | 11:25 | 13-16.5 ft |
| 9 | | | | |
| 10 | Silty sand, medium to fine, orange brown with black mottling | 5 | 11:25 | Refusal at 16.5 ft |
| 11 | | | | |
| 12 | Silty sand, grey with black mottling | 30 | 11:25 | Refusal at 16.5 ft |
| 13 | | | | |
| 14 | Sand, medium to fine, green/grey | 0 | 11:25 | Refusal at 16.5 ft |
| 15 | | | | |
| 16 | Same as Above with brown mottling | 4 | 11:25 | Refusal at 16.5 ft |
| 17 | Refusal at 16.5 ft | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 5/30/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 5/30/06 |
| Logged By: | M. Walters | Total Depth: | 20.0 ft |
| Location Code: | RISB-30 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|----------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Silty sand, light brown, very fine, dry | 5 | 16:05 | 0-1 ft |
| 2 | Clayey silt, reddish brown | 0 | 16:15 | 1-5 ft |
| 3 | | | | |
| 4 | Same as Above | 0 | 16:30 | 5-9 ft |
| 5 | | | | |
| 6 | Silty clay, brown | 0 | 16:40 | 9-13 ft |
| 7 | | | | |
| 8 | Silty clay, light grey with black mottling | 0 | 16:48 | 13-17 ft |
| 9 | | | | |
| 10 | Silty sand, light grey, with black mottling | 0 | 17:07 | 17-20 ft |
| 11 | | | | |
| 12 | Same as Above | 0 | 17:07 | 17-20 ft |
| 13 | | | | |
| 14 | Sand, medium to fine, brown to reddish brown | 2 | 17:07 | 17-20 ft |
| 15 | | | | |
| 16 | Same as Above | 0 | 17:07 | 17-20 ft |
| 17 | | | | |
| 18 | Same as Above | 0 | 17:07 | 17-20 ft |
| 19 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 5/30/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 5/30/06 |
| Logged By: | J. Weeber | Total Depth: | 19.0 ft |
| Location Code: | RISB-31 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-------------------------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Sandy clay, reddish brown | 0 | 18:00 | 0-1 ft |
| 2 3 | Silty clay, reddish brown, dense | 0 | 18:15 | 1-5 ft |
| 4 5 | Same as Above | 0 | | |
| 6 7 | Silty clay, gray, dense | 0 | 18:40 | 5-9 ft |
| 8 9 | Clay, grey, kaolinic, dry with sand | 0 | | |
| 10 11 | Silty clay, dark grey | 0 | 18:50 | 9-13 ft |
| 12 13 | Same as Above with specks of black, red, and white minerals | 0 | | |
| 14 15 | Same as Above | 0 | 19:00 | 13-17 ft |
| 16 17 | Same as Above | 0 | | |
| 18 19 | Same as Above, refusal at 19 ft | 0 | 19:10 | 17-19 ft |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 5/31/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 5/31/06 |
| Logged By: | J. Weeber | Total Depth: | 13.8 ft |
| Location Code: | RISB-32 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Clayey silt, reddish brown, dry | 0 | 8:50 | 0-1 ft |
| 2 | Same as Above | 0 | 9:00 | 1-5 ft |
| 3 | | | | |
| 4 | Same as Above | 0 | 9:07 | 5-9 ft |
| 5 | | | | |
| 6 | Same as Above | 0 | 9:20 | 9-13 ft |
| 7 | | | | |
| 8 | Silty clay, grey, with some sand | 0 | 9:20 | 9-13 ft |
| 9 | | | | |
| 10 | Sandy silt, dark grey sand medium to fine | 0 | 9:20 | 9-13 ft |
| 11 | | | | |
| 12 | Same as Above | 0 | 9:20 | 9-13 ft |
| 13 | | | | |
| 14 | Same as Above, refusal at 13.8 ft | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/6/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/6/06 |
| Logged By: | P. Nicholson | Total Depth: | 20 ft |
| Location Code: | RISB-33 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|---------------------------------------------------------------------|-------------|-------------------------|------------------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Silt and gravel | 0 | | |
| 2 3 | Silt, minor clay, orangish red, brown, medium dense, dry | 0 | 15:00 | 1-5 ft |
| 4 5 | Same as Above | 0 | | |
| 6 7 | Silty clay, orange brown with light grey mottling | 0 | 15:05 | 5-9 ft |
| 8 9 | Same as Above | 0 | | |
| 10 11 | Same as above but more dense clay | 0 | No Sample | |
| 12 13 | Sandy silt, light brown to yellow, quartz interbedded, stiff, dense | 0 | | |
| 14 15 | Sandy silt, light brown to yellow, quartz interbedded, stiff, dense | 0 | No Sample | |
| 16 17 | Sandy silt, light brown to yellow, quartz interbedded, stiff, dense | 0 | | |
| 18 19 | Sandy silt, light brown to yellow, quartz interbedded, stiff, dense | 0 | 15:20 | 18-20 ft, Duplicate RISB-522 |
| 20 | Refusal at 20 ft | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/6/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/6/06 |
| Logged By: | P. Nicholson | Total Depth: | 20 ft |
| Location Code: | RISB-34 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-----------------------------------------------------------------------------|-------------|-------------------------|-------------------------------------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Clay, orange to reddish brown, medium dense | 0 | No Sample | 0-1 ft |
| 2 | Silt, minor clay, brown dry | 0 | 13:55 | 1-5 ft |
| 3 | | | | |
| 4 | Same as Above | 0 | No Sample | 5-9 ft |
| 5 | | | | |
| 6 | Silty clay, orange brown with light grey mottling | 0 | No Sample | 5-9 ft |
| 7 | | | | |
| 8 | Same as Above | 0 | 14:10 | 9-13 ft (Black, red discoloration, slight odor) |
| 9 | | | | |
| 10 | Same as Above | 0 | 14:25 | 18-20 ft |
| 11 | | | | |
| 12 | Silt, minor clay, dark grey with black, light red and brown mottling, moist | 12 | No Sample | 13-18 |
| 13 | | | | |
| 14 | Same as Above with light green banding | 0 | No Sample | 13-18 |
| 15 | | | | |
| 16 | Silt, brown and greyish yellow, light grey mottling, medium dense, moist | 0 | 14:25 | 18-20 ft |
| 17 | | | | |
| 18 | Silt then weathered rock, brown, orange, tan and grey mottling, moist | 0 | 14:25 | 18-20 ft |
| 19 | | | | |
| 20 | Refusal at 20 ft | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/1/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/1/06 |
| Logged By: | J. Weeber | Total Depth: | 14.4 ft |
| Location Code: | RISB-35 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-----------------------------------------------------------------------------|-------------|-------------------------|-------------------------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Clay, red, dense, gravel | 0 | 15:25 | 0-1 ft |
| 2 | Silty clay, reddish orange, medium dense | 0 | 15:35 | 1-5 ft |
| 3 | | | | |
| 4 | | | | |
| 5 | Clayey silt, grey | 0 | | |
| 6 | Clay, orange grey, some silt | 0 | 15:40 | 5-9 ft |
| 7 | | | | |
| 8 | Clayey silt, grey | 0 | | |
| 9 | | | | |
| 10 | Silty clay, greyish green, soft | 0 | 15:45 | 9-13 ft and a Duplicate as RISB-935 |
| 11 | | | | |
| 12 | Silt, minor clay, dark grey with black, light red and brown mottling, moist | 0 | | |
| 13 | | | | |
| 14 | Same as Above, refusal at 14.4 ft | 0 | 15:50 | 13-15 ft |
| 15 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/1/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/1/06 |
| Logged By: | J. Weeber | Total Depth: | 16.4 ft |
| Location Code: | RISB-36 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|----------------------------------------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Silty sand, greyish brown, medium to fine | 0 | 14:40 | 0-1 ft |
| 2 | Same as Above, with red moist silty clay | 0 | 14:45 | 1-5 ft |
| 3 | | | | |
| 4 | Clay, dark greyish brown, dense | 0 | 14:55 | 5-9 ft |
| 5 | | | | |
| 6 | Clay, orange grey, dense | 0 | 15:00 | 9-13 ft |
| 7 | | | | |
| 8 | Clayey sand, reddish orange | 0 | 15:00 | 9-13 ft |
| 9 | | | | |
| 10 | Clayey sand, reddish brown, with green mottling | 0 | 15:00 | 9-13 ft |
| 11 | | | | |
| 12 | Clayey sand, reddish orange, with grey/black mottling, sand medium to fine | 0 | 15:00 | 9-13 ft |
| 13 | | | | |
| 14 | Same as Above, refusal at 14.4 ft | 0 | 15:00 | 9-13 ft |
| 15 | | | | |
| 16 | Refusal at 16.4 ft | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 5/30/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 5/30/06 |
| Logged By: | J. Weeber | Total Depth: | 24 ft |
| Location Code: | RISB-37 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|----------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Clayey silt, reddish brown | 0 | 16:10 | 0-1 ft |
| 2 | Same as Above | 0 | 16:25 | 1-5 ft |
| 3 | | | | |
| 4 | Same as Above | 0 | No Sample | 5-9 ft |
| 5 | | | | |
| 6 | Silty clay, light grey | 0 | No Sample | 5-9 ft |
| 7 | | | | |
| 8 | Same as Above | 0 | 16:45 | 9-13 ft |
| 9 | | | | |
| 10 | Same as Above, alluvial origin, plant debris | 0 | 17:00 | 13-17 ft |
| 11 | | | | |
| 12 | Sand, brown and grey, coarse, wet | 0 | 17:20 | 17-21 ft |
| 13 | | | | |
| 14 | Same as Above | 0 | 17:30 | 21-24 ft |
| 15 | | | | |
| 16 | Same as Above, alluvial origin, plant debris | 0 | 17:30 | 21-24 ft |
| 17 | | | | |
| 18 | Sand, brown and grey, coarse, wet | 0 | 17:20 | 17-21 ft |
| 19 | | | | |
| 20 | Same as Above | 0 | 17:30 | 21-24 ft |
| 21 | | | | |
| 22 | Sand, brown and grey, coarse, wet | 0 | 17:30 | 21-24 ft |
| 23 | | | | |
| 24 | Refusal at 24 ft | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 5/30/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 5/30/06 |
| Logged By: | M. Walters | Total Depth: | 25 ft |
| Location Code: | RISB-38 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|---------------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Sand, light brown, fine, dry | 0 | 18:05 | 0-1 ft |
| 2 | Clayey silt, reddish brown, with trace sand | 1 | 18:10 | 1-5 ft |
| 3 | | | | |
| 4 | Same as Above | 0 | | |
| 5 | | | | |
| 6 | Clayey silt, reddish brown | 1 | 18:16 | 5-9 ft |
| 7 | | | | |
| 8 | Same as Above | 0 | | |
| 9 | | | | |
| 10 | Silty sand, grey to brown, with black mottling | 0 | 18:22 | 9-13 ft |
| 11 | | | | |
| 12 | Silty sand, brown | 0 | | |
| 13 | | | | |
| 14 | Clayey silt, grey brown, moist | 0 | 18:35 | 13-17 ft |
| 15 | | | | |
| 16 | Sandy silt, grey brown with black mottling, moist | 0 | | |
| 17 | | | | |
| 18 | Sand, grey to brown, medium to fine, | 0 | 18:45 | 17-21 ft |
| 19 | | | | |
| 20 | Same as Above | 0 | | |
| 21 | | | | |
| 22 | Same as Above | 0 | 18:55 | 21-24 ft |
| 23 | | | | |
| 24 | Same as Above, refusal at 25 ft | | | |
| 25 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 5/31/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 5/31/06 |
| Logged By: | M. Walters | Total Depth: | 23.5 ft |
| Location Code: | RISB-39 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|---------------------------------------------|-------------|-------------------------|--------------------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Silty clay, reddish brown, dry | 0 | 9:35 | 0-1 ft |
| 2 | Same as Above | 2 | 9:45 | 1-5 ft |
| 3 | | | | |
| 4 | Silty clay, brown to grey, dry | 5 | 9:55 | 5-9 ft (organic odor) |
| 5 | | | | |
| 6 | Clayey silt, grey to brown, dry | 40 | 10:05 | 9-13 ft |
| 7 | | | | |
| 8 | Silty clay, dark brown, dry | 159 | 10:20 | 13-17 ft |
| 9 | | | | |
| 10 | Same as Above, reddish brown, moist | 13 | 10:28 | 17-21 ft (strong organic odor) |
| 11 | | | | |
| 12 | Same as Above, brown to grey, moist | 2 | 10:35 | 21-23.5 ft |
| 13 | | | | |
| 14 | Silty clay, greyish green, wet | 4 | 10:35 | 21-23.5 ft |
| 15 | | | | |
| 16 | Same as Above | 0 | 10:35 | 21-23.5 ft |
| 17 | | | | |
| 18 | Silty sand, with clay, dark green with grey | 4 | 10:35 | 21-23.5 ft |
| 19 | | | | |
| 20 | Same as Above | 8 | 10:35 | 21-23.5 ft |
| 21 | | | | |
| 22 | Silty sand, light green with grey mottling | 12 | 10:35 | 21-23.5 ft |
| 23 | | | | |
| 24 | Refusal at 23.5 ft | | | |
| 25 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/1/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/1/06 |
| Logged By: | J. Weeber | Total Depth: | 13.3 ft |
| Location Code: | RISB-40 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|------------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Clay, red, dense, gravel | 0 | 16:25 | 0-1 ft |
| 2 | Same as Above | 0 | 16:40 | 1-5 ft |
| 3 | | | | |
| 4 | Same as Above | 0 | 16:45 | 5-9 ft |
| 5 | | | | |
| 6 | Same as Above, silt with coarse weathered rock | 0 | 16:50 | 9-13 ft |
| 7 | | | | |
| 8 | Same as Above | 0 | 16:50 | 9-13 ft |
| 9 | | | | |
| 10 | Same as Above with refusal at 13.3 ft | 0 | 16:50 | 9-13 ft |
| 11 | | | | |
| 12 | | 0 | | |
| 13 | | | | |
| 14 | | | | |
| 15 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/1/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/1/06 |
| Logged By: | J. Weeber/M. Walters | Total Depth: | 8 ft |
| Location Code: | RISB-41 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-----------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Sandy silt, brown, dense | 2 | 13:15 | 0-1 ft |
| 2 3 | Same as Above | 2 | 13:30 | 1-5 ft |
| 4 5 | Sand, grey, medium to fine | 2 | | |
| 6 7 | Sand, reddish brown with black mottling | 2 | No sample | 5-8 ft |
| 8 9 | Same as Above, refusal at 8.5 ft | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/1/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/1/06 |
| Logged By: | M. Walters | Total Depth: | 8.5 ft |
| Location Code: | RISB-42 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|--------------------------------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Gravel, sand, brown | 0 | 8:25 | 0-1 ft |
| 2 3 | Sand, brown, some clay, dark brown, slight odor | 0 | 8:35 | 1-5 ft |
| 4 5 | Sand, reddish brown, some clay, refusal at 4 ft, move over 10 feet | 0 | | |
| 6 7 | Same as Above | 0 | 8:50 | 5-8 ft |
| 8 9 | Refusal at 8 ft | 0 | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/1/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/1/06 |
| Logged By: | M. Walters | Total Depth: | 13 ft |
| Location Code: | RISB-43 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|----------------------------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Clayey silt, reddish brown, gravel on top | 0 | 14:00 | 0-1 ft |
| 2 | Clayey silt, reddish brown | 0 | 14:10 | 1-5 ft |
| 3 | | | | |
| 4 | | | | |
| 5 | Same as Above | 0 | | |
| 6 | Sand, orange brown, medium to fine, dense | 0 | 14:15 | 5-9 ft |
| 7 | | | | |
| 8 | Same as Above | 0 | | |
| 9 | | | | |
| 10 | Sand, grey to brown, medium to fine, black and orange mottling | 0 | 14:20 | 8-13 ft |
| 11 | | | | |
| 12 | | | | |
| 13 | Same as Above, refusal at 13 ft | 0 | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/6/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/6/06 |
| Logged By: | P. Nicholson | Total Depth: | 8.5 ft |
| Location Code: | RISB-44 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|------------------------------------------------|-------------------------------------------------------------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Clayey silt, orange brown, dense, dry | See ColorTec Results (Appendix C of Phase I Technical Memorandum) | 16:20 | 0-1 ft |
| 2 | Clayey silt, reddish orange brown, soft, moist | | No Sample | 1-5 ft |
| 3 | | | | |
| 4 | Same as Above | | 16:35 | 5-8 ft |
| 5 | | | | |
| 6 | Silty clay, dark orange brown, soft moist | | 16:35 | 5-8 ft |
| 7 | | | | |
| 8 | Samprolite clay matrix, refusal at 8.5 ft | 16:35 | 5-8 ft | |
| 9 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/5/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/5/06 |
| Logged By: | P. Nicholson | Total Depth: | 15 ft |
| Location Code: | RISB-45 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|----------------------------------------------------------------|-------------|-------------------------|----------------|
| Depth (ft) | Sample Description | | | |
| 1 | Clayey silt, reddish brown, dense, with some gravel | 120 | 15:15 | 0-1 ft, odor |
| 2 | Same as Above, then silt at 3 ft, tan/brown, dry | 120 | 15:30 | 1-5 ft |
| 3 | | | | |
| 4 | Same as Above | 116 | 15:45 | 5-9 ft, odor |
| 5 | | | | |
| 6 | Weathered rock, tan/brown with yellowish grey mottling | 23 | 16:00 | 8-13 ft, odor |
| 7 | | | | |
| 8 | Same as Above | 38 | 16:10 | 14-15 ft, odor |
| 9 | | | | |
| 10 | Sand, grey to brown, medium to fine, black and orange mottling | 57 | 16:10 | 14-15 ft, odor |
| 11 | | | | |
| 12 | Same as Above | 27 | 16:10 | 14-15 ft, odor |
| 13 | | | | |
| 14 | Same as Above, refusal at 15 ft | 12 | 16:10 | 14-15 ft, odor |
| 15 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 5/31/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 5/31/06 |
| Logged By: | M. Walters | Total Depth: | 25 ft |
| Location Code: | RISB-46 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|--------------------------------------------------------------|-------------|-------------------------|-----------------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Clayey silt, dark grey to black, dry | 9 | 15:15 | 0-1 ft, strong organic odor |
| 2 | Same as Above | 5 | 15:35 | 1-5 ft |
| 3 | | | | |
| 4 | Clayey silt, brown, dry | 10 | 15:45 | 5-9 ft |
| 5 | | | | |
| 6 | Clayey silt, brown to orange brown, with black mottling, dry | 3 | 15:50 | 9-13 ft |
| 7 | | | | |
| 8 | Same as Above | 5 | 16:00 | 13-17 ft |
| 9 | | | | |
| 10 | Clayey silt, greenish grey, moist | 0 | 16:10 | 17-21 ft |
| 11 | | | | |
| 12 | Same as Above | 0 | 16:15 | 21-25 ft |
| 13 | | | | |
| 14 | Sandy silt, greenish grey, some clay, moist | 0 | 16:15 | 21-25 ft |
| 15 | | | | |
| 16 | Same as Above | 0 | 16:15 | 21-25 ft |
| 17 | | | | |
| 18 | Same as Above | 0 | 16:15 | 21-25 ft |
| 19 | | | | |
| 20 | Sandy silt, with black mottling, moist | 0 | 16:15 | 21-25 ft |
| 21 | | | | |
| 22 | Silty sand, grey with green, dry | 0 | 16:15 | 21-25 ft |
| 23 | | | | |
| 24 | Same as Above, brown with black mottling, refusal at 25 ft | | | |
| 25 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/1/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/1/06 |
| Logged By: | J. Weeber | Total Depth: | 17.5 ft |
| Location Code: | RISB-47 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|----------------------------------------------------------|-------------|-------------------------|-----------------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Gravel, sand, red, dry | 0 | 13:10 | 0-1 ft, strong organic odor |
| 2 | Same as Above | 0 | 13:23 | 1-5 ft |
| 3 | | | | |
| 4 | | 0 | | |
| 5 | Clay, red with black mottling, soft | | | |
| 6 | Same as Above, grey-green moist | 0 | 13:30 | 5-9 ft |
| 7 | | | | |
| 8 | Same as Above | 0 | 13:40 | 9-13 ft |
| 9 | | | | |
| 10 | Same as Above | 0 | 13:45 | 13-17 ft |
| 11 | | | | |
| 12 | Silty clay, red, soft, moist | 0 | 13:45 | 13-17 ft |
| 13 | | | | |
| 14 | Same as Above | 0 | 13:45 | 13-17 ft |
| 15 | | | | |
| 16 | Saprolite, sandy clay, red with black and white mottling | 0 | 13:45 | 13-17 ft |
| 17 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/5/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/5/06 |
| Logged By: | M. Lamar | Total Depth: | 15 ft |
| Location Code: | RISB-48 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Gravel, silt, brown, dry | See ColorTec Results (Appendix C of Phase I Technical Memorandum) | 13:45 | 0-1 ft |
| 2 | Silt, brown, softer, dry | | 13:50 | 1-5 ft |
| 3 | | | | |
| 4 | Sandy silt, light brown, moderately dense, dry | | | |
| 5 | | | 14:05 | 5-9 ft |
| 6 | Sandy silt, light brown, moderately dense, dry | | | |
| 7 | | | | |
| 8 | Same as Above, becoming silty sand | | 14:15 | 9-13 ft |
| 9 | | | | |
| 10 | Silty sand, light brown grey with black red mottling, loose, dry | | | |
| 11 | | | 14:20 | 13-15 ft |
| 12 | Same as Above | | | |
| 13 | | | | |
| 14 | Same as Above, refusal at 15 ft | | | |
| 15 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/2/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/2/06 |
| Logged By: | M. Walters | Total Depth: | 17 ft |
| Location Code: | RISB-49 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|-----------------------------------------------------------------|-------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Sand, medium to fine, tan to light brown with some gravel | 0 | 12:20 | 0-1 ft |
| 2 3 | Silty clay, dark red, with black mottling, dense, dry | 3 | 12:35 | 1-5 ft |
| 4 5 | Silty clay, grey green, moderately dense, dry | 2 | | |
| 6 7 | Silty sandy clay, grey green changing to red orange sands | 5 | 12:50 | 5-9 ft |
| 8 9 | Sand, black, grey, green, loose, moist, and evidence of ash | 5 | | |
| 10 11 | Sand, grey with black white mottling, diesel odor | 3 | 13:25 | 9-13 ft |
| 12 13 | Same as Above, with more grey-green color and more diesel odor | 76 | | |
| 14 15 | Same as Above, with more green color | 110 | 13:40 | 13-17 ft |
| 16 17 | Silty sand, dark grey, strong diesel odor, and refusal at 17 ft | 110 | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/2/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/2/06 |
| Logged By: | M. Walters | Total Depth: | 13 ft |
| Location Code: | RISB-50 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|--------------------|-------------|-------------------------|---------------------------------------------------------------------------------------------|
| Depth (ft) | Sample Description | | | |
| 1 | No Recovery | NA | NA | No Recovery 0-9' bls. Sample location was offset from RISB-29 to re-collect 9-13 ft sample. |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | | | | |
| 11 | | | | |
| 12 | | | | |
| 13 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/6/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/6/06 |
| Logged By: | P. Nicholson | Total Depth: | 15 ft |
| Location Code: | RISB-51 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------|-------------------------|------------------------------------|
| Depth (ft) | Sample Description | | | |
| 1 | Silty clay, orange brown, moderately dense, some gravel, dry | See ColorTec Results (Appendix C of Phase I Technical Memorandum) | 8:20 | 0-1 ft |
| 2 | Same as Above, without gravel | | 8:25 | 1-5 ft |
| 3 | | | | |
| 4 | Silt, brown and tan, some sand, soft, dry | | 8:30 | 5-9 ft |
| 5 | | | | |
| 6 | Same as Above | | 8:35 | 9-13 ft, Duplicate RISB-951 @11:00 |
| 7 | | | | |
| 8 | Same as Above | | 8:40 | 13-17 ft |
| 9 | | | | |
| 10 | Silt with saprolite, brown tan, with white/black speckling | | 8:40 | 13-17 ft |
| 11 | | | | |
| 12 | Same as Above | | 8:40 | 13-17 ft |
| 13 | | | | |
| 14 | Same as Above, refusal at 15 ft | | 8:40 | 13-17 ft |
| 15 | | | | |

Boring Log

| | | | |
|----------------|---------------------------|----------------------|-------------------|
| Project: | Former PSC Site | Start Date: | 6/6/06 |
| Project No.: | 20958-50105-TSK3.FLD | End Date: | 6/6/06 |
| Logged By: | P. Nicholson | Total Depth: | 15 ft |
| Location Code: | RISB-52 | Abandonment Details: | Bentonite pellets |
| Location: | Rock Hill, South Carolina | | |
| Driller: | M&W Drilling | | |
| Latitude: | | Longitude: | |

| Geoprobe direct push drilling | | OVM Reading | Lab Sample Collect Time | Comments |
|-------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------|-------------------------|----------|
| Depth (ft) | Sample Description | | | |
| 1 | Silty clay, orange brown, moderately dense, some gravel, dry | See ColorTec Results (Appendix C of Phase I Technical Memorandum) | 11:20 | 0-1 ft |
| 2 3 | Clay, yellow brown, stiff, dense | | 11:25 | 1-5 ft |
| 4 5 | Clayey silt, yellow brown, dry | | 11:30 | 5-9 ft |
| 6 7 | Same as above to 6 ft | | 11:35 | 9-13 ft |
| 8 9 | Silt with saprolite, brown tan, with white/black speckling | | 11:40 | 13-17 ft |
| 10 11 | Same as Above | | | |
| 12 13 | Same as Above | | | |
| 14 15 | Weathered rock, greyish yellow, with black/tan mottling | | | |
| 16 17 | Same as Above, refusal at 17 ft | | | |

Phase II Boring Logs

Boring Log

| | | | |
|----------------|------------------------------------|--------------|----------------------|
| Project: | Former PSC Site | Start Date: | 12/15/06 |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/15/06 |
| Logged By: | Nathan Parker | Total Depth: | 14 ft |
| Location Code: | RISB-56 | Abandonment: | Bentonite chips 3/8" |
| Location: | Rock Hill, South Carolina | Latitude: | |
| Driller: | Miller Drilling Co. | Longitude: | |
| Method: | Hollow Stem Auger with split spoon | | |

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |
|------------|----------|-------------|--------------------------------------------------------------------------------------|-------------|-------------------------|
| 1 | 12" | 18-7-9-10 | CLAY, silty, orangish brown mottled with black, some grey clasts, hard, dry | 0.6 | 1445 |
| 2 | | | | | |
| 3 | 24" | 10-14-17-18 | SILT, clayey, yellow orangish brown, mottled with grey | 0.7 | N/A |
| 4 | | | | | |
| 5 | 24" | 9-7-10-14 | CLAY, silty, lt yellow to pale brown mottled with orange stripes, dry | 0.5 | 1455 |
| 6 | | | | | |
| 7 | 24" | 8-10-12-10 | CLAY, silty, yellow (top 8"), orange (middle 8"), green with white specs (bottom 8") | 1.8 | N/A |
| 8 | | | | | |
| 9 | 24" | 11-22-24-27 | SAND, dark green with white specs, saprolite | 2.9 | 1510 |
| 10 | | | | | |
| 11 | 12" | 13-21-25-24 | SILT, sandy, dark green with white specs, saprolite | 3.3 | N/A |
| 12 | | | | | |
| 13 | 24" | 10-16-22-50 | SILT, sandy, dark green with white specs, saprolite | 68.2 | 1530 |
| 14 | | | | | |

Boring Log

| | | | | |
|----------------|---------------------------------------------------------------------------------|--------------|----------------------|--|
| Project: | Former PSC Site | Start Date: | 12/6/06 | |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/6/06 | |
| Logged By: | David Rojas & Nathan Parker | Total Depth: | 26 ft | |
| Location Code: | RISB-57 | Abandonment: | Bentonite chips 3/8" | |
| Location: | Rock Hill, South Carolina | Latitude: | | |
| Driller: | Miller Drilling Co. | Longitude: | | |
| Method: | Hollow Stem Auger with CME sampler for first 10' then split spoon to completion | | | |

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time | | | |
|------------|----------|------------|--------------------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|------|-----------------------------------------------------------------------------|------|
| 1 | 18" | N/A | GRAVEL, silty sand matrix, grey to brown | 0 | 1550 | | | |
| 2 | | | SAND, silty, orangish brown, occasional angular clasts | 5.5 | N/A | | | |
| 3 | | | 24" | CLAY, silty, mottled green and orangish brown | CLAY, silty, orangish brown mottled with greenish grey, moist, saprolite | 8.8 | 1620 | |
| 4 | 0.5" | | | | | 2.8 | N/A | |
| 5 | | | | | | 24" | 2.5 | 1645 |
| 6 | | | | | | | 24" | 10.6 |
| 7 | | | 3.2 | | | | | |
| 8 | | | 24" | | | | CLAY, greenish brown mottled with black and white, some soft clay intervals | 3.8 |
| 9 | | | | | | 7.4 | | |
| 10 | 24" | | | | | 12.7 | | N/A |
| 11 | | | | | | 5.8 | | |
| 12 | 18" | | | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |

Boring Log

| | | | | |
|----------------|------------------------------------|--------------|----------------------|--|
| Project: | Former PSC Site | Start Date: | 12/18/06 | |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/18/06 | |
| Logged By: | Nathan Parker | Total Depth: | 24 ft | |
| Location Code: | RISB-58 | Abandonment: | Bentonite chips 3/8" | |
| Location: | Rock Hill, South Carolina | Latitude: | | |
| Driller: | Miller Drilling Co. | Longitude: | | |
| Method: | Hollow Stem Auger with split spoon | | | |

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |
|------------|----------|-------------|-----------------------------------------------------------------------|-------------|-------------------------|
| 1 | 24" | 5-8-5-7 | CLAY, silty, orangish brown, plastic | 0 | 905 |
| 2 | | | | | N/A |
| 3 | 12" | 6-4-12-14 | SILT, clayey, orangish brown, slightly plastic | 0 | 920 |
| 4 | | | | | |
| 5 | 24" | 5-18-19-24 | CLAY, lt yellowish brown with green specs, moist , plastic, sparolite | 0 | N/A |
| 6 | | | | | |
| 7 | 6" | 12-18-15-17 | CLAY, silty, lt greenish brown, saprolite | 0 | 930 |
| 8 | | | | | |
| 9 | 24" | 16-19-15-14 | SILT, lt greenish grey, saprolite | 0 | 940 |
| 10 | | | | | |
| 11 | 18" | 6-5-5-4 | SILT, sandy, lt greenish grey with rust staining, saprolite | 0 | 950 |
| 12 | | | | | |
| 13 | 24" | 3-6-6-7 | SILT, sandy, lt greenish grey with rust staining, saprolite | 0 | N/A |
| 14 | | | | | |
| 15 | 24" | 6-8-13-12 | SILT, sandy, lt greenish grey with rust staining, saprolite | 0 | 950 |
| 16 | | | | | |
| 17 | 24" | 5-8-7-10 | SILT, sandy, lt greenish grey with rust staining, saprolite | 0 | N/A |
| 18 | | | | | |
| 19 | 24" | 3-9-11-16 | SILT, sandy, lt greenish grey with rust staining, saprolite | 0 | 950 |
| 20 | | | | | |
| 21 | 18" | 8-14-15-19 | SILT, sandy, lt greenish grey with rust staining, saprolite | 0 | N/A |
| 22 | | | | | |
| 23 | 18" | 5-8-11-12 | SILT, sandy, lt greenish grey with rust staining, saprolite | 0 | N/A |
| 24 | | | | | |

Boring Log

| | | | |
|-----------------------|-------------------------------------------|---------------------|-----------------------------|
| <u>Project:</u> | <u>Former PSC Site</u> | <u>Start Date:</u> | <u>12/18/06</u> |
| <u>Project No.:</u> | <u>20958-50105-TSK6.PHASE2</u> | <u>End Date:</u> | <u>12/18/06</u> |
| <u>Logged By:</u> | <u>Nathan Parker & Dave Rojas</u> | <u>Total Depth:</u> | <u>15.5 ft</u> |
| <u>Location Code:</u> | <u>RISB-59</u> | <u>Abandonment:</u> | <u>Bentonite chips 3/8"</u> |
| <u>Location:</u> | <u>Rock Hill, South Carolina</u> | <u>Latitude:</u> | |
| <u>Driller:</u> | <u>Miller Drilling Co.</u> | <u>Longitude:</u> | |
| <u>Method:</u> | <u>Hollow Stem Auger with split spoon</u> | | |

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |
|------------|----------|-------------|----------------------------------------------------------------------------------------------------------|-------------|-------------------------|
| 1 | 18" | 4-4-2-1 | CLAY, reddish orange brown, plastic (top 12"), SILT, clayey, orangish brown with black specs (bottom 6") | 0 | 1125 |
| 2 | | | | | N/A |
| 3 | 24" | 7-9-11-18 | SILT, orangish brown to grey with black specs (possible saprolite) | 0 | 1135 |
| 4 | | | | | |
| 5 | 24" | 21-27-34-47 | SILT, mottled greenish grey and lt orangish brown, rust staining, saprolite | 0.2 | N/A |
| 6 | | | | | |
| 7 | 24" | 15-18-19-21 | SAND, silty, orange, black and pink specs, saprolite | 0 | 1300 |
| 8 | | | | | |
| 9 | 24" | 15-18-32-47 | SAND, orange, black and pink specs, saprolite | 7.9 | 1325 |
| 10 | | | | | |
| 11 | 24" | 13-15-15-29 | SAND, orange, black and pink specs, saprolite | 0.8 | N/A |
| 12 | | | | | |
| 13 | 24" | 34-40-R | SAND, orange, black and pink specs, saprolite | 0.8 | N/A |
| 14 | | | | | |
| 15.5 | 12" | 34-40-R | SAND, orange, black and pink specs, saprolite | 0.8 | N/A |

Boring Log

| | | | | |
|----------------|------------------------------------|--------------|----------------------|--|
| Project: | Former PSC Site | Start Date: | 12/17/06 | |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/17/06 | |
| Logged By: | Nathan Parker & Dave Rojas | Total Depth: | 24 ft | |
| Location Code: | RISB-61 | Abandonment: | Bentonite chips 3/8" | |
| Location: | Rock Hill, South Carolina | Latitude: | | |
| Driller: | Miller Drilling Co. | Longitude: | | |
| Method: | Hollow Stem Auger with split spoon | | | |

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |
|------------|----------|-------------|----------------------------------------------------------------|-------------|-------------------------|
| 1 | 18" | 2-6-6-10 | SAND, course, deep grey, poorly sorted | 0 | N/A |
| 2 | | | | | |
| 3 | 18" | 2-4-18-19 | | 0 | |
| 4 | | | | | |
| 5 | 24" | 13-14-12-18 | | 0 | |
| 6 | | | | | |
| 7 | 24" | 14-15-16-15 | | 0 | |
| 8 | | | | | |
| 9 | 24" | 14-16-10-11 | | 0 | |
| 10 | | | | | |
| 11 | 9" | 8-10-11-14 | SILT, yellowish lt brown, saprolite | 0 | 1750 |
| 12 | | | | | |
| 13 | 18" | 9-9-9-13 | SILT, sandy, orangish yellow brown with black specs, saprolite | 0 | N/A |
| 14 | | | | | |
| 15 | 18" | 9-10-14-13 | SILT, sandy, lt green, pink, black specs, saprolite | 0 | |
| 16 | | | | | |
| 17 | 24" | 12-14-17-21 | | 0 | 1805 |
| 18 | | | | | |
| 19 | 24" | 14-18-21-30 | SILT, sandy, yellow orangish brown with black specs, saprolite | 0 | N/A |
| 20 | | | | | |
| 21 | 24" | 8-6-9-15 | | 0 | 1830 |
| 22 | | | | | |
| 23 | 24" | 8-13-23-28 | | 0 | N/A |
| 24 | | | | | |

Boring Log

| | | | |
|----------------|------------------------------------|--------------|----------------------|
| Project: | Former PSC Site | Start Date: | 12/19/06 |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/19/06 |
| Logged By: | Nathan Parker | Total Depth: | 14 ft |
| Location Code: | RISB-62 | Abandonment: | Bentonite chips 3/8" |
| Location: | Rock Hill, South Carolina | Latitude: | |
| Driller: | Miller Drilling Co. | Longitude: | |
| Method: | Hollow Stem Auger with split spoon | | |

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |
|------------|----------|-------------|-----------------------------------------------------------------|-------------|-------------------------|
| 1 | 12" | 3-2-5-3 | CLAY, orangish brown, soft, plastic | 0 | 900 |
| 2 | | | | | N/A |
| 3 | 24" | 4-4-3-18 | SILT, clayey, yellow orangish brown with black specs, saprolite | 31.9 | 920 |
| 4 | | | | | |
| 5 | 6" | 6-9-19-18 | | 50.2 | N/A |
| 6 | | | | | |
| 7 | 24" | 12-14-22-24 | | 70.1 | 930 |
| 8 | | | | | |
| 9 | 12" | 12-17-21-30 | SILT, mottled green, black and white specs, odor, saprolite | 79.3 | N/A |
| 10 | | | | | |
| 11 | 24" | 13-14-15-26 | | 48.2 | 1000 |
| 12 | | | | | |
| 13 | 24" | 27-38-54-R | | 12.9 | |
| 14 | | | | | |

Boring Log

| | | | |
|-----------------------|-------------------------------------------|---------------------|-----------------------------|
| <u>Project:</u> | <u>Former PSC Site</u> | <u>Start Date:</u> | <u>12/17/06</u> |
| <u>Project No.:</u> | <u>20958-50105-TSK6.PHASE2</u> | <u>End Date:</u> | <u>12/17/06</u> |
| <u>Logged By:</u> | <u>Nathan Parker</u> | <u>Total Depth:</u> | <u>18 ft</u> |
| <u>Location Code:</u> | <u>RISB-63</u> | <u>Abandonment:</u> | <u>Bentonite chips 3/8"</u> |
| <u>Location:</u> | <u>Rock Hill, South Carolina</u> | <u>Latitude</u> | |
| <u>Driller:</u> | <u>Miller Drilling Co.</u> | <u>Longitude:</u> | |
| <u>Method:</u> | <u>Hollow Stem Auger with split spoon</u> | | |

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |
|------------|----------|-------------|--------------------------------------------------------------------------------------------------|-------------|-------------------------|
| 1 | 12" | 1-1-1-3 | CLAY, orangish brown, plastic | 0.6 | 1415 |
| 2 | | | | | |
| 3 | 18" | 8-10-13-14 | GRAVEL, grey clasts, little matrix (top 12"), SILT, clayey, yellowish brown, plastic (bottom 6") | 4.3 | N/A |
| 4 | | | | | |
| 5 | 24" | 13-18-17-21 | SILT, clayey, yellowish brown with black specs, saprolite | 3.7 | 1430 |
| 6 | | | | | |
| 7 | 24" | 24-30-39-38 | | 9.7 | N/A |
| 8 | | | | | |
| 9 | 24" | 6-10-13-11 | SILT, clayey, lt green, odor, saprolite | 24.9 | 1620 |
| 10 | | | | | |
| 11 | 24" | 12-15-16-19 | | 11.7 | N/A |
| 12 | | | | | |
| 13 | 18" | 6-9-10-11 | SILT, yellowish brown with layers of lt green, odor, saprolite | 11.2 | N/A |
| 14 | | | | | |
| 15 | 24" | 4-12-23-23 | | 7.2 | 1645 |
| 16 | | | | | |
| 17 | 24" | 8-18-21-37 | | 7.4 | 1655 |
| 18 | | | | | |

Appendix B
Well Logs and Construction
Diagrams

Phase II Well Construction

Boring Log

| | | | | | | | |
|-----------------------|--|-------------------------------------------|--|---------------------|--|-----------------------|--|
| <u>Project:</u> | | <u>Former PSC Site</u> | | <u>Start Date:</u> | | <u>12/19/06</u> | |
| <u>Project No.:</u> | | <u>20958-50105-TSK6.PHASE2</u> | | <u>End Date:</u> | | <u>12/19/06</u> | |
| <u>Logged By:</u> | | <u>Nathan Parker</u> | | <u>Total Depth:</u> | | <u>30 ft</u> | |
| <u>Location Code:</u> | | <u>RIMW-1</u> | | <u>Abandonment:</u> | | <u>well installed</u> | |
| <u>Location:</u> | | <u>Rock Hill, South Carolina</u> | | <u>Latitude</u> | | | |
| <u>Driller:</u> | | <u>Miller Drilling Co.</u> | | <u>Longitude:</u> | | | |
| <u>Method:</u> | | <u>Hollow Stem Auger with split spoon</u> | | | | | |

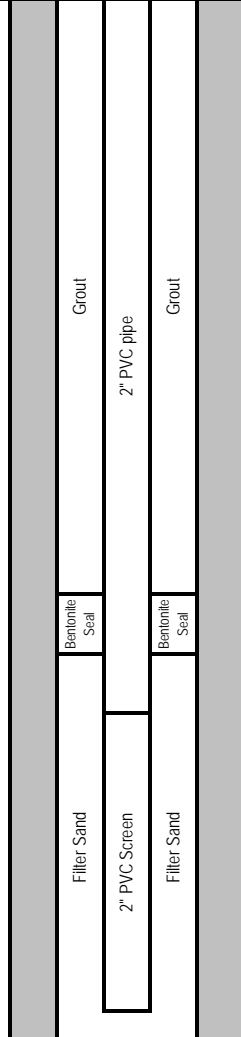
| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time | RIMW- 1 Well as built | | | | |
|------------|---------------------|-------------|----------------------------------------------------------------|-------------|-------------------------|--------------------------|---------------|-------------|----------------|----------------|
| 1 | | | N/A compare to RISB-23 | 0 | N/A | Grout | 2" PVC pipe | Grout | Bentonite Seal | Bentonite Seal |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| 5 | | | | | | | | | | |
| 6 | | | | | | | | | | |
| 7 | | | | | | | | | | |
| 8 | | | | | | | | | | |
| 9 | | | | | | | | | | |
| 10 | | | | | | | | | | |
| 11 | 24" | 6-12-14-19 | SILT, sandy, orangish brown with black specs, saprolite | 82.5 | 1520 | Filter Sand | 2" PVC Screen | Filter Sand | Bentonite Seal | Bentonite Seal |
| 12 | 24" | 21-35-51-63 | SILT, sandy, yellow orangish brown with black specs, saprolite | 118.2 | 1525 | | | | | |
| 13 | | | SILT, sandy, brown to orangish brown | N/A | N/A | | | | | |
| 14 | | | | | | | | | | |
| 15 | | | | | | | | | | |
| 16 | | | | | | | | | | |
| 17 | | | | | | | | | | |
| 18 | | | | | | | | | | |
| 19 | | | | | | | | | | |
| 20 | | | | | | | | | | |
| 21 | | | | | | | | | | |
| 22 | | | | | | | | | | |
| 23 | Cuttings from Auger | N/A | SILT, sandy, brown to orangish brown | 12.7 | N/A | | | | | |
| 24 | | | | | | | | | | |
| 25 | | | | | | | | | | |
| 26 | | | | | | | | | | |
| 27 | | | | | | | | | | |
| 28 | | | | | | | | | | |
| 29 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| | | | | 9.5 | | | | | | |

Boring Log

| | | | | |
|----------------|---------------------------|--------------|----------------|--|
| Project: | Former PSC Site | Start Date: | 12/19/06 | |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/19/06 | |
| Logged By: | Nathan Parker | Total Depth: | 31 ft | |
| Location Code: | RIMW-3 | Abandonment: | well installed | |
| Location: | Rock Hill, South Carolina | Latitude: | | |
| Driller: | Miller Drilling Co. | Longitude: | | |
| Method: | Hollow Stem Auger | | | |

**RIMW- 3 Well
as built**

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |
|------------|----------|------------|------------------------|-------------|-------------------------|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | N/A compare to RISB-23 | | |
| 19 | | | | | |
| 20 | | | | | |
| 21 | | | | | |
| 22 | | | | | |
| 23 | | | | | |
| 24 | | | | | |
| 25 | | | | | |
| 26 | | | | | |
| 27 | | | | | |
| 28 | | | | | |
| 29 | | | | | |
| 30 | | | | | |
| 31 | | | | | |
| 32 | | | | | |
| 33 | | | | | |
| 34 | | | | | |
| 35 | | | | | |



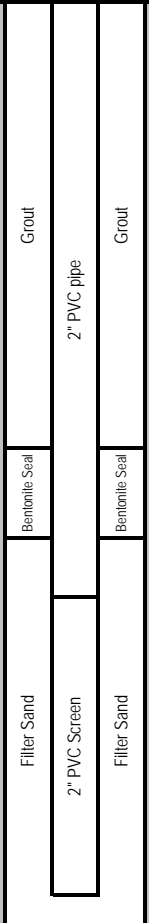
Boring Log

| | | | |
|----------------|---------------------------|--------------|----------------|
| Project: | Former PSC Site | Start Date: | 12/19/06 |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/19/06 |
| Logged By: | Nathan Parker | Total Depth: | 31 ft |
| Location Code: | RIMW-4 | Abandonment: | well installed |
| Location: | Rock Hill, South Carolina | Latitude: | |
| Driller: | Miller Drilling Co. | Longitude: | |
| Method: | Air Rotary | | |

**RIMW- 4 Well
as built**

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |
|------------|----------|------------|--------------------|-------------|-------------------------|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | | | | |
| 20 | | | | | |
| 21 | | | | | |
| 22 | | | | | |
| 23 | | | | | |
| 24 | | | | | |
| 25 | | | | | |
| 26 | | | | | |
| 27 | | | | | |
| 28 | | | | | |
| 29 | | | | | |
| 30 | | | | | |
| 31 | | | | | |

N/A compare to RIMW-19



Boring Log

| | | | | | | | |
|-----------------------|--|-------------------------------------------|--|---------------------|--|-----------------------|--|
| <u>Project:</u> | | <u>Former PSC Site</u> | | <u>Start Date:</u> | | <u>12/15/06</u> | |
| <u>Project No.:</u> | | <u>20958-50105-TSK6.PHASE2</u> | | <u>End Date:</u> | | <u>12/15/06</u> | |
| <u>Logged By:</u> | | <u>Nathan Parker</u> | | <u>Total Depth:</u> | | <u>26.5 ft</u> | |
| <u>Location Code:</u> | | <u>RIMW-5</u> | | <u>Abandonment:</u> | | <u>well installed</u> | |
| <u>Location:</u> | | <u>Rock Hill, South Carolina</u> | | <u>Latitude:</u> | | | |
| <u>Driller:</u> | | <u>Miller Drilling Co.</u> | | <u>Longitude:</u> | | | |
| <u>Method:</u> | | <u>Hollow Stem Auger with split spoon</u> | | | | | |

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time | RIMW- 5 Well as built | |
|------------|---------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------------------|------------------------------|-------------|
| 1 | 18" | 15-5-4-3 | ORGANIC , silty(major) gravel(minor), black to brownish (top 6"). GRAVEL , sand(major) silt(minor), grey (middle 6"). CLAY , sandy, mottled oranish brown and olive green, plastic (bottom 6") | 0 | 920 | Grout | 2" PVC pipe |
| 2 | | | | | N/A | | |
| 3 | 21" | 6-9-15-9 | CLAY , with intermittent layers of sandy clay, yellow orangish brown | 0 | 935 | Grout | 2" PVC pipe |
| 4 | | | | | | | |
| 5 | 12" | 8-10-9-8 | CLAY , sandy, yellow orangish brown, cohesive | 0 | 1650 | Grout | 2" PVC pipe |
| 6 | | | | | | | |
| 7 | 24" | 7-9-20-23 | SILT , clayey, mottled with greenish grey and orangish brown, moist, saprolite | 0 | N/A | Grout | 2" PVC pipe |
| 8 | | | | | | | |
| 9 | 24" | 7-15-21-23 | SILT , sandy, greenish grey, slight rust staining, moist, saprolite | 0 | 1705 | Grout | 2" PVC pipe |
| 10 | | | | | | | |
| 11 | 24" | 7-19-16-21 | SAND , silty, greenish grey, slight rust staining, moist, saprolite | 1.9 | 1710 | Grout | 2" PVC pipe |
| 12 | | | | | | | |
| 13 | 18" | 16-21-23-31 | SILT , clayey, mottled black and white, moist, saprolite | 1.9 | 1045 | Grout | 2" PVC pipe |
| 14 | | | | | | | |
| 15 | 24" | 17-29-30-40 | SILT , clayey, mottled green and white specs, moist, saprolite | 0.5 | N/A | Grout | 2" PVC pipe |
| 16 | | | | | | | |
| 17 | | | | | | | |
| 18 | 24" | 21-32-41-49 | | 2.9 | | | |
| 19 | 12" | 47-50 | SILT , clayey, lt brown, moist, saprolite | 2 | 1120 | Grout | 2" PVC pipe |
| 20 | | | | | | | |
| 21 | Cuttings from Auger | N/A | SILT , sandy, grey to lt brown | 2.9 | N/A | Grout | 2" PVC pipe |
| 22 | | | | | | | |
| 23 | | | | | | | |
| 24 | | | | | | | |
| 25 | | | | | | | |
| 26.5 | | | | | | | |

Boring Log

| | | | | | | | |
|-----------------------|--|-------------------------------------------|--|---------------------|--|-----------------------|--|
| <u>Project:</u> | | <u>Former PSC Site</u> | | <u>Start Date:</u> | | <u>12/12/06</u> | |
| <u>Project No.:</u> | | <u>20958-50105-TSK6.PHASE2</u> | | <u>End Date:</u> | | <u>12/18/06</u> | |
| <u>Logged By:</u> | | <u>Nathan Parker</u> | | <u>Total Depth:</u> | | <u>30 ft</u> | |
| <u>Location Code:</u> | | <u>RIMW-6</u> | | <u>Abandonment:</u> | | <u>well installed</u> | |
| <u>Location:</u> | | <u>Rock Hill, South Carolina</u> | | <u>Latitude</u> | | | |
| <u>Driller:</u> | | <u>Miller Drilling Co.</u> | | <u>Longitude:</u> | | | |
| <u>Method:</u> | | <u>Hollow Stem Auger with split spoon</u> | | | | | |

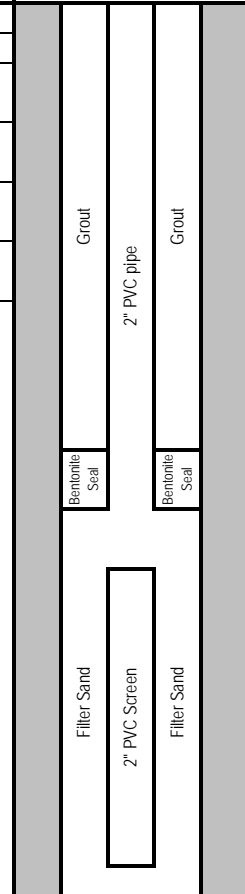
| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time | RIMW- 6 Well as built | | | |
|------------|---------------------|------------|--------------------------------------------------------------------------------------------|-------------|-------------------------|--------------------------|--|--|--|
| 1 | 12" | 12-16-10-8 | GRAVEL, silty-sand matrix, grey (top 6"), CLAY, silty, orangish brown, plastic (bottom 6") | 25.5 | 1630 | | | | |
| 2 | | | | | N/A | | | | |
| 3 | 12" | 7-8-12-15 | CLAY, silty, orangish brown, plastic | 19 | | | | | |
| 4 | | | | | | | | | |
| 5 | 24" | 3-3-5-7 | CLAY, silty, orangish brown mottled with bluish grey, plastic | 52.3 | 1650 | | | | |
| 6 | | | | | | | | | |
| 7 | 24" | 2-4-7-9 | CLAY, silty, greenish grey, plastic on top ft, stiff on bottom ft | 144.7 | N/A | | | | |
| 8 | | | | | | | | | |
| 9 | 24" | 5-10-12-9 | CLAY, silty, greenish grey, plastic, odor | 182.2 | 1705 | | | | |
| 10 | | | | | | | | | |
| 11 | 18" | 4-5-7-8 | CLAY, silty, orangish brown mottled with greenish grey, plastic | 262.2 | 1710 | | | | |
| 12 | | | | | | | | | |
| 13 | 24" | 2-4-7-9 | | 95.7 | N/A | | | | |
| 14 | | | | | | | | | |
| 15 | 24" | 6-9-21-31 | SILT, clayey, mottled black white and green specs, saprolite | 161.5 | | | | | |
| 16 | | | | | | | | | |
| 17 | 24" | 5-17-32-42 | SILT, mottled black white green and orangish brown specs, saprolite | 218.1 | | | | | |
| 18 | | | | | | | | | |
| 19 | 12" | 16-23-50 | SAND, silty, mottled black white green and orangish brown specs, saprolite | 115.3 | 1740 | | | | |
| 20 | | | | | | | | | |
| 21 | Cullings from Auger | N/A | SILT, clayey, brown to orangish brown | 45 | N/A | | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |
| 25 | | | | | | | | | |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | | | | | | | | |
| 31 | | | N/A | | | | | | |

Boring Log

| | | | |
|----------------|------------------------------------|--------------|----------------|
| Project: | Former PSC Site | Start Date: | 12/20/06 |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/20/06 |
| Logged By: | Nathan Parker | Total Depth: | 30 ft |
| Location Code: | RIMW-7 | Abandonment: | well installed |
| Location: | Rock Hill, South Carolina | Latitude: | |
| Driller: | Miller Drilling Co. | Longitude: | |
| Method: | Hollow Stem Auger with split spoon | | |

RIMW- 7 Well as built

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |
|------------|---------------------|-------------|-------------------------------------------------------------------|-------------|-------------------------|
| 1 | 12" | 3-3-5-4 | SAND, silty (major) clay (minor), dark brown | 0 | 920 |
| 2 | | | | | N/A |
| 3 | 12" | 3-3-5-8 | SILT, clayey, brown | 0 | N/A |
| 4 | | | | | |
| 5 | 18" | 7-12-21-20 | SILT, orangish brown with black specs | 0 | 930 |
| 6 | | | | | |
| 7 | 6" | 30-40-41-43 | SILT, sandy, orangish brown with black and white specs, sparolite | 0 | N/A |
| 8 | | | | | |
| 9 | 24" | 23-17-20-21 | SILT, yellow orangish brown | 0 | 940 |
| 10 | | | | | |
| 11 | 24" | 22-31-27-29 | SILT, sandy, black and white specs with rust staining, saprolite | 0 | N/A |
| 12 | | | | | |
| 13 | 6" | 12-R | | 0 | |
| 14 | Cuttings from Auger | N/A | SAND, silty, lt brown | 0 | N/A |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | 0.7 | |
| 18 | | | | | |
| 19 | | | | | |
| 20 | | | | 0 | |
| 21 | | | | | |
| 22 | | | | | |
| 23 | | | | | |
| 24 | | | | | |
| 25 | | | | | |
| 26 | | | | | |
| 27 | | | | | |
| 28 | | | | | |
| 29 | | | | | |
| 30 | | | | | |

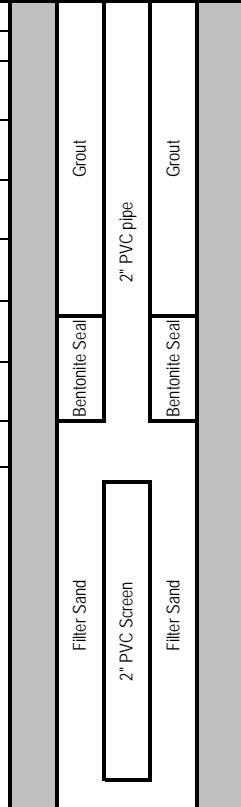


Boring Log

| | | | |
|----------------|------------------------------------|--------------|----------------|
| Project: | Former PSC Site | Start Date: | 12/18/06 |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/18/06 |
| Logged By: | Nathan Parker | Total Depth: | 27 ft |
| Location Code: | RIMW-8 | Abandonment: | well installed |
| Location: | Rock Hill, South Carolina | Latitude: | |
| Driller: | Miller Drilling Co. | Longitude: | |
| Method: | Hollow Stem Auger with split spoon | | |

**RIMW- 8 Well
as built**

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |
|------------|---------------------|-------------|-------------------------------------------------------------|-------------|-------------------------|
| 1 | 24" | 2-3-5-4 | CLAY, reddish orange, plastic | 0 | 1420 |
| 2 | | | CLAY, silty, lt orangish brown | | N/A |
| 3 | 24" | 6-8-10-14 | CLAY, silty, orangish brown, plastic | 9.8 | 1430 |
| 4 | | | | | |
| 5 | 24" | 4-10-16-16 | SILT, sandy, orangish brown with black specs, saprolite | 40.1 | 1435 |
| 6 | | | SILT, sandy, pale brownish grey with black specs, saprolite | | |
| 7 | 24" | 12-19-28-34 | SILT, sandy, orangish pink with black specs, saprolite | 200 | 1445 |
| 8 | | | | | |
| 9 | 24" | 10-9-16-26 | | 276 | 1455 |
| 10 | | | | | |
| 11 | 24" | 10-16-17-22 | | 297 | 1505 |
| 12 | | | | | |
| 13 | 18" | 16-26-50-48 | SAND, silty, green black and pink specs, saprolite | 859 | 1530 |
| 14 | | | | | |
| 15 | 12" | 18-37-58 | | 773 | 1535 |
| 16 | Cuttings from Auger | N/A | N/A | 167 | N/A |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | | | | |
| 20 | | | | | |
| 21 | | | | | |
| 22 | | | | | |
| 23 | | | | | |
| 24 | | | | | |
| 25 | | | | | |
| 26 | | | | | |
| 27 | | | | | |

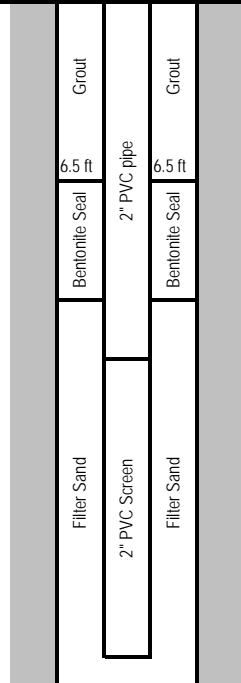


Boring Log

| | | | | |
|----------------|---------------------------|--------------|----------------|--|
| Project: | Former PSC Site | Start Date: | 12/18/06 | |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/18/06 | |
| Logged By: | David Rojas | Total Depth: | 23 ft | |
| Location Code: | RIMW-9 | Abandonment: | well installed | |
| Location: | Rock Hill, South Carolina | Latitude: | | |
| Driller: | Miller Drilling Co. | Longitude: | | |
| Method: | Air Rotary | | | |

**RIMW- 9 Well
as built**

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |
|------------|----------|------------|----------------------------------------|-------------|-------------------------|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | N/A. Entire well drilled with air rig. | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | | | | |
| 20 | | | | | |
| 21 | | | | | |
| 22 | | | | | |
| 23 | | | | | |



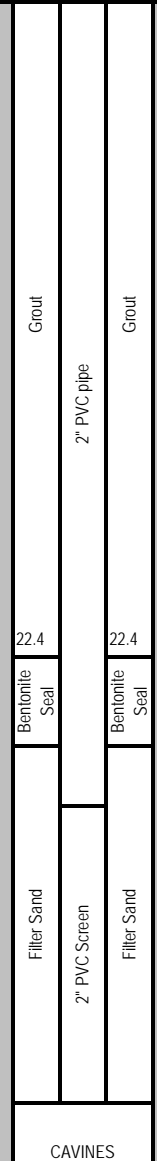
Boring Log

| | | | | |
|----------------|---------------------------|--------------|----------------|--|
| Project: | Former PSC Site | Start Date: | 12/14/06 | |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/14/06 | |
| Logged By: | David Rojas | Total Depth: | 39 ft | |
| Location Code: | RIMW-10 | Abandonment: | well installed | |
| Location: | Rock Hill, South Carolina | Latitude: | | |
| Driller: | Miller Drilling Co. | Longitude: | | |
| Method: | Air Rotary | | | |

**RIMW- 10 Well
as built**

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |
|------------|----------|------------|--------------------|-------------|-------------------------|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | | | | |
| 20 | | | | | |
| 21 | | | | | |
| 22 | | | | | |
| 23 | | | | | |
| 24 | | | | | |
| 25 | | | | | |
| 26 | | | | | |
| 27 | | | | | |
| 28 | | | | | |
| 29 | | | | | |
| 30 | | | | | |
| 31 | | | | | |
| 32 | | | | | |
| 33 | | | | | |
| 34 | | | | | |
| 35 | | | | | |
| 36 | | | | | |
| 37 | | | | | |
| 38 | | | | | |
| 39 | | | | | |

N/A compare to RISB-25. Entire well drilled with air rig.

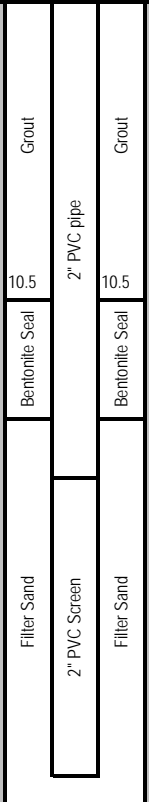


Boring Log

| | | | | |
|----------------|---------------------------|--------------|----------------|--|
| Project: | Former PSC Site | Start Date: | 12/18/06 | |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/18/06 | |
| Logged By: | David Rojas | Total Depth: | 36 ft | |
| Location Code: | RIMW-11 | Abandonment: | well installed | |
| Location: | Rock Hill, South Carolina | Latitude: | | |
| Driller: | Miller Drilling Co. | Longitude: | | |
| Method: | Air Rotary | | | |

**RIMW- 11 Well
as built**

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |
|------------|----------|------------|-----------------------------------------------------------|-------------|-------------------------|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | N/A compare to RIMW-18. Entire well drilled with air rig. | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | | | | |
| 20 | | | | | |
| 21 | | | | | |
| 22 | | | | | |
| 23 | | | | | |
| 24 | | | | | |
| 25 | | | | | |
| 26 | | | | | |
| 27 | | | | | |



Boring Log

| | | | | |
|----------------|---------------------------|--------------|----------------|--|
| Project: | Former PSC Site | Start Date: | 12/18/06 | |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/18/06 | |
| Logged By: | David Rojas | Total Depth: | 36 ft | |
| Location Code: | RIMW-12 | Abandonment: | well installed | |
| Location: | Rock Hill, South Carolina | Latitude: | | |
| Driller: | Miller Drilling Co. | Longitude: | | |
| Method: | Air Rotary | | | |

**RIMW- 12 Well
as built**

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |
|------------|----------|------------|--------------------|-------------|-------------------------|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | | | | |
| 20 | | | | | |
| 21 | | | | | |
| 22 | | | | | |
| 23 | | | | | |
| 24 | | | | | |
| 25 | | | | | |
| 26 | | | | | |
| 27 | | | | | |
| 28 | | | | | |
| 29 | | | | | |
| 30 | | | | | |
| 31 | | | | | |
| 32 | | | | | |
| 33 | | | | | |
| 34 | | | | | |
| 35 | | | | | |
| 36 | | | | | |

N/A. Entire well drilled with air rig.

Grout

2" PVC pipe

Grout

Bentonite Seal

Bentonite Seal

Filter Sand

2" PVC Screen

Filter Sand

Boring Log

| | | | |
|----------------|--------------------------------------------------------------------------|--------------|----------------|
| Project: | Former PSC Site | Start Date: | 12/11/06 |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/15/06 |
| Logged By: | Nathan Parker | Total Depth: | 102 ft |
| Location Code: | RIMW-13 | Abandonment: | well installed |
| Location: | Rock Hill, South Carolina | Latitude: | |
| Driller: | Miller Drilling Co. | Longitude: | |
| Method: | Hollow Stem Auger with split spoon to 35' then Air Drilled to completion | | |

**RIMW- 13 Well
as built**

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time | | | | | | |
|------------|----------|-------------|---------------------------------------------------------------------------------------------------------------------------|-------------|-------------------------|-----|-----------------|-------|-------------|-------|-----------------|
| 1 | 24" | 4-4-6-9 | GRAVEL, sandy matrix, grey (top 12"), CLAY, orange mottled with black bands, plastic (bottom 12") | 0 | | N/A | 6" Steel Casing | Grout | 2" PVC pipe | Grout | 6" Steel Casing |
| 2 | | | | | | | | | | | |
| 3 | 24" | 9-10-25-35 | SILT, orange with black specs, dry | 0.5 | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | 24" | 14-23-26-25 | SILT, clayey, orangish brown with black and white specs, dry, saprolite | 0 | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | 24" | 16-18-19-34 | SILT, black and white specs with rust staining, dry, sprollite | 0 | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | 18" | 18-20-33-50 | SILT, sandy, orangish pink with black specs, dry, saprolite | 0 | | | | | | | |
| 10 | | | | | | | | | | | |
| 11 | 18" | 13-30-33-50 | SAND, course, silt (minor), orangish grey with black specs, dry, saprolite | 0 | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | 0 | 18-18-R | N/A, this sample had no recovery due to the drillers helper dropping a piece of pvc pipe in the hole between split spoons | N/A | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | 12" | 23-50-R | SILT, sandy, lt orangish grey, saprolite | 0 | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |
| 21 | | | | 0.6 | | | | | | | |
| 22 | | | | | | | | | | | |
| 23 | | | | | | | | | | | |
| 24 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 26 | | | SILT, lt brown, dry | | | | | | | | |
| 27 | | | | | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 31 | | | | 0 | | | | | | | |
| 32 | | | | | | | | | | | |
| 33 | | | | | | | | | | | |
| 34 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 36 | | | | | | | | | | | |
| 37 | | | | | | | | | | | |
| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |
| 41 | | | N/A, due to Air Drilling | N/A | | | | | | | |
| 42 | | | | | | | | | | | |
| 43 | | | | | | | | | | | |
| 44 | | | | | | | | | | | |
| 45 | | | | | | | | | | | |
| 46 | | | | | | | | | | | |

Cuttings from Auger

N/A

Boring Log

| | | | | |
|----------------|--------------------------------------------------------------------------|--------------|----------------|--|
| Project: | Former PSC Site | Start Date: | 12/11/06 | |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/15/06 | |
| Logged By: | Nathan Parker | Total Depth: | 102 ft | |
| Location Code: | RIMW-13 | Abandonment: | well installed | |
| Location: | Rock Hill, South Carolina | Latitude: | | |
| Driller: | Miller Drilling Co. | Longitude: | | |
| Method: | Hollow Stem Auger with split spoon to 35' then Air Drilled to completion | | | |

**RIMW- 13 Well
as built**

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time | |
|------------|---------------------|------------|--------------------------|-------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 47 | | | | | | <p style="font-size: small; text-align: center;"> The diagram shows a vertical well casing. From top to bottom, it consists of: <ul style="list-style-type: none"> Grout Bentonite Seal Filter Sand 2" PVC Screen Filter Sand Bentonite Seal Grout The 2" PVC pipe is shown as a central vertical element within the casing. </p> |
| 48 | | | | | | |
| 49 | | | | | | |
| 50 | | | | | | |
| 51 | | | | | | |
| 52 | | | | | | |
| 53 | | | | | | |
| 54 | | | | | | |
| 55 | | | | | | |
| 56 | | | | | | |
| 57 | | | | | | |
| 58 | | | | | | |
| 59 | | | | | | |
| 60 | | | | | | |
| 61 | | | | | | |
| 62 | | | | | | |
| 63 | | | | | | |
| 64 | | | | | | |
| 65 | | | | | | |
| 66 | | | | | | |
| 67 | | | | | | |
| 68 | | | | | | |
| 69 | | | | | | |
| 70 | | | | | | |
| 71 | | | | | | |
| 72 | | | | | | |
| 73 | | | | | | |
| 74 | Cuttings from Auger | N/A | N/A, due to Air Drilling | N/A | N/A | |
| 75 | | | | | | |
| 76 | | | | | | |
| 77 | | | | | | |
| 78 | | | | | | |
| 79 | | | | | | |
| 80 | | | | | | |
| 81 | | | | | | |
| 82 | | | | | | |
| 83 | | | | | | |
| 84 | | | | | | |
| 85 | | | | | | |
| 86 | | | | | | |
| 87 | | | | | | |
| 88 | | | | | | |
| 89 | | | | | | |
| 90 | | | | | | |
| 91 | | | | | | |
| 92 | | | | | | |

Boring Log

| <u>Project:</u> | | <u>Former PSC Site</u> | | <u>Start Date:</u> | | <u>12/11/06</u> | | RIMW- 13 Well as built | |
|-----------------------|----------|---------------------------------------------------------------------------------|--------------------|---------------------|-------------------------|---------------------------|--|-----------------------------------|--|
| <u>Project No.:</u> | | <u>20958-50105-TSK6.PHASE2</u> | | <u>End Date:</u> | | <u>12/15/06</u> | | | |
| <u>Logged By:</u> | | <u>Nathan Parker</u> | | <u>Total Depth:</u> | | <u>102 ft</u> | | | |
| <u>Location Code:</u> | | <u>RIMW-13</u> | | <u>Abandonment:</u> | | <u>well installed</u> | | | |
| <u>Location:</u> | | <u>Rock Hill, South Carolina</u> | | <u>Latitude</u> | | | | | |
| <u>Driller:</u> | | <u>Miller Drilling Co.</u> | | <u>Longitude:</u> | | | | | |
| <u>Method:</u> | | <u>Hollow Stem Auger with split spoon to 35' then Air Drilled to completion</u> | | | | | | | |
| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time | Bentonite Plugback | | | |
| 93 | | | | | | | | | |
| 94 | | | | | | | | | |
| 95 | | | | | | | | | |
| 96 | | | | | | | | | |
| 97 | | | | | | | | | |
| 98 | | | | | | | | | |
| 99 | | | | | | | | | |
| 100 | | | | | | | | | |
| 101 | | | | | | | | | |
| 102 | | | | | | | | | |

Boring Log

| | | | |
|----------------|--------------------------------------------------------------------------|--------------|----------------|
| Project: | Former PSC Site | Start Date: | 12/8/06 |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/14/06 |
| Logged By: | Nathan Parker | Total Depth: | 86.5 ft |
| Location Code: | RIMW-14 | Abandonment: | well installed |
| Location: | Rock Hill, South Carolina | Latitude: | |
| Driller: | Miller Drilling Co. | Longitude: | |
| Method: | Hollow Stem Auger with split spoon to 43' then Air Drilled to completion | | |

**RIMW- 14 Well
as built**

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time | | | | | |
|------------|---------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------|-----------------|-------|-------------|-------|-----------------|
| 1 | 24" | 4-9-8-5 | SAND, clayey, orangish brown with stringers of pale greenish grey (top 18"), CLAY, silty, mottled orangish and reddish brown (bottom 6") | 0.7 | N/A | 6" Steel Casing | Grout | 2" PVC pipe | Grout | 6" Steel Casing |
| 2 | | | | | | | | | | |
| 3 | 12" | 6-10-13-15 | CLAY, silty, mottled orangish and reddish brown | 0.7 | | | | | | |
| 4 | | | | | | | | | | |
| 5 | 24" | 12-16-16-11 | CLAY, sandy, green and grey, high plasticity | 0.7 | | | | | | |
| 6 | | | | | | | | | | |
| 7 | 24" | 11-19-11-20 | CLAY, silty, greenish grey with white specs, non-cohesive | 0.7 | | | | | | |
| 8 | | | | | | | | | | |
| 9 | 24" | 25-40-43-23 | SILT, clayey, yellowish brown with white and black specs, dry | 0.7 | | | | | | |
| 10 | | | | | | | | | | |
| 11 | 24" | 4-4-9-11 | SILT, clayey, pink(main) white, black and green specs, dry | 0.9 | | | | | | |
| 12 | | | | | | | | | | |
| 13 | 24" | 4-8-10-14 | SILT, greenish grey with white specs, dry, sparolite | 0.7 | | | | | | |
| 14 | | | | | | | | | | |
| 15 | 24" | 8-11-14-18 | | | | | | | | |
| 16 | | | | | | | | | | |
| 17 | 24" | 6-10-18-17 | | 0.7 | | | | | | |
| 18 | | | | | | | | | | |
| 19 | 24" | 11-8-15-13 | SILT, greenish grey with white specs, moist, sparolite | 0.7 | | | | | | |
| 20 | | | | | | | | | | |
| 21 | 18" | 5-6-4-8 | SAND, silty, lt orangish brown, moist, sparolite | 0.7 | | | | | | |
| 22 | | | | | | | | | | |
| 23 | 24" | 4-6-11-19 | SAND, silty, greenish grey with white specs, saprolite | 0.6 | | | | | | |
| 24 | | | | | | | | | | |
| 25 | 24" | 4-12-20-31 | | 0.6 | | | | | | |
| 26 | | | | | | | | | | |
| 27 | 0 | 48-R | N/A | N/A | | | | | | |
| 28 | | | | | | | | | | |
| 29 | Cuttings from Auger | N/A | SILT, greenish grey, saprolite, moist | 0.6 | | | | | | |
| 30 | | | | | | | | | | |
| 31 | | | | 0.4 | | | | | | |
| 32 | | | | | | | | | | |
| 33 | | | | SILT, greenish brown, saprolite, wet | | | | | | |
| 34 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 36 | | | | | | | | | | |
| 37 | | | | N/A | | | | | | |
| 38 | | | | | | | | | | |
| 39 | | | | | | | | | | |
| 40 | | | | | | | | | | |
| 41 | | SAND, silty, some weather rock fragments (gabbro), saprolite, wet | | | | | | | | |
| 42 | | | | | | | | | | |
| 43 | | | | | | | | | | |
| 44 | | | | | | | | | | |
| 45 | | N/A, due to Air Drilling | | | | | | | | |
| 46 | | | | | | | | | | |

Boring Log

| | | | |
|----------------|--------------------------------------------------------------------------|--------------|----------------|
| Project: | Former PSC Site | Start Date: | 12/8/06 |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/14/06 |
| Logged By: | Nathan Parker | Total Depth: | 86.5 ft |
| Location Code: | RIMW-14 | Abandonment: | well installed |
| Location: | Rock Hill, South Carolina | Latitude: | |
| Driller: | Miller Drilling Co. | Longitude: | |
| Method: | Hollow Stem Auger with split spoon to 43' then Air Drilled to completion | | |

**RIMW- 14 Well
as built**

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |
|------------|----------|------------|--------------------|-------------|-------------------------|
| 47 | | | | | |
| 48 | | | | | |
| 49 | | | | | |
| 50 | | | | | |
| 51 | | | | | |
| 52 | | | | | |
| 53 | | | | | |
| 54 | | | | | |
| 55 | | | | | |
| 56 | | | | | |
| 57 | | | | | |
| 58 | | | | | |
| 59 | | | | | |
| 60 | | | | | |
| 61 | | | | | |
| 62 | | | | | |
| 63 | | | | | |
| 64 | | | | | |
| 65 | | | | | |
| 66 | | | | | |
| 67 | | | | | |
| 68 | | | | | |
| 69 | | | | | |
| 70 | | | | | |
| 71 | | | | | |
| 72 | | | | | |
| 73 | | | | | |
| 74 | | | | | |
| 75 | | | | | |
| 76 | | | | | |
| 77 | | | | | |
| 78 | | | | | |
| 79 | | | | | |
| 80 | | | | | |
| 81 | | | | | |
| 82 | | | | | |
| 83 | | | | | |
| 84 | | | | | |
| 85 | | | | | |
| 86.5 | | | | | |

Cuttings from Auger

N/A

N/A, due to Air Drilling

N/A

N/A

Bentonite Plugback

Boring Log

| | | | |
|----------------|------------------------------------|--------------|----------------|
| Project: | Former PSC Site | Start Date: | 12/7/06 |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/20/06 |
| Logged By: | Nathan Parker | Total Depth: | 102.5 ft |
| Location Code: | RIMW-15 | Abandonment: | well installed |
| Location: | Rock Hill, South Carolina | Latitude: | |
| Driller: | Miller Drilling Co. | Longitude: | |
| Method: | Hollow Stem Auger with split spoon | | |

**RIMW- 15 Well
as built**

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time | |
|------------|--------------------------------------------|-------------|------------------------------------------------------------------------------------------------------|-------------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | 18" | - | GRAVEL, sandy, fine, grey to lt brown | 3.9 | | <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; width: 10px; height: 100%;"></div> <div style="border: 1px solid black; width: 10px; height: 100%; text-align: center;">Grout</div> <div style="border: 1px solid black; width: 10px; height: 100%; text-align: center;">2" PVC pipe</div> <div style="border: 1px solid black; width: 10px; height: 100%; text-align: center;">Grout</div> <div style="border: 1px solid black; width: 10px; height: 100%;"></div> </div> |
| 2 | | | CLAY, silty, orangish brown, odor | 12.9 | | |
| 3 | 24" | - | CLAY, silty, orangish brown, odor | 63 | | |
| 4 | | | | | | |
| 5 | 0 | - | N/A | N/A | | |
| 6 | | | | | | |
| 7 | 24" | - | CLAY, orangish brown, soft | 17.8 | | |
| 8 | | | CLAY, silty, pale greenish grey | 634 | | |
| 9 | 24" | 4-8-8-9 | SILT, sandy, orangish brown | 354 | | |
| 10 | | | | | | |
| 11 | 24" | 4-6-8-9 | SILT, sandy, yellowish brown, odor | 704 | | |
| 12 | | | | | | |
| 13 | 24" | 6-12-16-19 | SILT, sandy, mottled orangish brown and geenish grey | 35 | | |
| 14 | | | | | | |
| 15 | 24" | 6-15-21-36 | SILT, sandy, greenish grey | 540 | | |
| 16 | | | | | | |
| 17 | 24" | 14-30-48-65 | CLAY, sandy, redish orange | 56 | | |
| 18 | | | | | | |
| 19 | 18" | 27-50-R | SAND, course grain minerals, feldspar (main), mottled black grey and greenish grey, moist, saprolite | 30 | | |
| 20 | | | | | | |
| 21 | Cuttings from Auger | N/A | SILT, sandy, grey to greenish grey, moist, saprolite | N/A | | |
| 22 | | | | | | |
| 23 | | | | | | |
| 24 | | | | | | |
| 25 | | | | | | |
| 26 | | | | | | |
| 27 | | | | | | |
| 28 | | | | | | |
| 29 | | | | | | |
| 30 | | | | | | |
| 31 | | | | | | |
| 32 | | | | | | |
| 33 | | | | | | |
| 34 | | | | | | |
| 35 | | | | | | |
| 36 | SILT, sandy, greenish grey, wet, saprolite | N/A | SILT, sandy, greenish grey, wet, saprolite | N/A | | |
| 37 | | | | | | |
| 38 | | | | | | |
| 39 | | | | | | |
| 40 | | | | | | |
| 41 | | | | | | |
| 42 | | | | | | |
| 43 | | | | | | |
| 44 | | | | | | |
| 45 | | | | | | |
| 46 | | | | | | |

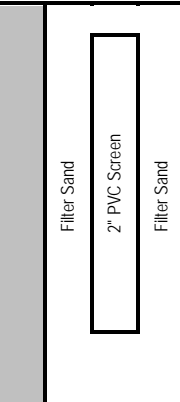
Boring Log

| | | | |
|----------------|------------------------------------|--------------|----------------|
| Project: | Former PSC Site | Start Date: | 12/7/06 |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/20/06 |
| Logged By: | Nathan Parker | Total Depth: | 102.5 ft |
| Location Code: | RIMW-15 | Abandonment: | well installed |
| Location: | Rock Hill, South Carolina | Latitude: | |
| Driller: | Miller Drilling Co. | Longitude: | |
| Method: | Hollow Stem Auger with split spoon | | |

**RIMW- 15 Well
as built**

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time | | | | |
|------------|---------------------|------------|--------------------------------------------|-------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| 47 | | | | | | <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;">Grout</div> <div style="border: 1px solid black; padding: 5px;">2" PVC pipe</div> <div style="border: 1px solid black; padding: 5px;">Grout</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="border: 1px solid black; padding: 5px;">Bentonite Seal</div> <div style="border: 1px solid black; padding: 5px;">Bentonite Seal</div> </div> | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | | | | | | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | | | | | | | | |
| 56 | | | | | | | | | |
| 57 | | | | | | | | | |
| 58 | | | | | | | | | |
| 59 | | | | | | | | | |
| 60 | | | | | | | | | |
| 61 | | | | | | | | | |
| 62 | | | | | | | | | |
| 63 | | | | | | | | | |
| 64 | | | | | | | | | |
| 65 | | | | | | | | | |
| 66 | | | | | | | | | |
| 67 | | | | | | | | | |
| 68 | | | | | | | | | |
| 69 | | | | | | | | | |
| 70 | | | | | | | | | |
| 71 | | | | | | | | | |
| 72 | | | | | | | | | |
| 73 | | | | | | | | | |
| 74 | Cuttings from Auger | | | | | | | | |
| 75 | | N/A | SILT, sandy, greenish grey, wet, saprolite | N/A | N/A | | | | |
| 76 | | | | | | | | | |
| 77 | | | | | | | | | |
| 78 | | | | | | | | | |
| 79 | | | | | | | | | |
| 80 | | | | | | | | | |
| 81 | | | | | | | | | |
| 82 | | | | | | | | | |
| 83 | | | | | | | | | |
| 84 | | | | | | | | | |
| 85 | | | | | | | | | |
| 86 | | | | | | | | | |
| 87 | | | | | | | | | |
| 88 | | | | | | | | | |
| 89 | | | | | | | | | |

Boring Log

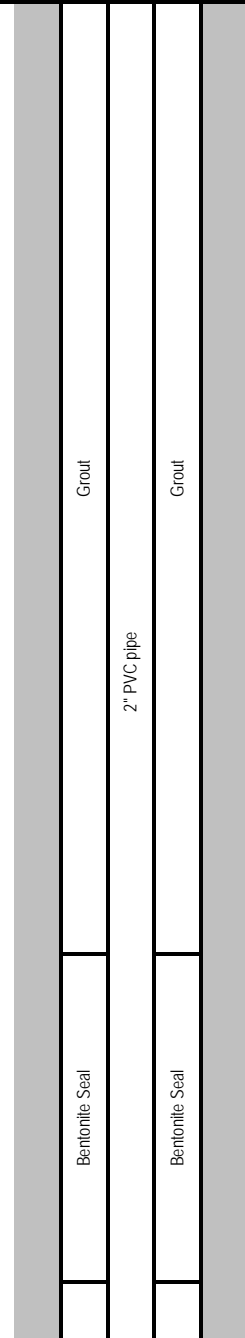
| <u>Project:</u> | | <u>Former PSC Site</u> | | <u>Start Date:</u> | | <u>12/7/06</u> | | RIMW- 15 Well as built | |
|-----------------------|----------|-------------------------------------------|--------------------|---------------------|-------------------------|-------------------------------------------------------------------------------------|--|-----------------------------------|--|
| <u>Project No.:</u> | | <u>20958-50105-TSK6.PHASE2</u> | | <u>End Date:</u> | | <u>12/20/06</u> | | | |
| <u>Logged By:</u> | | <u>Nathan Parker</u> | | <u>Total Depth:</u> | | <u>102.5 ft</u> | | | |
| <u>Location Code:</u> | | <u>RIMW-15</u> | | <u>Abandonment:</u> | | <u>well installed</u> | | | |
| <u>Location:</u> | | <u>Rock Hill, South Carolina</u> | | <u>Latitude</u> | | | | | |
| <u>Driller:</u> | | <u>Miller Drilling Co.</u> | | <u>Longitude:</u> | | | | | |
| <u>Method:</u> | | <u>Hollow Stem Auger with split spoon</u> | | | | | | | |
| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |  | | | |
| 90 | | | | | | | | | |
| 91 | | | | | | | | | |
| 92 | | | | | | | | | |
| 93 | | | | | | | | | |
| 94 | | | | | | | | | |
| 95 | | | | | | | | | |
| 96 | | | | | | | | | |
| 97 | | | | | | | | | |
| 98 | | | | | | | | | |
| 99 | | | | | | | | | |
| 100 | | | | | | | | | |
| 101 | | | | | | | | | |
| 102.5 | | | | | | | | | |

Boring Log

| | | | |
|----------------|-------------------------------------------------------------------|--------------|----------------|
| Project: | Former PSC Site | Start Date: | 12/20/06 |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/20/06 |
| Logged By: | Nathan Parker | Total Depth: | 56 ft |
| Location Code: | RIMW-16 | Abandonment: | well installed |
| Location: | Rock Hill, South Carolina | Latitude: | |
| Driller: | Miller Drilling Co. | Longitude: | |
| Method: | Hollow Stem Auger with split spoon & corer, reamed with Air Drill | | |

**RIMW- 16 Well
as built**

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |
|------------|----------|------------|------------------------|-------------|-------------------------|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | | | | |
| 20 | | | | | |
| 21 | | | | | |
| 22 | | | | | |
| 23 | | | | | |
| 24 | | | | | |
| 25 | | | | | |
| 26 | | | | | |
| 27 | | | | | |
| 28 | | | | | |
| 29 | | | N/A compare to RISB-?? | | |
| 30 | | | | | |
| 31 | | | | | |
| 32 | | | | | |
| 33 | | | | | |
| 34 | | | | | |
| 35 | | | | | |
| 36 | | | | | |
| 37 | | | | | |
| 38 | | | | | |
| 39 | | | | | |
| 40 | | | | | |
| 41 | | | | | |
| 42 | | | | | |
| 43 | | | | | |
| 44 | | | | | |
| 45 | | | | | |



Boring Log

| <u>Project:</u> | | <u>Former PSC Site</u> | | <u>Start Date:</u> | | <u>12/20/06</u> | | RIMW- 16 Well as built | |
|-----------------------|----------|------------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-----------------------|--|-----------------------------------|--|
| <u>Project No.:</u> | | <u>20958-50105-TSK6.PHASE2</u> | | <u>End Date:</u> | | <u>12/20/06</u> | | | |
| <u>Logged By:</u> | | <u>Nathan Parker</u> | | <u>Total Depth:</u> | | <u>56 ft</u> | | | |
| <u>Location Code:</u> | | <u>RIMW-16</u> | | <u>Abandonment:</u> | | <u>well installed</u> | | | |
| <u>Location:</u> | | <u>Rock Hill, South Carolina</u> | | <u>Latitude</u> | | | | | |
| <u>Driller:</u> | | <u>Miller Drilling Co.</u> | | <u>Longitude:</u> | | | | | |
| <u>Method:</u> | | <u>Hollow Stem Auger with split spoon & corer, reamed with Air Drill</u> | | | | | | | |
| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time | | | | |
| 46 | | | | | | | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | | | | | | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | | | | | | | | |
| 56 | | | | | | | | | |

Filter Sand

2" PVC Screen

Filter Sand

Boring Log

| Project: | | <u>Former PSC Site</u> | | Start Date: | <u>12/8/06</u> | RIMW- 18 Well as built | | | | |
|-----------------------|---------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------|-----------------------------------|-------|-------------|-------|-----------------|
| Project No.: | | <u>20958-50105-TSK6.PHASE2</u> | | End Date: | <u>12/17/06</u> | | | | | |
| Logged By: | | <u>Nathan Parker</u> | | Total Depth: | <u>80.5 ft</u> | | | | | |
| Location Code: | | <u>RIMW-18</u> | | Abandonment: | <u>well installed</u> | | | | | |
| Location: | | <u>Rock Hill, South Carolina</u> | | Latitude: | | | | | | |
| Driller: | | <u>Miller Drilling Co.</u> | | Longitude: | | | | | | |
| Method: | | <u>Hollow Stem Auger with split spoon & corer, reamed with Air Drill</u> | | | | | | | | |
| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time | | | | | |
| 1 | 18" | 18-24-9-10 | GRAVEL, silty-sand matrix, chalky grey clasts, orangish brown matrix (top12"), SILT, sandy, dark brown (bottom 6") | 0 | N/A | 6" Steel Casing | Grout | 2" PVC pipe | Grout | 6" Steel Casing |
| 2 | | | | | | | | | | |
| 3 | 6" | 4-4-10-30 | CLAY, greenish brown, plastic | 0.9 | | | | | | |
| 4 | | | | | | | | | | |
| 5 | 24" | 30-21-16-17 | CLAY, silty, greenish grey, partial rock texture | 0.8 | | | | | | |
| 6 | | | | | | | | | | |
| 7 | 24" | 15-18-21-23 | SILT, greenish grey, greener with depth, yellow staining, saprolite | 0.2 | | | | | | |
| 8 | | | | | | | | | | |
| 9 | 18" | 21-33-44-46 | | 1.8 | | | | | | |
| 10 | | | | | | | | | | |
| 11 | 24" | 8-25-27-33 | SAND, silty, greenish grey, moist, saprolite | 0 | | | | | | |
| 12 | | | | | | | | | | |
| 13 | 18" | 11-24-20-35 | | 0.7 | | | | | | |
| 14 | | | | | | | | | | |
| 15 | 20" | 10-13-20-25 | SILT, sandy, yellowish brown, saprolite | 0.3 | | | | | | |
| 16 | | | | | | | | | | |
| 17 | 24" | 8-10-20-25 | SAND, silty, yellowish brown, saprolite | 0.4 | | | | | | |
| 18 | | | | | | | | | | |
| 19 | 24" | 11-15-25-21 | | | | | | | | |
| 20 | | | | | | | | | | |
| 21 | 24" | 17-15-20-21 | | 0.4 | | | | | | |
| 22 | | | | | | | | | | |
| 23 | 18" | 11-30-29-32 | SAND, orangish brown, saprolite | 0.8 | | | | | | |
| 24 | | | | | | | | | | |
| 25 | 12" | 17-20-22-50 | SAND, orangish brown, wet, saprolite | 0.2 | | | | | | |
| 26 | | | | | | | | | | |
| 27 | 24" | 43-40-44-45 | SAND, silty, more silty with depth orangish brown with green tint, wet, saprolite | 0 | | | | | | |
| 28 | | | | | | | | | | |
| 29 | 12" | 40-47-R | | 0 | | | | | | |
| 30 | | | | | | | | | | |
| 31 | Cuttings from Auger | N/A | SILT, sandy, greenish grey to brownish grey, saprolite | N/A | | | | | | |
| 32 | | | | | | | | | | |
| 33 | | | | | | | | | | |
| 34 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 36 | | | | | | | | | | |
| 37 | | | | | | | | | | |
| 38 | | | | | | | | | | |

Boring Log

| | | | |
|----------------|-------------------------------------------------------------------|--------------|----------------|
| Project: | Former PSC Site | Start Date: | 12/8/06 |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/17/06 |
| Logged By: | Nathan Parker | Total Depth: | 80.5 ft |
| Location Code: | RIMW-18 | Abandonment: | well installed |
| Location: | Rock Hill, South Carolina | Latitude: | |
| Driller: | Miller Drilling Co. | Longitude: | |
| Method: | Hollow Stem Auger with split spoon & corer, reamed with Air Drill | | |

**RIMW- 18 Well
as built**

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time | |
|------------|---------------------|------------|--------------------------|-------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 39 | Cuttings from Auger | | PARTIALLY WEATHERED ROCK | | | <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: 8px;">6" Steel Casing</div> <div style="border: 1px solid black; padding: 2px; font-size: 8px;">Bentonite Seal</div> <div style="border: 1px solid black; padding: 2px; font-size: 8px;">2" PVC pipe</div> <div style="border: 1px solid black; padding: 2px; font-size: 8px;">Bentonite Seal</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: 8px;">6" Steel Casing</div> </div> |
| 40 | | | | | | |
| 41 | | | | | | |
| 42 | | | | | | |
| 43 | | | | | | |
| 44 | | | | | | |
| 45 | | | | | | |
| 46 | | | | | | |
| 47 | | | | | | |
| 48 | | | | | | |
| 49 | Core | N/A | COMPETENT ROCK, Gabbro | | | <div style="border: 1px solid black; padding: 5px; font-size: 10px; text-align: center;">Bentonite Plugback</div> |
| 50 | | | | | | |
| 51 | | | | | | |
| 52 | | | | | | |
| 53 | | | | | | |
| 54 | | | | | | |
| 55 | | | | | | |
| 56 | | | | | | |
| 57 | | | | | | |
| 58 | | | | | | |
| 59 | | | | | | |
| 60 | | | | | | |
| 61 | | | | | | |
| 62 | | | | | | |
| 63 | | | | | | |
| 64 | | | | | | |
| 65 | | | | | | |
| 66 | | | | | | |
| 67 | | | | | | |
| 68 | | | | | | |
| 69 | | | | | | |
| 70 | | | | | | |
| 71 | | | | | | |
| 72 | | | | | | |
| 73 | | | | | | |
| 74 | | | | | | |
| 75 | | | | | | |
| 76 | | | | | | |
| 77 | | | | | | |
| 78 | | | | | | |
| 79 | | | | | | |
| 80 | | | | | | |
| 81 | | | | | | |

Boring Log

| Project: | | Former PSC Site | | Start Date: | | 12/12/06 | |
|----------------|---------------------|---------------------------------------------------------------------------------|----------------------------------------------------------------------|--------------|-------------------------|---------------------------|--|
| Project No.: | | 20958-50105-TSK6.PHASE2 | | End Date: | | 12/19/06 | |
| Logged By: | | Nathan Parker | | Total Depth: | | 95 ft | |
| Location Code: | | RIMW-19 | | Abandonment: | | well installed | |
| Location: | | Rock Hill, South Carolina | | Latitude: | | | |
| Driller: | | Miller Drilling Co. | | Longitude: | | | |
| Method: | | Hollow Stem Auger with split spoon & corer, reamed and completed with Air Drill | | | | | |
| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time | RIMW- 19 Well as built | |
| 1 | 24" | 35-33-19-10 | GRAVEL, grey to lt brown | 0 | N/A | | |
| 2 | | | | | | | |
| 3 | 18" | 10-10-12-35 | CLAY, silty, orangish red, plastic | 0 | | | |
| 4 | | | | | | | |
| 5 | 24" | 17-8-16-11 | SILT, clayey, orangish red to brown, dry | 0 | | | |
| 6 | | | | | | | |
| 7 | 18" | 17-8-16-11 | SILT, orangish brown with black and white specs | 0 | | | |
| 8 | | | | | | | |
| 9 | 24" | 17-30-49-46 | | 3.8 | 845 | | |
| 10 | | | | | | | |
| 11 | 24" | 4-7-9-10 | CLAY, silty, orangish brown with black specs | 3.3 | N/A | | |
| 12 | | | | | | | |
| 13 | 24" | 5-5-9-10 | SILT, clayey, lt orangish brown, saprolite | 1.6 | 915 | | |
| 14 | | | | | | | |
| 15 | 24" | 6-8-13-15 | SILT, sandy, lt greenish brown, saprolite | 0.3 | N/A | | |
| 16 | | | | | | | |
| 17 | 12" | 9-19-26-50 | SILT, sandy, lt brown, saprolite | 1.7 | 935 | | |
| 18 | | | | | | | |
| 19 | 12" | 22-50 | SAND, black, orange, white, green weathered minerals, wet, saprolite | 0 | N/A | | |
| 20 | | | | | | | |
| 21 | Cuttings from Auger | N/A | | 3.7 | | | |
| 22 | | | | | | | |
| 23 | | | | | | | |
| 24 | | | | | | | |
| 25 | | | | | | | |
| 26 | | | | | | | |
| 27 | | | | | | | |
| 28 | | | | 4.5 | | | |
| 29 | | | | | | | |
| 30 | | | | | | | |
| 31 | | | | | | | |
| 32 | | | | | | | |
| 33 | 2.5 | | | | | | |
| 34 | | | | | | | |
| 35 | | | | | | | |
| 36 | | | | | | | |
| 37 | | | | | | | |
| 38 | 5.9 | | | | | | |
| 39 | | | | | | | |
| 40 | | | | | | | |
| 41 | | | | | | | |
| 42 | | | | | | | |
| 43 | 8.3 | | | | | | |
| 44 | | | | | | | |
| 45 | | | | | | | |
| 46 | 4.1 | | | | | | |

Boring Log

| | | | |
|----------------|---------------------------------------------------------------------------------|--------------|----------------|
| Project: | Former PSC Site | Start Date: | 12/12/06 |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/19/06 |
| Logged By: | Nathan Parker | Total Depth: | 95 ft |
| Location Code: | RIMW-19 | Abandonment: | well installed |
| Location: | Rock Hill, South Carolina | Latitude: | |
| Driller: | Miller Drilling Co. | Longitude: | |
| Method: | Hollow Stem Auger with split spoon & corer, reamed and completed with Air Drill | | |

**RIMW- 19 Well
as built**

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time | | | | |
|------------|----------|------------|-------------------------------------|-------------|-------------------------|--|--|--|--|
| 47 | | | SILT, sandy (fine), dark brown, wet | 4.1 | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | | | | | | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | | | | | | | | |
| 56 | | | | | | | | | |
| 57 | | | N/A due to Air Drilling | N/A | | | | | |
| 58 | | | | | | | | | |
| 59 | | | | | | | | | |
| 60 | | | | | | | | | |
| 61 | | | | | | | | | |
| 62 | | | | | | | | | |
| 63 | | | | | | | | | |
| 64 | | | | | | | | | |
| 65 | | | | | | | | | |
| 66 | | | | | | | | | |
| 67 | | | | | | | | | |
| 68 | | | | | | | | | |
| 69 | | | | | | | | | |
| 70 | | | | | | | | | |
| 71 | | | | | | | | | |
| 72 | | | | | | | | | |
| 73 | | | | | | | | | |
| 74 | | | | | | | | | |
| 75 | | | | | | | | | |
| 76 | | | | | | | | | |
| 77 | | | | | | | | | |
| 78 | | | | | | | | | |
| 79 | | | | | | | | | |
| 80 | | | | | | | | | |
| 81 | | | | | | | | | |

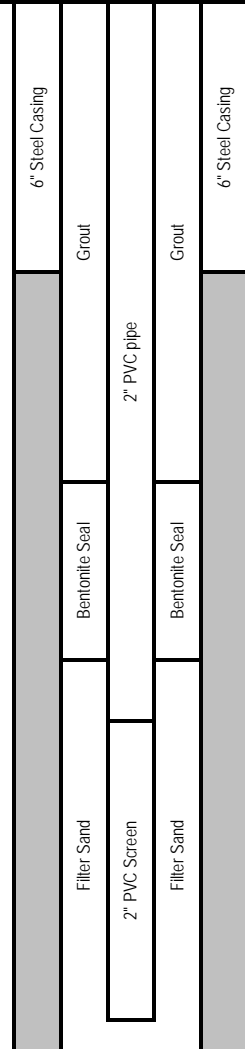
Cuttings from Auger

N/A

N/A due to Air Drilling

N/A

N/A



Boring Log

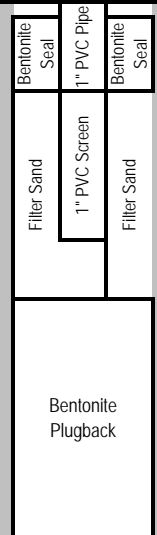
| <u>Project:</u> | | <u>Former PSC Site</u> | | <u>Start Date:</u> | | <u>12/12/06</u> | | RIMW- 19 Well as built |
|-----------------------|----------|---------------------------------------------------------------------------------------------|--------------------|---------------------|-------------------------|---------------------------|--|-----------------------------------|
| <u>Project No.:</u> | | <u>20958-50105-TSK6.PHASE2</u> | | <u>End Date:</u> | | <u>12/19/06</u> | | |
| <u>Logged By:</u> | | <u>Nathan Parker</u> | | <u>Total Depth:</u> | | <u>95 ft</u> | | |
| <u>Location Code:</u> | | <u>RIMW-19</u> | | <u>Abandonment:</u> | | <u>well installed</u> | | |
| <u>Location:</u> | | <u>Rock Hill, South Carolina</u> | | <u>Latitude</u> | | | | |
| <u>Driller:</u> | | <u>Miller Drilling Co.</u> | | <u>Longitude:</u> | | | | |
| <u>Method:</u> | | <u>Hollow Stem Auger with split spoon & corer, reamed and completed with Air Drill.</u> | | | | | | |
| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time | Bentonite Plugback | | |
| 82 | | | | | | | | |
| 83 | | | | | | | | |
| 84 | | | | | | | | |
| 85 | | | | | | | | |
| 86 | | | | | | | | |
| 87 | | | | | | | | |
| 88 | | | | | | | | |
| 89 | | | | | | | | |
| 90 | | | | | | | | |
| 91 | | | | | | | | |
| 92 | | | | | | | | |
| 93 | | | | | | | | |
| 94 | | | | | | | | |
| 95 | | | | | | | | |

Boring Log

| | | | |
|----------------|------------------------------------|--------------|----------------|
| Project: | Former PSC Site | Start Date: | 12/20/06 |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/20/06 |
| Logged By: | Nathan Parker | Total Depth: | 18 ft |
| Location Code: | RIPZ-1 | Abandonment: | well installed |
| Location: | Rock Hill, South Carolina | Latitude: | |
| Driller: | Miller Drilling Co. | Longitude: | |
| Method: | Hollow Stem Auger with split spoon | | |

RIPZ- 1 Well as built

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |
|------------|----------|------------|--------------------|-------------|-------------------------|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | N/A | | |
| 11 | | | | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |



Boring Log

| | | | | |
|----------------|---------------------------|--------------|----------------|--|
| Project: | Former PSC Site | Start Date: | | |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/19/06 | |
| Logged By: | Mark Walters | Total Depth: | 78 ft | |
| Location Code: | RIPZ-2 | Abandonment: | well installed | |
| Location: | Rock Hill, South Carolina | Latitude: | | |
| Driller: | Miller Drilling Co. | Longitude: | | |
| Method: | Air Drill | | | |

RIPZ- 2 Well as built

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time | | | | |
|------------|----------|------------|------------------------------|-------------|-------------------------|--|--|--|--|
| 1 | | | | | | | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | Soil Lithology not collected | | | | | | |
| 16 | | | Top of Bedrock - 34' bls | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | | | | | | | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |
| 25 | | | | | | | | | |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | | | | | | | | |
| 31 | | | | | | | | | |
| 32 | | | | | | | | | |
| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | | | | | | | | |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
| 38 | | | | | | | | | |

4" PVC Casing
Grout
1" PVC Riser
Grout
4" PVC Casing

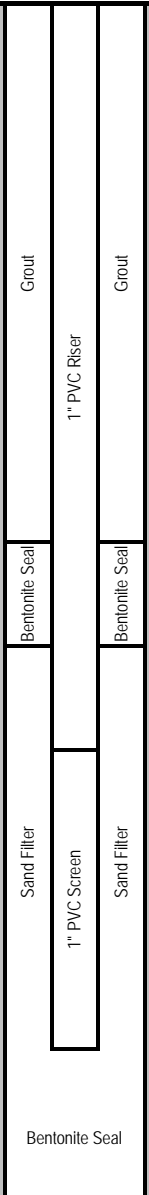
Boring Log

| | | | |
|----------------|---------------------------|--------------|----------------|
| Project: | Former PSC Site | Start Date: | |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/19/06 |
| Logged By: | Mark Walters | Total Depth: | 78 ft |
| Location Code: | RIPZ-2 | Abandonment: | well installed |
| Location: | Rock Hill, South Carolina | Latitude: | |
| Driller: | Miller Drilling Co. | Longitude: | |
| Method: | Air Drill | | |

RIPZ- 2 Well as built

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time |
|------------|----------|------------|--------------------|-------------|-------------------------|
| 39 | | | | | |
| 40 | | | | | |
| 41 | | | | | |
| 42 | | | | | |
| 43 | | | | | |
| 44 | | | | | |
| 45 | | | | | |
| 46 | | | | | |
| 47 | | | | | |
| 48 | | | | | |
| 49 | | | | | |
| 50 | | | | | |
| 51 | | | | | |
| 52 | | | | | |
| 53 | | | | | |
| 54 | | | | | |
| 55 | | | | | |
| 56 | | | | | |
| 57 | | | | | |
| 58 | | | | | |
| 59 | | | | | |
| 60 | | | | | |
| 61 | | | | | |
| 62 | | | | | |
| 63 | | | | | |
| 64 | | | | | |
| 65 | | | | | |
| 66 | | | | | |
| 67 | | | | | |
| 68 | | | | | |
| 69 | | | | | |
| 70 | | | | | |
| 71 | | | | | |
| 72 | | | | | |
| 73 | | | | | |
| 74 | | | | | |
| 75 | | | | | |
| 76 | | | | | |
| 77 | | | | | |
| 78 | | | | | |

Soil Lithology not collected
Top of Bedrock - 34' bls



Boring Log

| | | | |
|----------------|--------------------------------------------------------------------------|--------------|----------------|
| Project: | Former PSC Site | Start Date: | 12/11/06 |
| Project No.: | 20958-50105-TSK6.PHASE2 | End Date: | 12/20/06 |
| Logged By: | Nathan Parker | Total Depth: | 102 ft |
| Location Code: | RIPZ-3 (formerly RIMW-17) | Abandonment: | well installed |
| Location: | Rock Hill, South Carolina | Latitude: | |
| Driller: | Miller Drilling Co. | Longitude: | |
| Method: | Hollow Stem Auger with split spoon to 32' then Air Drilled to completion | | |

RIPZ-3 Well as built

| Depth (ft) | Recovery | Blow Count | Sample Description | OVM Reading | Lab Sample Collect Time | | | | | | |
|------------|----------|-------------|---------------------------------------------------------------------------------------------------|-------------|-------------------------|-----|-----------------|-------|-------------|-------|-----------------|
| 1 | 21" | 7-5-5-7 | CLAY, sandy, reddish orange, poorly sorted, plastic, mottled with black | 0 | | N/A | 6" Steel Casing | Grout | 1" PVC pipe | Grout | 6" Steel Casing |
| 2 | | | | | | | | | | | |
| 3 | 24" | 5-10-17-? | CLAY, silty, reddish orange, some large clasts, plastic mottled with brown | 0 | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | 18" | 17-27-24-2 | CLAY, with sand, greenish brown, plastic, small clasts 0.5' layer of grey gravel | 0 | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | 24" | 10-22-25-31 | CLAY, sandy, greenish (olive) brown, plastic, organic material 7.5-8' | 0 | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | 24" | 20-25-27-34 | CLAY, silty, brown with orangish brown, mottling, odor, moist | 1 | | | | | | | |
| 10 | | | | | | | | | | | |
| 11 | 12" | 26-28-32-27 | Same as Above | 88 | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | 6" | 22-30-23-24 | CLAY, silty, brown, moist to wet | 26 | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | 24" | 1-1-5-? | SAND, grey, med-coarse, wet | 1 | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | 18" | 18-24-25-34 | SAPROLITE, green (80%) with black (20%), breaks to sandy silt, moist | 0 | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | 18" | 2-2-15-20 | Same as Above | 0 | | | | | | | |
| 20 | | | | | | | | | | | |
| 21 | | 7-31-47-R | SAPROLITE, green (80%) with pink (5%), black (15%), breaks to silty sand. Split spoon refusal. | 0 | | | | | | | |
| 22 | | | | | | | | | | | |
| 23 | | | | | | | | | | | |
| 24 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | | | Mud, greenish gray, w/ sandy clay. From cuttings (no split spoon) | | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 31 | | | | | | | | | | | |
| 32 | | | MUD, grey with bluish green hue, sandy silt HAS Refusal at 32' bls | | | | | | | | |
| 33 | | | | | | | | | | | |
| 34 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 36 | | | | | | | | | | | |
| 37 | | | | | | | | | | | |
| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |
| 41 | | | N/A, due to Air Drilling | | | | | | | | |
| 42 | | | | | | | | | | | |
| 43 | | | | | | | | | | | |
| 44 | | | | | | | | | | | |
| 45 | | | | | | | | | | | |
| 46 | | | | | | | | | | | |

Phase III Well Construction

Appendix B-2

Remedial Investigation Report

September 2008

Former PSC Site, Rock Hill, South Carolina

Soil Classification System

| Major Divisions | | | Descriptions | |
|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Coarse Grained Soils (More than 50% of material is LARGER than 200 sieve size) | Gravels (More than 50% of coarse fraction is LARGER than the No. 4 sieve size) | Clean Gravels (Little or no fines) | GW | Well graded gravels, gravel-sand mixtures, little or no fines |
| | | Gravels with fines | GP | Poorly graded gravels or gravel-sand mixtures, little or no fines |
| | | | GM | Silty gravels, gravel-sand- silt mixtures |
| | | Sands (More than 50% of coarse fraction is SMALLER than the No.4 sieve size) | Clean Sands (Little or no fines) | GC |
| | SW | | | Well graded sands, gravelly sands, little or no fines |
| | Sands with fines | | SP | Poorly graded sands or gravelly sands, little or no fines |
| | | | SM | Silty sands, sand-silt mixtures. |
| | Fine Grained Soils (More than 50% of material is SMALLER than 200 sieve size) | SILTS and CLAYS (liquid limit LESS than 50) | SC | Clayey sands, sand-clay mixtures. |
| ML | | | Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity | |
| CL | | | Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays | |
| SILTS and CLAYS (liquid limit GREATER than 50) | | OL | Organic silts and organic silty clays of low plasticity | |
| | | MH | Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts | |
| | | CH | Inorganic clays of high plasticity, fat clays | |
| | | OH | Organic clays of medium to high plasticity, organic silts | |
| HIGHLY ORGANIC SOILS | | | Pt | Peat and other highly organic soils |
| Rock Classifications | | | | |
| Weathering | | Abbreviation | Description | |
| Fresh | | VBR | Core pieces 1 - 3 inches | |
| Slightly Weathered | | BR | Core pieces 3 inches to 1 ft | |
| Weathered | | BL | Core 1 - 3 ft | |
| Severely Weathered | | M | Core sections more than 3 ft long | |

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------------|----------|---------------|-----------------------|
| Project: | Former PSC Site | Start Date: | 8/20/07 | | | |
| Project No.: | 20958-50105 | End Date: | 8/23/07 | | | |
| Logged By: | J. Hofer | Total Depth: | 133' | | | |
| Location Code: | RIMW-20 | Abandonment: | | | | |
| Location: | Rock Hill, South Carolina | Latitude | | | | |
| Driller: | Jimmy Hall: Boart-Longyear | Longitude: | | | | |
| Method: | Sonic | | | | | |
| Depth (ft) | Description of Materials | USCS/Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 1 | SAND with silt, brown loose, fine- very fine- | SM | 0 | 1 | 7/7 | RIMW-20 Well as built |
| 2 | SILT with fine sand, brown-yellow, brown, stiff, dry | ML | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | SAND, fine-medium with silt, medium density, grey green and yellow brown, moist SAPROLITE (biotite, quartz, feldspar, hornblende) (starts @ 7.5') | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |
| 13 | becomes dry | | | | | |
| 14 | | | | | | |
| 15 | | | | | | |
| 16 | | | | | | |
| 17 | | | | | | |
| 18 | becoming coarse dense | SP | | | | |
| 19 | | | | | | |
| 20 | | | | | | |
| 21 | SAPROLITE, sand, medium-coarse, white, black, green, slightly moist, (biotite, hornblende, feldspar) | SP | | | | |
| 22 | | | | | | |
| 23 | | | | | | |
| 24 | | | | | | |
| 25 | | | | | | |
| 26 | | | | | | |
| 27 | | | | | | |
| 28 | | | | | | |
| 29 | | | | | | |
| 30 | | | | | | |
| 31 | | | | | | |
| 32 | | | | | | |
| 33 | | | | | | |
| 34 | Grading to severely weathered rock (DIORITE), gravel with sand and silt | GP | | | | |
| 35 | | | | | | |
| 36 | | | | | | |
| 37 | | | | | | |
| 38 | | | | | | |
| 39 | | | | | | |
| 40 | | | | | | |

corina

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|---------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|--------------|---------------|-------------------------------------|
| Project: | | Former PSC Site | | Start Date: | | 8/20/07 |
| Project No.: | | 20958-50105 | | End Date: | | 8/23/07 |
| Logged By: | | J. Hofer | | Total Depth: | | 133' |
| Location Code: | | RIMW-20 | | Abandonment: | | |
| Location: | | Rock Hill, South Carolina | | Latitude | | |
| Driller: | | Jimmy Hall: Boart-Longyear | | Longitude: | | |
| Method: | | Sonic | | | | |
| Depth (ft) | Description of Materials | USCS/Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 41 | Weathered GRANODIORITE Gravel with sand | GP | | 5 | 2/10 | coring with water, fines washed out |
| 42 | | | | | | |
| 43 | | | | | | |
| 44 | | | | | | |
| 45 | | | | | | |
| 46 | | | | | | |
| 47 | | | | | | |
| 48 | | | | | | |
| 49 | | | | | | |
| 50 | | | | | | |
| 51 | Weathered DIORITE/GRANODIORITE, quartz, hornblende, feldspar, biotite, poss. garnet, (GRAVEL with sand) | GP/SP | | 7 | 1.5/10 | hard coring |
| 52 | | | | | | |
| 53 | | | | | | |
| 54 | | | | | | |
| 55 | | | | | | |
| 56 | | | | | | |
| 57 | | | | | | |
| 58 | | | | | | |
| 59 | | | | | | |
| 60 | | | | | | |
| 61 | No recovery, (sand?) | SP | | 8 | 0/10 | softer drilling |
| 62 | | | | | | |
| 63 | | | | | | |
| 64 | | | | | | |
| 65 | | | | | | |
| 66 | | | | | | |
| 67 | | | | | | |
| 68 | | | | | | |
| 69 | | | | | | |
| 70 | | | | | | |
| 71 | cored with water fines washed out | | | | | |
| 72 | | | | | | |
| 73 | | | | | | |
| 74 | | | | | | |
| 75 | | | | | | |
| 76 | | | | | | |
| 77 | | | | | | |
| 78 | | | | | | |
| 79 | | | | | | |
| 80 | | | | | | |
| 81 | | | | | | |

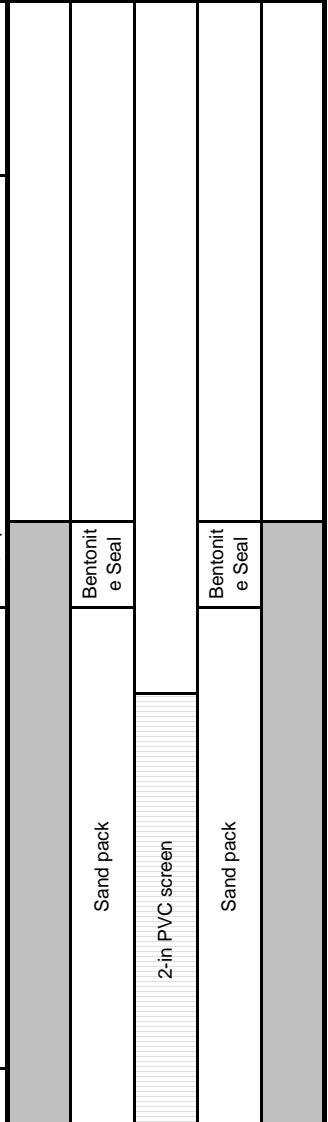
RIMW-20
Well as built

6-in threaded steel casing
 Grout
 2-in PVC casing
 Grout
 6-in threaded steel casing

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|--------------|---------------|-------------------------------|
| Project: | | Former PSC Site | | Start Date: | | 8/20/07 |
| Project No.: | | 20958-50105 | | End Date: | | 8/23/07 |
| Logged By: | | J. Hofer | | Total Depth: | | 133' |
| Location Code: | | RIMW-20 | | Abandonment: | | |
| Location: | | Rock Hill, South Carolina | | Latitude: | | |
| Driller: | | Jimmy Hall: Boart-Longyear | | Longitude: | | |
| Method: | | Sonic | | | | |
| Depth (ft) | Description of Materials | USCS/Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 82 | Weathered (Moderate-Severe) DIORITE/GRANODIORITE, appears to becoming more competent rock, (GRAVEL with sand) | GP/SP | NA | 9 | 2/10 | Stop 8/20/07 |
| 83 | | | | | | |
| 84 | | | | | | |
| 85 | | | | | | |
| 86 | | | | | | |
| 87 | | | | | | |
| 88 | | | | | | |
| 89 | GRANODIORITE, fresh-slightly weathered, hard quartz, feldspar, hornblende, trace biotite, trace possible garnet, broken (starts at 95.5') | BR | NA | 10 | 2.8/10 | Start 8/21/07 |
| 90 | | | | | | |
| 91 | | | | | | |
| 92 | | | | | | |
| 93 | | | | | | |
| 94 | | | | | | |
| 95 | | | | | | |
| 96 | | | | | | |
| 97 | | | | | | |
| 98 | | | | | | |
| 99 | GRANODIORITE, moderate weathering, Iron staining, laumonite filled frac | VBR | NA | 11 | 5/5 | TD-102'-10" hole 8/21/07 |
| 100 | | | | | | |
| 101 | | | | | | |
| 102 | | | | | | |
| 103 | | | | | | |
| 104 | | | | | | |
| 105 | | | | | | |
| 106 | | | | | | |
| 107 | | | | | | |
| 108 | | | | | | |
| 109 | becomes slightly weathered (at 104.75') | BR | NA | 12 | 5/5 | vertical fracture 105.5-107.1 |
| 110 | | | | | | |
| 111 | | | | | | |
| 112 | | | | | | |
| 113 | | | | | | |
| 114 | | | | | | |
| 115 | | | | | | |
| 116 | Apparent increase in Chlorite content | VBR | NA | 13 | 10/10 | vertical fracture 105.5-107.1 |
| 117 | | | | | | |
| 118 | | | | | | |
| 119 | | | | | | |
| 120 | | | | | | |
| 121 | | | | | | |
| 122 | | | | | | |
| 123 | Weathered zone with chlorite, feldspar and laumonite on fractured faces | VBR | NA | 14 | 10/10 | high-frac c 120.2-122.2 |
| 124 | | | | | | |
| 125 | | | | | | |
| 126 | | | | | | |
| 127 | | | | | | |
| 128 | | | | | | |
| 129 | | | | | | |

RIMW-20 Well as built



Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | | |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|--------------|---------------|-----------|--------------------|
| Project: | | Former PSC Site | | Start Date: | | 8/20/07 | |
| Project No.: | | 20958-50105 | | End Date: | | 8/23/07 | |
| Logged By: | | J. Hofer | | Total Depth: | | 133' | |
| Location Code: | | RIMW-20 | | Abandonment: | | | |
| Location: | | Rock Hill, South Carolina | | Latitude: | | | |
| Driller: | | Jimmy Hall: Boart-Longyear | | Longitude: | | | |
| Method: | | Sonic | | | | | |
| Depth (ft) | Description of Materials | USCS/Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks | |
| 121 | GABBRO, fresh, few laumontite filled fractures, lower chlorite, increased pyroxine/hornblende, chlorite zoning along fractured traces | BR | | 14 | 10/10 | 120.8 | Backfilled w/ sand |
| 122 | | | | | | high>frac | |
| 123 | | | | | | c 124.7- | |
| 124 | | | | | | 125.3 | |
| 125 | | | | | | | |
| 126 | | | | | | | |
| 127 | | | | | | | |
| 128 | Fractured zone with chlorite and Iron staining on fractured faces (at 27.2') | VBR | | 15 | 6/6 | | TD-133' |
| 129 | | BL | | | | | |
| 130 | | BR | | | | | |
| 131 | | | | | | | |
| 132 | | M | | | | | |
| 133 | | | | | | | |

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log - RIMW-21 | | | | | | | | | | | | | | | | | |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|----------|---------------|-------------------------------------------------|-----------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Project: | | Former PSC Site | Start Date: | | 8/20/07 | | RIMW- 21 Well as built | | | | | | | | | | |
| Project No.: | | 20958-50105 | End Date: | | 8/23/07 | | | | | | | | | | | | |
| Logged By: | | J. Hofer | Total Depth: | | 133' | | | | | | | | | | | | |
| Location Code: | | RIMW-21 | Abandonment: | | | | | | | | | | | | | | |
| Location: | | Rock Hill, South Carolina | Latitude: | | | | | | | | | | | | | | |
| Driller: | | Jimmy Hall: Boart-Longyear | Longitude: | | | | | | | | | | | | | | |
| Method: | | Sonic | | | | | | | | | | | | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks | | | | | | | | | | | |
| 1 | SILT with sand, brown, dry, stiff (first 0.6') | ML | 0 | | | | 6-in treaded steel casing | | | | | | | | | | |
| 2 | SAND with gravel, fractured, light brown, dry(0.6- | SW/GW | | | | | | 6-in treaded steel casing | | | | | | | | | |
| 3 | SAPROLITE, SILT with sand, brown, dry, very stiff hard, quartz, mica (1.6-6.4') | ML | | 1 | 4/7 | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | |
| 7 | SAPROLITE, SAND fine-very fine with silt, some clay, moist, medium density, pale brown, dark green and pale yellow (starts @6.4') | SM | | | | | | | 6-in treaded steel casing | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | |
| 12 | SAND fine-medium, with silt, dense, dry, green-gray | SM | | 2 | 10/10 | | | | | 6-in treaded steel casing | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | |
| 15 | SAND, fine, with clay, gray-green, moist, medium | SC | | | | | | | | | 6-in treaded steel casing | | | | | | |
| 16 | SAPROLITE, SAND grading to severely weathered rock, dark green (starts @ 15.4') | SW/GW | | | | | | | | | | 6-in treaded steel casing | | | | | |
| 17 | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | |
| 19 | SAND, medium, green-dark green, dense, some silt (saprolite-severely weathered rock) Becomes brown-green (ends @ 24.6') | SP | | 3 | 5/5 | Begin coring with water sample washed out @ 22' | | | | | | | 6-in treaded steel casing | | | | |
| 20 | | | | | | | | | | | | | | 6-in treaded steel casing | | | |
| 21 | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | |
| 25 | SAPROLITE/SEVERELY WEATHERED ROCK, Sand, medium-fine, very dense, some silt, dry, brown-green to green-gray (starts @ 24.6') | SP | | 4 | 0/5 | No water used | | | | | | | | | 6-in treaded steel casing | | |
| 26 | | | | | | | | | | | | | | | | 6-in treaded steel casing | |
| 27 | | | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | 6-in treaded steel casing |
| 30 | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | | | | | |
| 33 | | | | | | | | | | | | | | | | | |
| 34 | | | | | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | |
| 36 | | | | | | | | | | | | | | | | | |
| 37 | | | | | | | | | | | | | | | | | |
| 38 | | | | | | | | | | | | | | | | | |
| 39 | | | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | |
| 41 | | | | | | | | | | | | | | | | | |
| 42 | | | | | | | | | | | | | | | | | |

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log - RIMW-21 | | | | | | |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|--------------|-----------------------|-----------------------|
| Project: | | Former PSC Site | | Start Date: | | 8/20/07 |
| Project No.: | | 20958-50105 | | End Date: | | 8/23/07 |
| Logged By: | | J. Hofer | | Total Depth: | | 133' |
| Location Code: | | RIMW-21 | | Abandonment: | | |
| Location: | | Rock Hill, South Carolina | | Latitude | | |
| Driller: | | Jimmy Hall: Boart-Longyear | | Longitude: | | |
| Method: | | Sonic | | | | |
| Depth (ft) | Description of Materials | USCS/Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 43 | SEVERELY WEATHERED ROCK, DIORITE, friable, coarse, Iron and Manganese staining, dry, hard | GW | 0 | | | No water used |
| 44 | | | | | | |
| 45 | | | | | | |
| 46 | | | | | | |
| 47 | | | | | | |
| 48 | | | | | | |
| 49 | | | | | | |
| 50 | | | | 7 | 8/5 | |
| 51 | | | | | | |
| 52 | | | | | | |
| 53 | | | | | | |
| 54 | DIORITE moderate-severely weathered, abundant Iron staining (ends @55.5') | VBR | NA | 8 | 3.8/5 | 5-1/2-in sonic casing |
| 55 | | | | | | |
| 56 | SAPROLITE, silt with sand, green-grayish green, some rock fragments, medium stiffness (from 55.5-59.2') | ML/SM | NA | | | 5-1/2-in sonic casing |
| 57 | | | | | | |
| 58 | | | | | | |
| 59 | weathered rock fragments and fine-coarse gravel (from 58.1-59.2') | CL | 0 | 9 | 8.4/10 | 5-1/2-in sonic casing |
| 60 | | | | | | |
| 61 | CLAY with fine-medium sand, green, dry, very stiff, low plasticity (starts @ 59.2') | SP/GP | 0 | | | 5-1/2-in sonic casing |
| 62 | | | | | | |
| 63 | | | | | | |
| 64 | | | | | | |
| 65 | SAND and GRAVEL, saprolite to severely weathered, DIORITE, green-grayish green | CL | 0 | | | 5-1/2-in sonic casing |
| 66 | | | | | | |
| 67 | | | | | | |
| 68 | | | | | | |
| 69 | CLAY with gravel, gray-greenish gray, moist, stiff (ends @ 69.6) | CL | 0 | 10 | 4.5/5 | 5-1/2-in sonic casing |
| 70 | | | | | | |
| 71 | DIORITE, white, black and green, fresh, plagioclase, hornblende, biotite, little quartz, chlorite and laumontite in fractured traces (69.6-76.4') | BL/BR | 0 | 11 | 5/5 | 5-1/2-in sonic casing |
| 72 | | | | | | |
| 73 | | | | | | |
| 74 | | | | | | |
| 75 | | | | | | |
| 76 | BL/BR | 0 | 11 | 5/5 | 5-1/2-in sonic casing | |
| 77 | | | | | | |
| 78 | | | | | | |
| 79 | DIORITE with GABBRO (diabase) intrusions, DIORITE as above, GABBRO, dark gray-black, fine xstalline, pyroxine, hornblende, trace pyrite (starts @ 76.4') | BL | 0 | | | 5-1/2-in sonic casing |
| 80 | | | | | | |
| | | RR | | | | |

RIMW- 21
Well as built

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log - RIMW-21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------|-----------------------------------------------------------------------------------------------------|----------------------------|-------------------------|--------------|---------------|--------------------------------------|-------------------------|-------------------------|-----------------------------|-----------------------------|-----------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Project: | | Former PSC Site | | Start Date: | | 8/20/07 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Project No.: | | 20958-50105 | | End Date: | | 8/23/07 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Logged By: | | J. Hofer | | Total Depth: | | 133' | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Location Code: | | RIMW-21 | | Abandonment: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Location: | | Rock Hill, South Carolina | | Latitude | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Driller: | | Jimmy Hall: Boart-Longyear | | Longitude: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Method: | | Sonic | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 81 | DIORITE and GABBRO as above, feldspar alteration banding along diorite/gabbro contacts (ends @87.6) | BR | NA | 12 | 10/10 | ar filled, high < fracture 78.2-78.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82 | | VBR | | | | high < fracture 81.5- | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 83 | | | | | | BR | vertical fracture 82.8- | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84 | | | | | | | BL | vertical fracture 85.9- | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85 | | | | | | | | BR | Zone broken by coring @ 87' | | | | | | | | | | | | | | | | | | | | | | | | | |
| 86 | | | | | | | | | VBR | Vertical fracture 91.6-92.6 | | | | | | | | | | | | | | | | | | | | | | | | |
| 87 | | | | | | | | | | NA | Cored 8/23/07 TD-107' | | | | | | | | | | | | | | | | | | | | | | | |
| 88 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89 | DIORITE, coarse xstalline, mineral composition same as above (starts @ 87.6) | BR | NA | 13 | 10/10 | Backfilled w/ sand | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90 | | BL | | | | BR | 14 | 10/10 | Cored 8/23/07 TD-107' | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91 | | | | | | | | | | VBR | NA | | | | | | | | | | | | | | | | | | | | | | | |
| 92 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 98 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 99 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

RIMW- 21
Well as built

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|------------------------------------------------------------------------------------------------|--------------|-------------------------|----------------------------------|---------------|-------------------------|
| Project: | Former PSC Site | Start Date: | 8/15/07 | RIMW-22 Well as built | | |
| Project No.: | 20958-50105 | End Date: | 8/21/07 | | | |
| Logged By: | J. Hofer | Total Depth: | 152' | | | |
| Location Code: | RIMW-22 | Abandonment: | | | | |
| Location: | Rock Hill, South Carolina | Latitude: | | | | |
| Driller: | Jimmy Hall: Boart-Longyear | Longitude: | | | | |
| Method: | Sonic | | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 1 | Gravel fill (until 1.4') | | | | | |
| 2 | CLAY, some silt, dark brown, moist, medium stiff (1.4-3') | CL | 731 | 1 | 7/7 | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | CLAY, some silt, red brown, slightly moist, medium stiff | CL | 141 | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | CLAY with silt, yellow- red and light gray, mottled, slightly moist, medium stiff (ends @ 9.5) | CL | 78 | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | SILT with fine sand, light gray very stiff-hard, dry (9.5-11.5') | ML | 16.8 | 2 | 10/10 | |
| 12 | SAND, fine, some silt, pale yellow, moist, medium density (11.5-12.8') | SM | 10.9 | | | |
| 13 | | SW | | | | |
| 14 | SAND, medium, brown-red, medium density, angular, moist (12.8-15') | ML/SM | 46 | 3 | 10/10 | hard drilling/ coring |
| 15 | | | | | | |
| 16 | | | | | | |
| 17 | SAPROLITE, SILT and very fine grained sand, stiff, slightly moist | ML/SM | 156 | | | |
| 18 | | | | | | |
| 19 | | | | | | |
| 20 | SAPROLITE as above, dry, hard | ML/SM | 401 | 4 | 7/7 | |
| 21 | | | | | | |
| 22 | | | | | | |
| 23 | Weathered Rock, DIORITE, with saprolitic zones gray-greenish gray, dry | VBR | 559 | | | |
| 24 | | | | | | |
| 25 | | | | | | |
| 26 | Iron staining on rock fracture faces (34-34.6') | SW | 50.2 | 5 | 3/3 | Begin coring w/ water |
| 27 | | | | | | |
| 28 | | | | | | |
| 29 | SAND, coarse, feldspar, hornblende, quartz, dark green, white (34.6-38.2') | SW | 0 | | | |
| 30 | | | | | | |
| 31 | | | | | | |
| 32 | SAND, gravel and weathered rock (38.2-40') | SP/GP | 0 | 6 | 1/10 | most of core washed out |
| 33 | | | | | | |
| 34 | | | | | | |
| 35 | SAND and Weathered Rock, quartz filled vein (broken piece) | SP/GP | 0 | | | |
| 36 | | | | | | |
| 37 | | | | | | |
| 38 | | | | | | |
| 39 | | | | | | |
| 40 | | | | | | |
| 41 | | | | | | |
| 42 | | | | | | |
| 43 | | | | | | |
| 44 | | | | | | |
| 45 | | | | | | |
| 46 | | | | | | |

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|----------------------------------------------------------------------|----------------------------|-------------------------|--------------|---------------|-----------------------------------------------|
| Project: | | Former PSC Site | | Start Date: | | 8/15/07 |
| Project No.: | | 20958-50105 | | End Date: | | 8/21/07 |
| Logged By: | | J. Hofer | | Total Depth: | | 152' |
| Location Code: | | RIMW-22 | | Abandonment: | | |
| Location: | | Rock Hill, South Carolina | | Latitude: | | |
| Driller: | | Jimmy Hall: Boart-Longyear | | Longitude: | | |
| Method: | | Sonic | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 47 | | | | | | |
| 48 | SAND and silt with weathered rock, dry, gray-green | SM | 0 | 7 | 5/5 | dry cored |
| 49 | | | | | | |
| 50 | | | | | | |
| 51 | | | | | | |
| 52 | | | | | | |
| 53 | Same as above, higher weathered rock content | SP/GP | 0 | 8 | 2.5/5 | coring with water |
| 54 | | | | | | |
| 55 | | | | | | |
| 56 | | | | | | |
| 57 | | | | | | |
| 58 | SAND medium-coarse with silt, gray, dense, saturated (ends @ 58.8') | SP/SM | | | | dry coring |
| 59 | | | | | | |
| 60 | ROCK (58.8-60') | | | | | |
| 61 | SAND with weathered rock fragments, saturated, dark gray | SP | 0 | 9 | 10/10 | very hard @58.8' slightly faster coring @ 62' |
| 62 | | | | | | |
| 63 | | | | | | |
| 64 | | | | | | |
| 65 | | | | | | |
| 66 | | | | | | |
| 67 | | | | | | |
| 68 | | | | | | |
| 69 | | | | | | |
| 70 | | | | | | |
| 71 | SAND, fine-coarse with silt and rock fragments, dry, light-dark gray | | | 10 | 8/10 | |
| 72 | | | | | | |
| 73 | | | | | | |
| 74 | | | | | | |
| 75 | | | | | | |
| 76 | | | | | | |
| 77 | | | | | | |

RIMW-22
Well as built

| | | | | |
|----------------------------|-------|-----------------|-------|----------------------------|
| 6-in Threaded steel casing | Grout | 2-in PVC casing | Grout | 6-in Threaded steel casing |
|----------------------------|-------|-----------------|-------|----------------------------|

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------------|----------|---------------|--------------------------------------------------------------------------|
| Project: | Former PSC Site | Start Date: | 8/15/07 | | | |
| Project No.: | 20958-50105 | End Date: | 8/21/07 | | | |
| Logged By: | J. Hofer | Total Depth: | 152' | | | |
| Location Code: | RIMW-22 | Abandonment: | | | | |
| Location: | Rock Hill, South Carolina | Latitude: | | | | |
| Driller: | Jimmy Hall: Boart-Longyear | Longitude: | | | | |
| Method: | Sonic | | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 78 | SAND and Weathered Rock | | | | | |
| 79 | | | | | | |
| 80 | | | | | | |
| 81 | SAND and Weathered Rock (DIORITE), light brownish gray to brown | SP/GP | | 11 | 4/10 | coring with water fines washed out @ 80' |
| 82 | | | | | | |
| 83 | | | | | | |
| 84 | | | | | | |
| 85 | | | | | | |
| 86 | SAND, pink, with gravel, plagioclase, quartz, hornblende, (GRANITE?), 2-in diameter Biotite, quartz Schist? Rock fragment (ends @92.6') | SP | | | | Fines washed out |
| 87 | | | | | | |
| 88 | | | | | | |
| 89 | | | | | | |
| 90 | | | | | | |
| 91 | | | | | | |
| 92 | | | | | | |
| 93 | DIORITE, Fragments with weathered quartz (92.6-102.6') | | | 12 | 2/10 | |
| 94 | | | | | | |
| 95 | | | | | | |
| 96 | | | | | | |
| 97 | | | | | | |
| 98 | | GP | | | | |
| 99 | | | | | | |
| 100 | | | | | | |
| 101 | | | | | | |
| 102 | | | | | | |
| 103 | | | | 13 | 3.5/10 | Borehole reamed to 10" 0-119' 6" steel threaded casing installed to 117' |
| 104 | SAND with Gravel, some Clay, grayish green-dark red brown (saprolitic) (starts @ 102.6') | SP | | | | |
| 105 | | | | | | |
| 106 | | | | | | |
| 107 | GRAVEL, (Weathered DIORITE), abundant Iron staining | | | | | |
| 108 | | | | | | |
| 109 | | | | | | |
| 110 | | | NA | | | |
| 111 | | GP | | | | |
| 112 | | | | | | |
| 113 | | | | 14 | 5/10 | |
| 114 | | | | | | |
| 115 | feldspar/Quartz vein (114-115.2') | | | | | |

RIMW-22
Well as built

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|-------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------------|----------------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------------------------------|
| Project: | Former PSC Site | Start Date: | 8/15/07 | <div style="text-align: center;"> <h2>RIMW-22</h2> <h3>Well as built</h3> </div> | | |
| Project No.: | 20958-50105 | End Date: | 8/21/07 | | | |
| Logged By: | J. Hofer | Total Depth: | 152' | | | |
| Location Code: | RIMW-22 | Abandonment: | | | | |
| Location: | Rock Hill, South Carolina | Latitude: | | | | |
| Driller: | Jimmy Hall: Boart-Longyear | Longitude: | | | | |
| Method: | Sonic | | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 116 | GABBRO, dark green- greenish black, plagioclase, hornblende, quartz, biotite, fresh, fine grained (diabase) (starts @ 115.2') | BR | | | | very hard coring @ 118' |
| 117 | | | | | | |
| 118 | | | | | | |
| 119 | | | | | | |
| 120 | | | | | | |
| 121 | DIORITE, fresh, fine-medium xstalline, white, green and black, plagioclase, hornblende, biotite, pyroxine | BR | | | | TD-122' 8/15/07 |
| 122 | | | | | | |
| 123 | | | | | | |
| 124 | | | | | | |
| 125 | | | | | | |
| 126 | | | | | | |
| 127 | | | | | | VBR |
| 128 | | | | | | |
| 129 | | | | | | becoming coarse xstalline @ 127.6' |
| 130 | | | | | | |
| 131 | BL (126.8-140.4') | | | | | Resume coring 8/21/07 |
| 132 | | | | | | |
| 133 | | | | | | |
| 134 | | | | | | |
| 135 | | | | | | |
| 136 | | | | | | |
| 137 | | | | | | |
| 138 | | | | | | |
| 139 | | | | | | |
| 140 | | | | | | |
| 141 | GRANODIORITE, fresh, broken-blocky, hornblende, orthoclase, quartz, biotite | VBR | | | | Open vert. frac 123.5-124.1' |
| 142 | | BL | | | | |
| 143 | | VBR | | | | |
| 144 | | | | | | |
| 145 | | | | | | |
| 146 | | BR | | | | |
| 147 | VBR | | | | | |
| 148 | BR/BL (147.5-152') | | | | | closed 124.1-124.8' frac zone 126.0-133.0-133.7' quartz& felds vein @ 137.8' |
| 149 | | | | | | |
| 150 | | | | | | |
| 151 | | | | | | |
| 152 | | | | | | frac zone 140.4-147.5' washout frac zone 144.4-147.5' flush out to 147' frac zone 147-147.5' TD- 152' |

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|--------------|---------------|----------------------------------------|
| Project: | | Former PSC Site | | Start Date: | | 8/22/07 |
| Project No.: | | 20958-50105 | | End Date: | | 8/22/07 |
| Logged By: | | J. Hofer | | Total Depth: | | 42' |
| Location Code: | | RIMW-23 | | Abandonment: | | |
| Location: | | Rock Hill, South Carolina | | Latitude: | | |
| Driller: | | Jimmy Hall: Boart-Longyear | | Longitude: | | |
| Method: | | Sonic | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 1 | Gravel fill (0-0.8') | | | | | No Well Borehole grouted |
| 2 | CLAY with silt and fine sand, yellow-red (FILL) (starts 0.8') | FILL | 0 | | | |
| 3 | | | | | | |
| 4 | CLAY with brown-yellow brown, slightly moist, medium stiffness | CL | 0 | 1 | 5/7 | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | SILT with very fine grained sand brown-red brown, moist, soft | ML | 3.8 | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | SILT with very fine grained sand, some clay, saturated, very soft, olive brown | ML | 7.4 | | | |
| 11 | | | | | | |
| 12 | | ML | 4.6 | 2 | 10/10 | |
| 13 | | | | | | |
| 14 | | | | | | |
| 15 | SAND fine-very fine, olive brown, medium desity (15-17.6') | SM | 10 | | | |
| 16 | | | | | | |
| 17 | | | | | | |
| 18 | SILT with gravel and sand, yellow brown, gravel up to 3.5" in diameter, sub angular-sub rounded (17.6-20') | ML | 8.8 | | | |
| 19 | | | | | | |
| 20 | | | | | | |
| 21 | GRAVEL with sand and clay, dark olive brown, saturated, fine-coarse, medium density | GP/GC | 4.8 | 3 | 10/10 | |
| 22 | | | | | | |
| 23 | | | | | | |
| 24 | SAND medium-coarse, some silt and clay, slightly moist-dry, medium density (ends @ 27.8') | SP/SC | 15.6 | | | |
| 25 | | | | | | |
| 26 | | | | | | |
| 27 | | | | | | |
| 28 | | | 56.2 | | | |

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|-----------------------------------------------------------------------------------------------------|--------------|-------------------------|----------|----------------|---------------------------|
| Project: | Former PSC Site | Start Date: | 8/22/07 | | No Well | |
| Project No.: | 20958-50105 | End Date: | 8/22/07 | | | |
| Logged By: | J. Hofer | Total Depth: | 42' | | | |
| Location Code: | RIMW-23 | Abandonment: | | | | |
| Location: | Rock Hill, South Carolina | Latitude: | | | | |
| Driller: | Jimmy Hall: Boart-Longyear | Longitude: | | | | |
| Method: | Sonic | | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 29 | GRAVEL with sand and clay, sub-well rounded, up to 3.5" in diameter, grayish brown (starts @ 27.8') | GP/GC | 27.6 | 4 | 6/6 | Start water coring @ 33' |
| 30 | | | | | | |
| 31 | | | | | | |
| 32 | GRAVEL with sand, sub-well rounded, dry-slightly moist, redish brown | GP | 42.8 | 5 | 2/4 | vert. frac 34.5-39-40 |
| 33 | | | | | | |
| 34 | | | | | | |
| 35 | GABBRO (diabase), fine xstalline, fresh-slightly weathered, chlorite on fractured faces | BR | NA | 6 | 5/5 | bore hole abandoned @ 42' |
| 36 | | | | | | |
| 37 | | | | | | |
| 38 | | | | | | |
| 39 | | | | | | |
| 40 | | | | | | |
| 41 | GABBRO (diabase) as above, hard-very hard, broken, fine xstalline | | | | | |
| 42 | | | | | | |

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|---------------------------------|----------------------------|-------------------------|--------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project: | | Former PSC Site | | Start Date: | | 8/22/07 |
| Project No.: | | 20958-50105 | | End Date: | | 8/24/07 |
| Logged By: | | J. Hofer | | Total Depth: | | 72' |
| Location Code: | | RIMW-23A | | Abandonment: | | |
| Location: | | Rock Hill, South Carolina | | Latitude: | | |
| Driller: | | Jimmy Hall: Boart-Longyear | | Longitude: | | |
| Method: | | Sonic | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 1 | See boring log RIMW-24 for 0-37 | | | | | <p style="text-align: center;">RIMW-23 Well as built</p> <div style="display: flex; justify-content: space-between; border: 1px solid black; padding: 5px;"> <div style="width: 30%; border-right: 1px solid black; padding-right: 5px;">5 1/2-in sonic casing installed to 37.5 ft</div> <div style="width: 10%; border-right: 1px solid black; padding-right: 5px; text-align: center;">Grout</div> <div style="width: 10%; border-right: 1px solid black; padding-right: 5px; text-align: center;">2-in PVC casing</div> <div style="width: 10%; border-right: 1px solid black; padding-right: 5px; text-align: center;">Grout</div> <div style="width: 30%; padding-left: 5px;">5 1/2-in sonic casing installed to 37.5 ft</div> </div> |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |
| 13 | | | | | | |
| 14 | | | | | | |
| 15 | | | | | | |
| 16 | | | | | | |
| 17 | | | | | | |
| 18 | | | | | | |
| 19 | | | | | | |
| 20 | | | | | | |
| 21 | | | | | | |
| 22 | | | | | | |
| 23 | | | | | | |
| 24 | | | | | | |
| 25 | | | | | | |
| 26 | | | | | | |
| 27 | | | | | | |
| 28 | | | | | | |
| 29 | | | | | | |
| 30 | | | | | | |
| 31 | | | | | | |
| 32 | | | | | | |
| 33 | | | | | | |
| 34 | | | | | | |
| 35 | | | | | | |
| 36 | | | | | | |
| 37 | | | | | | |

RIMW-23
Well as built

5 1/2-in sonic casing installed to 37.5 ft

Grout

2-in PVC casing

Grout

5 1/2-in sonic casing installed to 37.5 ft

Sonic casing installed to 37.5' 8/22/07
 Resumed coring 8/24/07

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|--------------|---------------|--------------------------------------|
| Project: | | Former PSC Site | | Start Date: | | 8/22/07 |
| Project No.: | | 20958-50105 | | End Date: | | 8/24/07 |
| Logged By: | | J. Hofer | | Total Depth: | | 72' |
| Location Code: | | RIMW-23A | | Abandonment: | | |
| Location: | | Rock Hill, South Carolina | | Latitude: | | |
| Driller: | | Jimmy Hall: Boart-Longyear | | Longitude: | | |
| Method: | | Sonic | | | | |
| Depth (ft) | Description of Materials | USCS/Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 38 | GRANODIORITE, slightly weathered, coarse, xstalline, orthoclase, hornblende, biotite, pyroxine, chlorite few laumonite/feldspar filled fractures | VBR | NA | 1 | 8.9/10 | high < frac. 43.0-43.5' & 43.4-44.0' |
| 39 | | | | | | |
| 40 | | | | | | |
| 41 | | | | | | |
| 42 | | | | | | |
| 43 | highly fractured 51.4-52.0' with feldspar/laumonite on fractured faces | BR (42.8-46') | NA | 2 | 10/10 | vert. frac 47.0-48.7 vug @ 48.8' |
| 44 | | | | | | |
| 45 | | | | | | |
| 46 | | | | | | |
| 47 | | | | | | |
| 48 | | | | | | |
| 49 | | | | | | |
| 50 | | | | | | |
| 51 | | | | | | |
| 52 | | | | | | |
| 53 | BR (58-59.6') | NA | NA | 3 | 10/10 | near vertical fract 55.4-56.3 |
| 54 | | | | | | |
| 55 | | | | | | |
| 56 | | | | | | |
| 57 | | | | | | |
| 58 | | | | | | |
| 59 | | | | | | |
| 60 | BR | NA | NA | 4 | 5/5 | 8/24/07 TD- 72' |
| 61 | | | | | | |
| 62 | | | | | | |
| 63 | | | | | | |
| 64 | | | | | | |
| 65 | | | | | | |
| 66 | | | | | | |
| 67 | | | | | | |
| 68 | | | | | | |
| 69 | | | | | | |
| 70 | | | | | | |
| 71 | | | | | | |
| 72 | | | | | | |

RIMW-23
Well as built

| | | | |
|----------------|-----------------|----------------|----------------------|
| Bentonite Seal | | Bentonite Seal | |
| Sand pack | 2-in PVC Screen | Sand pack | Backfilled with sand |

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | | | |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------------|----------|----------------------------------------|------------------------------------------------|--|--------|
| Project: | Former PSC Site | Start Date: | 8/14/07 | | RIMW-24 Well as built | | | |
| Project No.: | 20958-50105 | End Date: | 8/14/07 | | | | | |
| Logged By: | J. Hofer | Total Depth: | 37' | | | | | |
| Location Code: | RIMW-24 | Abandonment: | | | | | | |
| Location: | Rock Hill, South Carolina | Latitude: | | | | | | |
| Driller: | Jimmy Hall: Boart-Longyear | Longitude: | | | | | | |
| Method: | Sonic | | | | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks | | |
| 1 | Gravel (0-0.5') | | | | | | | |
| 2 | CLAY with silt, some fine sand, red-dark red, dry, very stiff (0.5-3') | CL | 2.2 | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | 1 | 6.5/7 | | |
| 5 | SILT, trace very fine grained sand, brown-olive brown, dry, hard (3-5.5') | ML | 0 | | | | | |
| 6 | | | | | | | | |
| 7 | SILT with fine to medium sand, olive gray, hard (5.5-7.4') | ML/SM | 0 | | | | | |
| 8 | | | | | | | | |
| 9 | SAND, veryfine-fine, rounded, little medium, moist, loose, with silt olive brown (starts @ 7.4') becomes medium-coarse, with silt, red brown (@ 10') becomes coarse, some silt, olive gray (@ 13.6') saturated | SM | 7 | | | | | |
| 10 | | | | | | | | |
| 11 | | SM/S W | 10.7 | | 2 | 10/10 | | |
| 12 | | | 16.4 | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | SAND, medium-coarse, rounded, loose | SW | 18 | | | | | |
| 16 | | | | | | | | |
| 17 | | | | | | | | |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | 21.2 | | | | | |
| 21 | | | 40.6 | | | | | |
| 22 | | | | | | | | |
| 23 | | | | | | | | |
| 24 | | | | | | | | |
| 25 | | | | | | | | |
| 26 | Weathered rock | GP | 104 | | | Installed MW @25' with screen 15-25' | | |
| 27 | | | NA | | | | | |
| 28 | | | | | | | | |
| 29 | | | | | | | | |
| 30 | | | | | | | | |
| 31 | Bedrock, DIORITE, medium grained, feldspar, hornblende, little quartz, fractured | BR | | | | Backfilled to 27' logs with 3/8" bent. Pellets | | |
| 32 | | | | | | | | |
| 33 | | | | | | | | |
| 34 | | | | | | | | |
| 35 | | | | | | | | |
| 36 | | | | | | | | |
| 37 | | | | | | | | TD-37' |

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------------|----------|----------------------------------|------------------------------------------|
| Project: | Former PSC Site | Start Date: | 8/17/07 | | RIMW-25 Well as built | |
| Project No.: | 20958-50105 | End Date: | 8/27/07 | | | |
| Logged By: | J. Hofer | Total Depth: | 72' | | | |
| Location Code: | RIMW-25 | Abandonment: | | | | |
| Location: | Rock Hill, South Carolina | Latitude: | | | | |
| Driller: | Jimmy Hall: Boart-Longyear | Longitude: | | | | |
| Method: | Sonic | | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 1 | CLAY with silt, some fine-medium sand, dark red brown, dry, stiff (0-3.8') | CL | 0 | 1 | 7/7 | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | CLAY, some silt, grayish-yellowish brown, Manganese/Iron concretions, very stiff, dry, (3.8- | CL | 0 | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | SILT, some fine sand, brown-yellow to gray brown, stiff (5.7-7') | ML | 0 | 2 | 10/10 | strong petroleum odor |
| 9 | SAND, some silt, medium, grayish green, loose, dry (7-9.5') | SM | 356 | | | |
| 11 | SILT with fine sand, grayish green, soft, dry (9.5-13) | ML | 420 | 3 | 7/7 | |
| 12 | | | 292 | | | |
| 13 | SAPROLITE, Sand with silt, fine-medium, greenish gray and white, dry (13-23.5') becoming fine to coarse with some fine gravel | SM | 50.5 | 4 | 3/3 | coring w/ water @ 24' strong odor @25.5' |
| 14 | | | 50.1 | | | |
| 15 | | | | | | |
| 16 | | | | | | |
| 17 | | | SW | | | |
| 18 | 11.1 | | | | | |
| 19 | Increase in gravel content | SP | 568 | | | |
| 20 | | | | | | |
| 21 | SAND, medium-coarse, little silt, dark green (23.5-32') | | | | | |
| 22 | | | | | | |
| 23 | | | | | | |
| 24 | | | | | | |
| 25 | | | | | | |
| 26 | | | | | | |
| 27 | | | | | | |
| 28 | | | | | | |
| 29 | | | | | | |
| 30 | | | | | | |
| 31 | | | | | | |
| 32 | | | | | | |

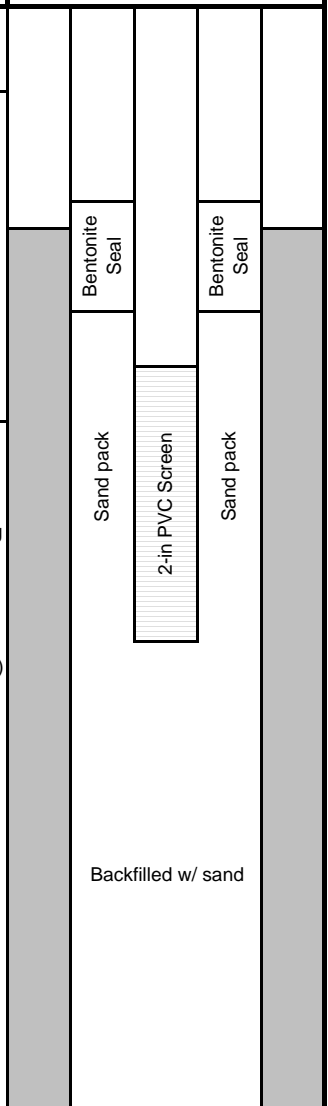
**RIMW-25
Well as built**

| | | | | |
|----------------------------|-------|-----------------|-------|----------------------------|
| 6-in Threaded steel casing | Grout | 2-in PVC Casing | Grout | 6-in Threaded steel casing |
|----------------------------|-------|-----------------|-------|----------------------------|

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|-------------------------------------------------------------------------------------------------|----------------|-------------------------|----------|---------------|---------------|
| Project: | Former PSC Site | Start Date: | 8/17/07 | | | |
| Project No.: | 20958-50105 | End Date: | 8/27/07 | | | |
| Logged By: | J. Hofer | Total Depth: | 72' | | | |
| Location Code: | RIMW-25 | Abandonment: | | | | |
| Location: | Rock Hill, South Carolina | Latitude: | | | | |
| Driller: | Jimmy Hall: Boart-Longyear | Longitude: | | | | |
| Method: | Sonic | | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 33 | DIORITE, slightly weathered, fractured, hornblende, plagioclase, biotite, pyroxine | BR (33-35') | NA | 6 | 4/5 | coring (@32') |
| 34 | | VBR (35-36.2') | | | | |
| 35 | very broken weathered zone 35-36.5' | BR (36.2-40') | | | | |
| 36 | | GP | | | | |
| 37 | | BR (42-43.5') | | | | |
| 38 | weathered zone (gravel) | VBR | | | | |
| 39 | | BR | | | | |
| 40 | weathered zone with sand and silt (@41.5') | BR | | | | |
| 41 | | VBR | | | | |
| 42 | weathered zone (44-46') | BR | | | | |
| 43 | | VBR | | | | |
| 44 | DIORITE, fresh-slightly weathered, medium xstalline, plagioclase, hornblende, pyroxine, biotite | BR | | | | |
| 45 | | VBR | | | | |
| 46 | orthoclase filled vert frac: 54-56' | BR | | | | |
| 47 | | VBR | | | | |
| 48 | | BR | | | | |
| 49 | | VBR | | | | |
| 50 | | BR | | | | |
| 51 | | VBR | | | | |
| 52 | | BR | | | | |
| 53 | | VBR | | | | |
| 54 | | BR | | | | |
| 55 | | BR | | | | |
| 56 | TD-51' (8/17/07) | BR-BL | | | | |
| 57 | | BR | | | | |
| 58 | resume coring 8/27/07 | BR | | | | |
| 59 | | BR | | | | |
| 60 | bottom 4' left in bore hole | BR | | | | |
| 61 | | BR | | | | |
| 62 | TD- 72' | BR(66-68.2') | | | | |
| 63 | | BL (68.2-72) | | | | |
| 64 | | | | | | |
| 65 | | | | | | |
| 66 | | | | | | |
| 67 | | | | | | |
| 68 | | | | | | |
| 69 | | | | | | |
| 70 | | | | | | |
| 71 | | | | | | |
| 72 | | | | | | |

RIMW-25
Well as built



Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|--------------|---------------|--------------------------|
| Project: | | Former PSC Site | | Start Date: | | 8/18/07 |
| Project No.: | | 20958-50105 | | End Date: | | 8/22/07 |
| Logged By: | | J. Hofer | | Total Depth: | | 107' |
| Location Code: | | RIMW-26 | | Abandonment: | | |
| Location: | | Rock Hill, South Carolina | | Latitude: | | |
| Driller: | | Jimmy Hall: Boart-Longyear | | Longitude: | | |
| Method: | | Sonic | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 1 | CLAY with silt and sand, brown-yellow and light brown gray mottled, dry-slightly moist, very stiff | CL | 0 | 1 | 7/7 | RIMW-26 Well as built |
| 2 | | | 0 | | | |
| 3 | | | 0 | | | |
| 4 | | | 0 | | | |
| 5 | | | 0 | | | |
| 6 | | | 0 | | | |
| 7 | SILT with fine sand, brownish yellow- yellowish brown, dry stiff | ML | 0 | 2 | 10/10 | |
| 8 | | | 0 | | | |
| 9 | | | 0 | | | |
| 10 | SILT with very fine sand, grayish green, medium stiff-soft (SAPROLITE), moist | ML | 0 | 3 | 10/10 | |
| 11 | | | 0 | | | |
| 12 | | | 0 | | | |
| 13 | SAND, fine, some silt, grayish green to yellow brown, slightly moist, medium density (12-15.5') | SM | 0 | 4 | 6/6 | |
| 14 | | | 0 | | | |
| 15 | | | 0 | | | |
| 16 | | | 0 | | | |
| 17 | | | 0 | | | |
| 18 | SAND, medium, some fine, little silt, grayish green to brownish yellow, dense, angular, quartz and horseblende, SATURATED | SP | 0 | 3 | 10/10 | |
| 19 | | | 0 | | | |
| 20 | | | 0 | | | |
| 21 | | | 0 | | | |
| 22 | | | 0 | | | |
| 23 | | | 0 | | | |
| 24 | | | 0 | | | |
| 25 | | | 0 | | | |
| 26 | 0 | | | | | |
| 27 | 0 | | | | | |
| 28 | 0 | | | | | |
| 29 | CLAY with silt some sand, olive gray, moist, medium stiffness (29-30') | CL | 0 | 4 | 6/6 | |
| 30 | | | 0 | | | |
| 31 | SILT with very fine sand, green-gray, dry, very stiff hard | ML | 0 | 4 | 6/6 | |
| 32 | | | 0 | | | |
| 33 | | | 0 | | | |

ising

ising

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|----------------------------------------------------------------------------------|--------------|-------------------------|----------|---------------|---------------------------------------------------------------------------------|
| Project: | Former PSC Site | Start Date: | 8/18/07 | | | |
| Project No.: | 20958-50105 | End Date: | 8/22/07 | | | |
| Logged By: | J. Hofer | Total Depth: | 107' | | | |
| Location Code: | RIMW-26 | Abandonment: | | | | |
| Location: | Rock Hill, South Carolina | Latitude: | | | | |
| Driller: | Jimmy Hall: Boart-Longyear | Longitude: | | | | |
| Method: | Sonic | | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 34 | SAND, medium-coarse, (severely weathered rock?), dark green and black (33-41.4') | SP | 0 | 5 | 2/4 | fines and sand above rock @ 41.5' washed out |
| 35 | | | | | | |
| 36 | | | | | | |
| 37 | | | | | | |
| 38 | | | | | | |
| 39 | | | | | | |
| 40 | | | | | | |
| 41 | DIORITE, weathered (41.4-44') | VBR | 0 | 6 | 2.5/10 | hard drilling @41' |
| 42 | | | | | | |
| 43 | | | | | | |
| 44 | | | | | | |
| 45 | SAND with silt, some DIORITE Gravel (44-46.6') | SM | | | | vry easy drilling @ 44' |
| 46 | | | | | | |
| 47 | CLAY with some rock fragments dark green-gray, moist (46.6-48') | CL | 0 | 7 | 7/7 | dry coring @47' |
| 48 | | | | | | |
| 49 | SAND, some rock fragments, medium-coarse, green and brown, moist (48-49.2') | SW | 0 | 7 | 7/7 | driller reports rock sample fell out barrell down hole @ 55' & washed out @ 57' |
| 50 | | | | | | |
| 51 | | | | | | |
| 52 | SAND and CLAY, greenish gray-gray, little gravel (49.2-54') | SC | 0 | 8 | 0/3 | |
| 53 | | | | | | |
| 54 | ROCK (Diorite?) | | | | | |
| 55 | Unknown | | 0 | 9 | 5/10 | very easy drilling/coring @67' |
| 56 | | | | | | |
| 57 | | | | | | |
| 58 | | | | | | |
| 59 | Weathered DIORITE | GP | | 9 | 5/10 | |
| 60 | | | | | | |
| 61 | | | | | | |
| 62 | | | | | | |
| 63 | Coarse SAND, angular, quartz, feldspa, with rock fragments (63-69.4') | SP | | | | |
| 64 | | | | | | |
| 65 | | | | | | |
| 66 | | | | | | |
| 67 | | | | | | |
| 68 | | | | | | |
| 69 | | | | | | |

RIMW-26
Well as built

| | | | | |
|-----------------------|-------|-----------------|-------|-----------------------|
| 6-in Treaded steel ca | Grout | 2-in PVC Casing | Grout | 6-in Treaded steel ca |
|-----------------------|-------|-----------------|-------|-----------------------|

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|---------------------------------------------------------------------------------------|--------------|-------------------------|----------|----------------------------------|------------------------------------------------------------------|
| Project: | Former PSC Site | Start Date: | 8/18/07 | | RIMW-26 Well as built | |
| Project No.: | 20958-50105 | End Date: | 8/22/07 | | | |
| Logged By: | J. Hofer | Total Depth: | 107' | | | |
| Location Code: | RIMW-26 | Abandonment: | | | | |
| Location: | Rock Hill, South Carolina | Latitude: | | | | |
| Driller: | Jimmy Hall: Boart-Longyear | Longitude: | | | | |
| Method: | Sonic | | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 70 | DIORITE, fresh, (GRANODORITE), plagioclase, hornblende, biotite, pyroxine (69.4-107') | BR | NA | 10 | 8/10 | very hard, TD-10" borehole install 6"ID steel casing @ 70.8' bgs |
| 71 | | | | | | |
| 72 | | | | | | |
| 73 | | | | | | |
| 74 | | BR-VBR | NA | 11 | 10/10 | TD 6" 8/18/07 |
| 75 | | | | | | |
| 76 | | | | | | |
| 77 | | | | | | |
| 78 | becomes broken-very broken @ 79' | BR-BL | NA | 12 | 10/10 | high < frac 98.5-99.3' |
| 79 | | | | | | |
| 80 | | | | | | |
| 81 | | | | | | |
| 82 | | BR | NA | 13 | 10/10 | low< weathered frags 99.8 - 100.1' |
| 83 | | | | | | |
| 84 | | | | | | |
| 85 | | | | | | |
| 86 | becomes broken-blocky @ 84.6' | VBR | NA | 13 | 10/10 | Driller reported water loss @ 100' |
| 87 | | | | | | |
| 88 | | | | | | |
| 89 | | | | | | |
| 90 | | BR | NA | 13 | 10/10 | TD-107' |
| 91 | | | | | | |
| 92 | | | | | | |
| 93 | | | | | | |
| 94 | broken zone (91.5-92.1') | BR | NA | 13 | 10/10 | TD-107' |
| 95 | | | | | | |
| 96 | | | | | | |
| 97 | | | | | | |
| 98 | becomes very broken, slightly weathered, staining, pitted @ 97.4' | BR | NA | 13 | 10/10 | TD-107' |
| 99 | | | | | | |
| 100 | | | | | | |
| 101 | | | | | | |
| 102 | | BR | NA | 13 | 10/10 | TD-107' |
| 103 | | | | | | |
| 104 | | | | | | |
| 105 | | | | | | |
| 106 | | BR | NA | 13 | 10/10 | TD-107' |
| 107 | | | | | | |

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|--------------------------------------------------------------------------------------------|----------------------------|-------------------------|--------------|---------------|------------------------|
| Project: | | Former PSC Site | | Start Date: | | 8/19/07 |
| Project No.: | | 20958-50105 | | End Date: | | 8/22/07 |
| Logged By: | | J. Hofer | | Total Depth: | | 87' |
| Location Code: | | RIMW-27 | | Abandonment: | | |
| Location: | | Rock Hill, South Carolina | | Latitude: | | |
| Driller: | | Jimmy Hall: Boart-Longyear | | Longitude: | | |
| Method: | | Sonic | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 1 | CLAY with some gravel, red-brown, moist, stiff (FILL) | FILL | 0 | 1 | 7/7 | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | SAND & GRAVEL, gray, coarse (6-6.6') | | 0 | | | |
| 8 | CLAY, brown, saturated, soft (6.6-14.5') medium sand lens (8-8.5') | CL | 0 | 2 | 10/10 | (hand auger 7-10') |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |
| 13 | | | | | | |
| 14 | | | | | | |
| 15 | CLAY with very fine grained sand, dark greenish gray, moist, medium stiffness (14.5-16.6') | CL | 1.6 | | | |
| 17 | SILT some clay, dark gray, very stiff, low plasticity (16.6-18') | ML | 0 | | | |
| 19 | SAND with silt & GRAVEL (SAPROLITE), gray-green, dense | SW | | | | |
| 21 | SAND with silt, gray with little yellow-brown, saprolite, dense, dry (weathered rock?) | SM | 0 | 3 | 10/10 | relatively hard coring |
| 22 | | | | | | |
| 23 | | | | | | |
| 24 | | | | | | |
| 25 | | | | | | |
| 26 | | | | | | |

RIMW-27
Well as built

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|-----------------------------------|--------------|-------------------------|----------|----------------------------------------|-------------------------------------|
| Project: | Former PSC Site | Start Date: | 8/19/07 | | RIMW-27 Well as built | |
| Project No.: | 20958-50105 | End Date: | 8/22/07 | | | |
| Logged By: | J. Hofer | Total Depth: | 87' | | | |
| Location Code: | RIMW-27 | Abandonment: | | | | |
| Location: | Rock Hill, South Carolina | Latitude: | | | | |
| Driller: | Jimmy Hall: Boart-Longyear | Longitude: | | | | |
| Method: | Sonic | | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 27 | Severely Weathered Rock (DIORITE) | GP | | 4 | 2/10 | Fines washed out, coring with water |
| 28 | | | | | | |
| 29 | | | | | | |
| 30 | | | | | | |
| 31 | | | | | | |
| 32 | | | | | | |
| 33 | | | | | | |
| 34 | | | | | | |
| 35 | | | | | | |
| 36 | | | | | | |
| 37 | | | | | | |
| 38 | | | | | | |
| 39 | | | | | | |
| 40 | | | | | | |
| 41 | | | | | | |
| 42 | | | | | | |
| 43 | | | | | | |
| 44 | | | | | | |
| 45 | | | | | | |
| 46 | | | | | | |
| 47 | | | | | | |
| 48 | | | | | | |
| 49 | | | | | | |
| 50 | | | | | | |
| 51 | | | | | | |
| 52 | | | | | | |
| 53 | | | | | | |
| 54 | | | | | | |
| 55 | | | | | | |

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|-------------------------------------------------------------------------------------------|----------------------------|-------------------------|--------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project: | | Former PSC Site | | Start Date: | | 8/19/07 |
| Project No.: | | 20958-50105 | | End Date: | | 8/22/07 |
| Logged By: | | J. Hofer | | Total Depth: | | 87' |
| Location Code: | | RIMW-27 | | Abandonment: | | |
| Location: | | Rock Hill, South Carolina | | Latitude: | | |
| Driller: | | Jimmy Hall: Boart-Longyear | | Longitude: | | |
| Method: | | Sonic | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 56 | Quartz/Feldspa veins (weathered out) @ 55.6' | | NA | | | <p style="text-align: center;">RIMW-27 Well as built</p> <p>The diagram shows a well casing with several sections. From top to bottom: a 6-inch diameter section from 77 feet to the total depth of 87 feet. Below this, there are two sections of sand pack, each 6 feet thick, separated by a 2-inch PVC screen. Bentonite seals are located at the top of the well, at the junction of the 6-inch casing, and at the top of each sand pack section. The well is labeled 'RIMW-27 Well as built'.</p> |
| 57 | | | | | | |
| 58 | | | | | | |
| 59 | | | | | | |
| 60 | | | | | | |
| 61 | DIORITE, weathered, very broken (60-65.4') | | | | | |
| 62 | | | | | | |
| 63 | | VBR | | 7 | 3.5/10 | |
| 64 | | | | | | |
| 65 | | | | | | |
| 66 | DIORITE, fresh-slightly weathered, orthoclase, hornblende, biotite, pyroxine (65.4-78.6') | | | | | |
| 67 | | | | | | |
| 68 | | | | | | |
| 69 | | | | | | |
| 70 | | | | | | |
| 71 | | | | | | |
| 72 | | BR/ VBR | | 8 | 9/10 | |
| 73 | | | | | | |
| 74 | | | | | | |
| 75 | | | | | | |
| 76 | | | | | | |
| 77 | | | | | | |
| 78 | | | | | | |
| 79 | | | | | | |
| 80 | SAND, medium-coarse, with gravel, gray-olive green, saturated (78.6-80.6') | SP | | | | |
| 81 | | | | | | |
| 82 | GABBRO?, black-dark green, fresh- slightly weathered, pyroxine, hornblende (80.6-83.8') | BR | | 9 | 10/10 | |
| 83 | | | | | | |
| 84 | | | | | | |
| 85 | SAND, medium-coarse, with gravel, some silt, saturated (83.8-86.5') | SP | | | | |
| 86 | | | | | | |
| 87 | CLAY, black with sand, dry, hard (86.5-87') | CL | | | | |
| | | | | | | 6" TD 77' 8/19/07 |
| | | | | | | TD-87' |

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|-----------------------------------------------------------------------------------------------------|--------------|-------------------------|----------|----------------------------------|---------------------|
| Project: | Former PSC Site | Start Date: | 8/20/07 | | RIMW-28 Well as built | |
| Project No.: | 20958-50105 | End Date: | 8/23/07 | | | |
| Logged By: | J. Hofer | Total Depth: | 82' | | | |
| Location Code: | RIMW-28 | Abandonment: | | | | |
| Location: | Rock Hill, South Carolina | Latitude: | | | | |
| Driller: | Jimmy Hall: Boart-Longyear | Longitude: | | | | |
| Method: | Sonic | | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 1 | CONCRETE (0-0.6') | | | | | |
| 2 | CLAY, yellow-red, slightly moist, stiff (0.6-2.8') | CL | 20.4 | 1 | 6/7 | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | SAND with silt, yellow-green, fine-medium, loose, dry (2.8-7') | | 24.6 | | | |
| 6 | | | | | | |
| 7 | SAND with silt, fine-medium, (SAPROLITE), slightly moist, loose-medium density, green-grayish green | SM | 190 | 2 | 10/10 | Strong solvent odor |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |
| 13 | | | | | | |
| 14 | | | | | | |
| 15 | | | | | | |
| 16 | | | | | | |
| 17 | SM/SP | 26.3 | 3 | 10/10 | | |
| 18 | | | | | | |
| 19 | | | | | | |
| 20 | SM/SP | 11.1 | 3 | 10/10 | | |
| 21 | | | | | | |
| 22 | SM/SP | 23.7 | 3 | 10/10 | | |
| 23 | | | | | | |
| 24 | SM/SP | 37 | 3 | 10/10 | | |
| 25 | | | | | | |
| 26 | SAPROLITE/SAND, dense-very dense, saturated | | 0 | 4 | 10/10 | |
| 27 | | | | | | |
| 28 | | | | | | |
| 29 | | | | | | |
| 30 | | | | | | |
| 31 | | | | | | |
| 32 | | | | | | |

**RIMW-28
Well as built**

6-in Treaded steel casing
 Grout
 2-inch PVC Casing
 Grout
 6-in Treaded steel casing

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | | | | | |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------|----------------|----------------------------------|------------------------------------------|-----------------------------|--------------------------|--------------------------|-------------------------------------|
| Project: | Former PSC Site | Start Date: | 8/20/07 | | RIMW-28 Well as built | | | | | |
| Project No.: | 20958-50105 | End Date: | 8/23/07 | | | | | | | |
| Logged By: | J. Hofer | Total Depth: | 82' | | | | | | | |
| Location Code: | RIMW-28 | Abandonment: | | | | | | | | |
| Location: | Rock Hill, South Carolina | Latitude: | | | | | | | | |
| Driller: | Jimmy Hall: Boart-Longyear | Longitude: | | | | | | | | |
| Method: | Sonic | | | | | | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks | | | | |
| 33 | becoming dry @ 32' | SP | 0 | 4 | 10/10 | | | | | |
| 34 | | | 0 | 5 | 4/5 | | | | | |
| 35 | | | | | | | | | | |
| 36 | | | | | | | | | | |
| 37 | | | | | | | | | | |
| 38 | | | | | | | | | | |
| 39 | | | | | | | | | | |
| 40 | DIORITE, slightly weathered-fresh, medium-coarse xstalline, plagioclase, hornblende, biotite, white, black and dark green (42-51.8') | BR | 0 | 5 | 4/5 | TD-10" borehole, install 6" casing @ 46' | | | | |
| 41 | | | 0 | 6 | 5/5 | vert frags 46.0-48.2' | | | | |
| 42 | | | | | | | | | | |
| 43 | | | | | | | becomes fresh, broken @ 46' | 7 | 5/5 | TD-6" Resume d coring 8/23/07 @ 52' |
| 44 | | | | | | | | | | |
| 45 | | | | | | | | | | |
| 46 | | | | | | | | | | |
| 47 | | | | | | | | | | |
| 48 | GRANODIORITE, fresh-slightly weathered, orthoclase, hornblende, biotite, pyroxine, medium-coarse, xstalline, pink, black & dark green | VBR (57.8-59.4') | NA | 9 | 10/10 | vertical frac 57.3-58.1' | | | | |
| 49 | | | | | | | | | | |
| 50 | | | | | | | BR | vertical frac 58.9-59.8' | | |
| 51 | | | | | | | | | vertical frac 60.6-61.8' | |
| 52 | | | | | | | | | | |
| 53 | | | | | | | | | | |
| 54 | BR-VBR | vertical frac 60.6-61.8' | | | | | | | | |
| 55 | | | | | | | | | | |
| 56 | | | | | | | | | | |
| 57 | | | | | | | | | | |
| 58 | Bentonite Seal | Sand pack | 1-inch PVC Screen | Bentonite Seal | Sand pack | | | | | |
| 59 | | | | | | | | | | |
| 60 | | | | | | | | | | |
| 61 | | | | | | | | | | |
| 62 | | | | | | | | | | |
| 63 | | | | | | | | | | |
| 64 | | | | | | | | | | |

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|----------------------------------------------------|--------------|-------------------------|----------|----------------------------------------|----------------------------------|
| Project: | Former PSC Site | Start Date: | 8/20/07 | | RIMW-28 Well as built | |
| Project No.: | 20958-50105 | End Date: | 8/23/07 | | | |
| Logged By: | J. Hofer | Total Depth: | 82' | | | |
| Location Code: | RIMW-28 | Abandonment: | | | | |
| Location: | Rock Hill, South Carolina | Latitude: | | | | |
| Driller: | Jimmy Hall: Boart-Longyear | Longitude: | | | | |
| Method: | Sonic | | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 65 | feldspar/laumontite precipitate on fractured faces | BR | | | | multiple high < frags 64.5-67.5' |
| 66 | | | | | | |
| 67 | | BL | | 10 | 10/10 | Probably mech break @ 73' |
| 68 | | | | | | |
| 69 | | VBR | | | | mech break @ 77' |
| 70 | | | | | | |
| 71 | | BR | | | | vert frac 78.0-82.0' |
| 72 | | | | | | |
| 73 | | VBR | | | | TD-82' |
| 74 | | | | | | |
| 75 | No apparent weathering on fractured face @ 73.2' | BR | | | | Backfilled with sand |
| 76 | | | | | | |
| 77 | | VBR | | | | |
| 78 | | | | | | |
| 79 | | BL | | | | |
| 80 | | | | | | |
| 81 | | | | | | |
| 82 | | | | | | |

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log - RIMW-29 | | | | | | |
|----------------------|-------------------------------------------------------------------------------------------|----------------------------|-------------------------|--------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project: | | Former PSC Site | | Start Date: | | 8/19/07 |
| Project No.: | | 20958-50105 | | End Date: | | 8/22/07 |
| Logged By: | | J. Hofer | | Total Depth: | | 82' |
| Location Code: | | RIMW-29 | | Abandonment: | | |
| Location: | | Rock Hill, South Carolina | | Latitude: | | |
| Driller: | | Jimmy Hall: Boart-Longyear | | Longitude: | | |
| Method: | | Sonic | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 1 | GRAVEL (0-0.5') | | | | | <p style="text-align: center;">RIMW-29 Well as built</p> <p>6-inch Threaded Casing</p> <p>Grout</p> <p>2-inch PVC Casing</p> <p>Grout</p> <p>6-inch Threaded Casing</p> |
| 2 | CLAY, with medium sand, some gravel, brown-red, dry, very stiff, low pasticity (0.5-4.6') | CL | 0 | 1 | 5/7 | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | SILT with fine sand, yellow-brown, medium stiffness, low plasticity (4.6-7') | ML | 0 | | | |
| 7 | | | | | | |
| 8 | SILT with clay, brown, organic, very moist, high plasticity (7-11.4') | ML | 0 | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | SAND, fine-medium, little silt, grayish green, loose saturated (11.4-15') | SP | 0 | 2 | 9.5/10 | |
| 13 | | | | | | |
| 14 | | | | | | |
| 15 | | | | | | |
| 16 | SAND, medium-coarse, trace silt, saturated, loose (15-17.5') | SP | 0 | | | |
| 17 | | | | | | |
| 18 | SAND, dark gray green, moist, medium-coarse, some silt, dense (17.5-20') | SM | 0 | 3 | 7/6 | |
| 19 | | | | | | |
| 20 | | | | | | |
| 21 | SAPROLITE, sand with silt, dry, hard (20-21.5') | GP | 0 | | | |
| 22 | DIORITE, severely weathered, dry (21.5-23') | | | | | |
| 23 | | | | | | |
| 24 | SAND, fine-coarse, greenish gray, dry, loose (23-31.5') | SP | | 4 | 4/4 | |
| 25 | | | | | | |
| 26 | | | | | | |
| 27 | | | | | | |
| 28 | | | | | | |
| 29 | | | | | | |
| 30 | | | | | | |
| 31 | | | | | | |
| 32 | | | | 5 | 5 5/10 | |

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log - RIMW-29 | | | | | | |
|----------------------|-----------------------------------------------------------------------------------------------------------------|--------------|-------------------------|----------|---------------|---------------------------------|
| Project: | Former PSC Site | Start Date: | 8/19/07 | | | |
| Project No.: | 20958-50105 | End Date: | 8/22/07 | | | |
| Logged By: | J. Hofer | Total Depth: | 82' | | | |
| Location Code: | RIMW-29 | Abandonment: | | | | |
| Location: | Rock Hill, South Carolina | Latitude: | | | | |
| Driller: | Jimmy Hall: Boart-Longyear | Longitude: | | | | |
| Method: | Sonic | | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 33 | Severely Weathered DIORITE and saprolite sand, grayish green and brownish yellow (31.5-42') | GP/SP | NA | 6 | 4.5/10 | Install 6" casing @ 46" 8/20/07 |
| 34 | | | | | | |
| 35 | | | | | | |
| 36 | | | | | | |
| 37 | | | | | | |
| 38 | | | | | | |
| 39 | | | | | | |
| 40 | | | | | | |
| 41 | | | | | | |
| 42 | | | | | | |
| 43 | DIORITE, fresh with Iron staining on fractured faces, medium grained, orthoclase, hornblende, pyroxine, biotite | BR | NA | 7 | 10/10 | TD-10"-46' |
| 44 | | | | | | |
| 45 | | | | | | |
| 46 | | | | | | |
| 47 | | | | | | |
| 48 | | | | | | |
| 49 | | | | | | |
| 50 | | | | | | |
| 51 | | | | | | |
| 52 | | | | | | |
| 53 | DIORITE, green and black, coarse xstalline, fresh-slightly weathered | VBR | NA | 8 | 10/10 | vert. frac 57.7-58.3 |
| 54 | | | | | | |
| 55 | | | | | | |
| 56 | | | | | | |
| 57 | | | | | | |
| 58 | | | | | | |
| 59 | | | | | | |
| 60 | | | | | | |
| 61 | | | | | | |
| 62 | | | | | | |
| 63 | DIORITE, fresh, coarse (64-70.8') | VBR/GP | NA | | | Sand Pack |
| 64 | | | | | | |
| 65 | | | | | | |
| 66 | | | | | | |
| 67 | | | | | | |
| 68 | | | | | | |
| 69 | | | | | | |
| 70 | | | | | | |
| 71 | | | | | | |
| | | | | | | |
| | | | | | | 2-inch PVC Screen |
| | | | | | | Bentonite Seal |
| | | | | | | Sand Pack |

RIMW-29
Well as built

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log - RIMW-29 | | | | | | | |
|----------------------|-----------------------------------------------------------|----------------------------|-------------------------|--------------|---------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Project: | | Former PSC Site | | Start Date: | | 8/19/07 | |
| Project No.: | | 20958-50105 | | End Date: | | 8/22/07 | |
| Logged By: | | J. Hofer | | Total Depth: | | 82' | |
| Location Code: | | RIMW-29 | | Abandonment: | | | |
| Location: | | Rock Hill, South Carolina | | Latitude: | | | |
| Driller: | | Jimmy Hall: Boart-Longyear | | Longitude: | | | |
| Method: | | Sonic | | | | | |
| Depth (ft) | Description of Materials | USCS/ Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks | |
| 72 | Highly fractured zone (70.8-72.4') | VBR | | 9 | 10/10 | | <p style="text-align: center;">RIMW-29 Well as built</p> <p style="text-align: center;">Backfilled with sand</p> |
| 73 | DIORITE, fresh, coarse, very little fracturing (72.4-82') | BL (72.4-76') | | | | vert. frac 77.3-78.3 | |
| 74 | | | | | | | |
| 75 | | | | | | | |
| 76 | | | | | | | |
| 77 | | | | | | | |
| 78 | | | | | | | |
| 79 | | | | | | | |
| 80 | BR | | | 10 | 5/5 | TD-82' | |
| 81 | | | | | | | |
| 82 | | | | | | | |

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|--------------------------------------------------------|----------------------------|-------------------------|--------------|---------------|----------------------------------|
| Project: | | Former PSC Site | | Start Date: | | 8/20/07 |
| Project No.: | | 20958-50105 | | End Date: | | 8/23/07 |
| Logged By: | | J. Hofer | | Total Depth: | | 133' |
| Location Code: | | RIMW-20 | | Abandonment: | | |
| Location: | | Rock Hill, South Carolina | | Latitude | | |
| Driller: | | Jimmy Hall: Boart-Longyear | | Longitude: | | |
| Method: | | Sonic | | | | |
| Depth (ft) | Description of Materials | USCS/Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 1 | SAND with silt, brown loose, fine- very fine- | SM | | | | RIMW-30 Well as built |
| 2 | SILT with fine sand, brown-yellow, brown, stiff, dry | | | | | |
| 3 | | | | | | |
| 4 | | ML | | 1 | 7/7 | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | SAND, fine-medium with silt, medium density, grey | | | | | |
| 9 | green and yellow brown, moist SAPROLITE | | | | | |
| 10 | (biotite, quartz, feldspar, hornblende) (starts @ | | | | | |
| 11 | 7.5') | | | | | |
| 12 | | SM | | 2 | 10/10 | |
| 13 | becomes dry | | | | | |
| 14 | | | | | | |
| 15 | | | | | | |
| 16 | | | | | | |
| 17 | | | | | | |
| 18 | becoming coarse dense | | | | | |
| 19 | | SP | | | | |
| 20 | | | | | | |
| 21 | SAPROLITE, sand, medium-coarse, white, black, | | | | | |
| 22 | green, slightly moist, (biotite, hornblende, feldspar) | | | 3 | 10/10 | |
| 23 | | | | | | |
| 24 | | | | | | |
| 25 | | | | | | |
| 26 | | | | | | |
| 27 | | SP | | | | |
| 28 | | | | | | |
| 29 | | | | | | |
| 30 | | | 0 | | | |
| 31 | | | | | | |
| 32 | | | | | | |
| 33 | | | | 4 | 10/10 | |

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|---------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|--------------|---------------|-------------------------------------|
| Project: | | Former PSC Site | | Start Date: | | 8/20/07 |
| Project No.: | | 20958-50105 | | End Date: | | 8/23/07 |
| Logged By: | | J. Hofer | | Total Depth: | | 133' |
| Location Code: | | RIMW-20 | | Abandonment: | | |
| Location: | | Rock Hill, South Carolina | | Latitude: | | |
| Driller: | | Jimmy Hall: Boart-Longyear | | Longitude: | | |
| Method: | | Sonic | | | | |
| Depth (ft) | Description of Materials | USCS/Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 34 | Grading to severely weathered rock (DIORITE), gravel with sand and silt | GP | | | | |
| 35 | | | | | | |
| 36 | | | | | | |
| 37 | | | | | | |
| 38 | | | | | | |
| 39 | | | | | | |
| 40 | | | | | | |
| 41 | Weathered GRANODIORITE Gravel with sand | GP | | 5 | 2/10 | coring with water, fines washed out |
| 42 | | | | | | |
| 43 | | | | | | |
| 44 | | | | | | |
| 45 | | | | | | |
| 46 | | | | | | |
| 47 | | | | | | |
| 48 | | | | | | |
| 49 | | | | | | |
| 50 | | | | | | |
| 51 | Weathered DIORITE/GRANODIORITE, quartz, hornblende, feldspar, biotite, poss. garnet, (GRAVEL with sand) | GP/SP | | 7 | 1.5/10 | hard coring |
| 52 | | | | | | |
| 53 | | | | | | |
| 54 | | | | | | |
| 55 | | | | | | |
| 56 | | | | | | |
| 57 | | | | | | |
| 58 | | | | | | |
| 59 | | | | | | |
| 60 | | | | | | |
| 61 | | | | | | |
| 62 | | | | | | |
| 63 | | | | | | |
| 64 | | | | | | |
| 65 | | | | | | |

RIMW-30
Well as built

Grout

2-in PVC casing

Grout

Appendix B-2
Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

| Boring Log | | | | | | |
|----------------|---------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------|--------------|---------------|-----------------------------------|
| Project: | | Former PSC Site | | Start Date: | | 8/20/07 |
| Project No.: | | 20958-50105 | | End Date: | | 8/23/07 |
| Logged By: | | J. Hofer | | Total Depth: | | 133' |
| Location Code: | | RIMW-20 | | Abandonment: | | |
| Location: | | Rock Hill, South Carolina | | Latitude: | | |
| Driller: | | Jimmy Hall: Boart-Longyear | | Longitude: | | |
| Method: | | Sonic | | | | |
| Depth (ft) | Description of Materials | USCS/Litho | Screening Results (ppm) | Core Run | Recovery (ft) | Remarks |
| 66 | No recovery, (sand?) | SP | NA | 8 | 0/10 | cored with water fines washed out |
| 67 | | | | | | |
| 68 | | | | | | |
| 69 | | | | | | |
| 70 | | | | | | |
| 71 | | | | | | |
| 72 | | | | | | |
| 73 | | | | | | |
| 74 | | | | | | |
| 75 | | | | | | |
| 76 | Weathered (Moderate-Severe) DIORITE/GRANODIORITE, appears to becoming more competent rock, (GRAVEL with sand) | GP/SP | NA | 9 | 2/10 | Stop 8/20/07 |
| 77 | | | | | | |
| 78 | | | | | | |
| 79 | | | | | | |
| 80 | | | | | | |
| 81 | | | | | | |
| 82 | | | | | | |
| 83 | | | | | | |
| 84 | | | | | | |
| 85 | | | | | | |
| 86 | GRANODIORITE, fresh-slightly weathered, hard quartz, feldspar, hornblende, trace biotite, trace | BR | | 10 | 2.8/10 | hard coring |
| 87 | | | | | | |
| 88 | | | | | | |
| 89 | | | | | | |
| 90 | | | | | | |
| 91 | | | | | | |
| 92 | | | | | | |
| 93 | | | | | | |
| 94 | | | | | | |
| 95 | | | | | | |
| 96 | RIMW-30 Well as built | | | | | |
| 97 | | | | | | |

Appendix C

Geophysical Survey Reports

**Borehole Geophysical Survey Report
PSC Site
Rock Hill, South Carolina**

Date of Survey: December 13-18, 2006



**James Ursic
Superfund Division – Innovative Systems and Technology Branch
Field Services Section
United States Environmental Protection Agency
Region 5
Chicago, Illinois**

Introduction

Requests for a borehole geophysical survey were presented to Kevin Beswick of U.S. Environmental Protection Agency (USEPA) Region 4 Office of Regional Counsel by Judy Canova from the South Carolina Department of Health and Environmental Control. The request sought assistance from Region 5 to provide borehole geophysical surveys to aid positioning of well screens during a well construction phase, in addition to gathering geophysical information from existing on-site wells. The survey commenced on December 13 and continued consecutively through the 18, 2006 at the PSC - Thermalkem site in Rock Hill, South Carolina. Funding for the borehole geophysical survey was provided by Region 4 of USEPA.

Geophysical Methods

Data were collected using a borehole logging platform mounted in a modified four wheel drive Suburban vehicle owned and operated by Region 5 USEPA. The vehicle has two on-board geophysical logging collection systems which run independently through a single Century winch system. The two data collection systems are a Century Geophysical unit and a Mount Sopris Instruments unit.

A combination of five logging tools were used at the site which included Century probes: 9041, 9060, 9065 and Mount Sopris probes 2EMA and 2IDA. Table 1 provides information describing each of the tools, while Appendix A presents a chronology of tool applications for each well investigated. Table 2 is a summary of which logging tools were used at each well.

Table 1
Geophysical Tool Descriptions

| Probe → | 9041 Multi-Parameter Formation & Resistivity | 9060 Slim-hole Natural Gamma (without SP option) | 9065 3-Arm Caliper | 2EMA Formation Conductivity (Electromagnetic Induction or EM) | 2IDA Multi-Parameter Fluid Chemistry |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|---------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Purpose | Geologic & limited fluid data | Clay characterization | Hole & casing diameter | Geologic conductive- resistive intervals | General fluid chemistry parameters |
| Operating System | Century | Century | Century | Mount Sopris | Mount Sopris |
| Diameter | 2.5" | 1.4" | 1.7" | 1.5" | 2" |
| Length | 84" | 80" | 61.6" | 62.2" | 24.1" |
| Parameters Measured | Natural gamma Temperature Fluid resistivity Spontaneous Potential Single Point Resistance Normal resistivity: 16 inch 64 inch Lateral resistivity: 48 inch | Natural gamma | Diameter | Collective geologic/fluid conductivity | Pressure (depth) Temperature Fluid Conductivity Oxygen Redox Chloride Ammonia Nitrate (note NO ₃ & NH ₄ sensors are interchangeable – cannot be operated simultaneously) |

Table 2
Geophysical Tools Applied in Various Wells at PSC Site

| WELL ID ↓ | 9065 (Century Inc.) 3-Arm Caliper Tool | 9041 (Century Inc.) Multi Parameter Formation & Resistivity Tool | 9060 (Century Inc.) Slim-Hole Natural Gamma Tool | 2EMA (Mount Sopris Inc.) Formation Conductivity (EM) Tool | 2IDA (Mount Sopris Inc.) Multi Parameter Fluid Analysis Tool |
|---------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| RIMW14 | X | X | | X | X ¹ |
| PW3 | X | X | | X | X ¹ |
| RIMW13 | X | X | | X | X ^{1,2} |
| RIMW18 | X | X | | X | X ^{1,2} |
| P3 | | | | X | X ^{1,2} |
| OB109B | | | X | X | X ¹ |
| W1 | | | | X | X ¹ |
| BP1B | | | X | X | X ^{1,2} |
| MW113B | | | X | X | X ^{1,2} |
| MW100 | | | X | | X ^{1,2} |
| RIPZ2 | X | X | | X | X ^{1,2} |
| RIMW19 | X | X | | X | X ^{1,2} |
| MW122B | | | X | X | X ^{1,2} |
| EW4 | | | X | | X ^{1,2} |
| MW123B | | | X | | X ^{1,2} |

X¹ = NO₃ X² = NH₄

Note that not all tools could be used in each well due to varying well diameters and well construction conditions (refer to tool diameters; Table 1). For example, certain parameters of the 9041 tool (i.e. spontaneous potential, single point resistance, normal and lateral resistivity) require open hole (no casing) and fluid conditions to operate properly. Although fluid parameters can be obtained in wells with or without casing, those data obtained without casing or inside screen intervals will be most representative of formation conditions. Generally, fluid measurements obtained within casing are measuring stagnant conditions, unless recently purged. It is also important to note that all fluid measurements can be effected by multiple tool traverses which agitates and disrupts the fluid column each time a tool traverse is initiated.

Natural gamma and caliper measurements can be obtained through all commonly used well casings and open hole conditions. Formation or electromagnetic (EM) conductivity measurements can be obtained through commonly used plastic casing material and within open hole conditions, it cannot be used within metal casing. Any metal near the EM induction tool will interfere with the data; this includes any metal external to PVC casing such as metal well casing stabilizers within the annulus between the casing and borehole wall.

Field Procedures

Standardization checks for various tools were conducted as follows: caliper tool (9065) was evaluated against eight and four inch diameter rings; data were 2910 and 1720 counts per second respectively. Natural gamma readings for the 9060 and 9041 were evaluated using a check source; data were 260 and 210 counts per second respectively. Background for each natural gamma tool was 4 and 10 counts per second respectively. The 2IDA tool sensors were evaluated against water collected from a local hotel in Rock Hill. Conductivity ranged between 103.86 and 118.367 uS/cm; Conductivity at 20 degrees Centigrade ranged between 100.161 and 112.760 uS/cm; redox ranged between 240-310mV and 219-230 mV; oxygen values remained constant at zero ppm. Chloride ranged between 141.2 and 148.60 mg/L; nitrate ranged near 191 mg/L; and ammonia ranged near 85 mg/L. Formation conductivity (EM) data were not collected until the readings stabilized after being lowered into the well and electronic components had time acclimate to borehole temperatures. Time periods required to acclimate with down hole conditions were noted on log headers.

The primary goal of the survey was to log wells RIMW13, RIMW14, RIMW18, RIMW19 and RIPZ2 as initial drilling activities were completed at each location. However, as time permitted between drilling operations, other previously existing wells at the site were also logged. These included wells BP1B, EW4, MW100, OB109B, MW113B, MW122B, MW123B, PW3, P3 and W1. Attempts were made to log MW120B and MW121B but overgrown vegetation and debris within the gravel roadway prohibited vehicle access to the wells (see photographic log).

Sequencing the order of tool applications were established by the logging operator based on well conditions reported by the driller, time constraints, drilling schedules, casing conditions and water levels. Wells with stability concerns were usually logged with a caliper tool for the initial traverse. When possible, tools measuring water parameters were logged moving down hole to fully expose sensors without backwash issues and also to avoid additional mixing of the fluid column. Draft well logs were provided to on-site officials as the logging process was completed at each well.

Data Processing

Well log data for on-site draft logs and this report were created using WellCAD version 4.1. In some cases a smoothing algorithm (moving average) built into WellCAD program was applied for easier comprehension of certain logs, most often natural gamma logs. When such an algorithm was used, a note was made on the log header as well as the range of the moving average calculation.

For those tools having multiple sensors, note that not all data terminates at the same elevation, this is due to varied sensor locations throughout the length of the tool. The most varied sensor separations can be seen from data obtained by the 9041 tool.

Table 3 summarizes how various data sets of well log information were combined to display data for each well. Note that tool 2IDA can be configured using two optional modes, either with an ammonia sensor or nitrate sensor. Both of these sensors use the same sensor base and thus

cannot be used at the same time, therefore it requires two separate traverses if both sets of data are desired. When both sets of options are obtained, the acquisition process results in the duplication of the remaining multiple sensor data as the second traverse is completed. Minor differences will exist when comparing the duplicate data from each traverse due to the agitation of well fluids from the previous traverses.

Table 3
Presentation Combinations for Geophysical Log Data

| WELL ID ↓ | Log Combinations 9041 & 9065 | Log Combinations Partial 9041; 9065 & 2EMA | Log Combinations 9060 & 2EMA | Log Presentation 2EMA | Log Presentation 9060 | Log Presentation 2IDA¹ | Log Presentation 2IDA² | Total Log Presentation Sets Per Well |
|--------------------------|---------------------------------------------|---------------------------------------------------------------|---------------------------------------------|----------------------------------|----------------------------------|----------------------------------------------|----------------------------------------------|-------------------------------------------------|
| RIMW14 | X | X | | | | X ¹ | | 3 |
| PW3 | X | X | | | | X ¹ | | 3 |
| RIMW13 | X | X | | | | X ¹ | X ² | 4 |
| RIMW18 | X | X | | | | X ¹ | X ² | 4 |
| P3 | | | | X | | X ¹ | X ² | 3 |
| OB109B | | | X | | | X ¹ | | 2 |
| W1 | | | | X | | X ¹ | | 2 |
| BP1B | | | X | | | X ¹ | X ² | 3 |
| MW113B | | | X | | | X ¹ | X ² | 3 |
| MW100 | | | | | X | X ¹ | X ² | 3 |
| RIPZ2 | X | X | | | | X ¹ | X ² | 4 |
| RIMW19 | X | X | | | | X ¹ | X ² | 4 |
| MW122B | | | X | | | X ¹ | X ² | 3 |
| EW4 | | | | | X | X ¹ | X ² | 3 |
| MW123B | | | | | X | X ¹ | X ² | 3 |

X¹ = NO₃

X² = NH₄



Results

Combinations of forty seven log sets are attached to this report presenting all data collected at the site. Each combination was grouped in a manner which complemented similar parameters, some of which may have been duplicated and incorporated into other data sets such as caliper and natural gamma logs added to an EM log. When possible, photographs were taken of logging sites in addition to GPS coordinates if acceptable satellite reception conditions existed. A Trimble Pathfinder Pro and Recon data recorder were used to acquire GPS data.

Most all measurements were referenced from the top of the inner casing, when present, or the outer casing during logging operations. The height of the various above/below ground risers/casings were also measured and noted on log headers so that references to ground level could be established. However, all final logs were referenced to ground surface to avoid confusion with any prior temporary casings. Locations of wells logged are noted on Figure 1.

Generally all of the new wells drilled had water levels which stabilized within a day. However, well RIMW14 required over a day to stabilize and the following rates were recorded:

| Date | Time | DTW* (feet) |
|-------|-------|-------------|
| 12/13 | 10:45 | 81.81 |
| 12/13 | 13:45 | 69.42 |
| 12/13 | 13:56 | 68.28 |
| 12/14 | 08:15 | 20.25 |

* = Depth to Water

Some wells, such as MW122B, have PVC riser casing and stainless steel well screens, which would limit acquiring EM and other electric logs. When such circumstances occurred, they were noted on the log header. When possible, EM logs were recorded the entire length of the hole but data were omitted after the metal screen was encountered due to interference.

Locations of well screens, or proposed placement locations, were noted on well logs to better assist the reader in log interpretation.

Conclusions

Please refer to the attached well logs.

Newly drilled wells (RIMW13, RIMW14, RIMW18, RIMW19 and RIPZ2) which were surveyed with borehole geophysical tools also had fluids sampled at specific intervals using a packer assembly. The packer assembly, operated by the drilling contractor, used a sampling interval of ten feet between inflatable packers which isolated fluids beyond the ten foot sampling area (see photo log). Well RIMW19 was tested with packer sampling intervals set at 63'-75' and 76'-88'. Analytical data from sampled fluids and geophysical anomalies observed with borehole geophysical instruments provided information needed to locate well screen intervals. Note that screen locations were referenced and measured from the top of the outer casing at the time drilling was completed, not from the final well head completion configuration (see photo log for clarifications). The proposed screen intervals are as follows:

| | |
|--------|----------------------------------------------|
| RIMW13 | 72' to 82' feet from ground surface (GS) |
| RIMW14 | 85' to 75' feet from ground surface (GS) |
| RIMW18 | 45.5' to 55.5' feet from ground surface (GS) |
| RIMW19 | 70' to 80' feet from ground surface (GS) |
| RIPZ2 | 63 to 73 feet from ground surface (GS) |

(GS) = Ground Surface

Some of the existing wells logged (P3, BP1B and MW100) extended beyond the documented screen interval and it is unclear from previous well completion records if sumps exist below the screen interval. If sumps do not exist, there are minor discrepancies with screen locations.

Two of the flush mount wells (OB109B and 113B) terminated at a depth before the end of the documented screen interval. If well construction documents are correct, these wells probably have accumulated sediment within the screen interval.

A final observation concerning well MW123B was made in reference to log responses from the 2IDA tool. It appears that conductivity, temperature, ammonia, chloride, redox and nitrate all seem to have some changes at ten foot intervals (18.63', 28.63' and 38.63' from ground surface). If well construction logs indicate that ten foot sections of casing were used to construct the well and jointed together at these locations, the possibility exists that the casing joints may be leaking. If this observation can be refuted, the log responses may only be a coincidence. If additional evidence is needed, a video log of the well casing would provide data as to the location of casing joints.

Any questions regarding this report can be directed to:

James Ursic
77 West Jackson Boulevard
Mail Stop SRT-4J
Chicago, IL 60604
312.353.2536
Ursic.James@EPA.GOV

Attachments: Appendix A, B and C
Well Logs (47 logs)

APPENDIX A

Chronology of Geophysical Logging Events PSC Site Rock Hill, South Carolina

| <u>Date</u> | <u>Tool*</u> | <u>Time</u> | <u>Well</u> | <u>Traverse Direction</u> | <u>Scale Options</u> | <u>Parameter Option</u> | <u>Well Photo</u> |
|--------------|--------------|-------------|-------------|---------------------------|----------------------------|-------------------------|-------------------|
| 12/13 | | | | | | | |
| 9065 | | 10:12 | test | | | | |
| 9065 | N/A | | RIMW14 | Down | | | Yes |
| 9065 | | 10:53 | RIMW14 | Up** | | | |
| 9041 | | 11:34 | RIMW14 | Down | | | |
| 9041 | N/R | | RIMW14 | Up | | | |
| 9041 | N/R | | RIMW14 | Down | | | |
| 9041 | | 12:22 | RIMW14 | Up | | | |
| 2EMA | | 13:43 | RIMW14 | Down | 1000mS/m | | |
| 2EMA | | 13:50 | RIMW14 | Up | 1000mS/m | | |
| 9065 | N/A | | PW3 | Down | | | |
| 9065 | | 14:39 | PW3 | Up | | | Yes ^x |
| 9041 | | 15:19 | PW3 | Down | | | |
| 9041 | N/R | | PW3 | Up | | | |
| 2EMA | | 16:00 | PW3 | Down | 1000mS/m | | |
| 2EMA | | 16:05 | PW3 | Up | 1000mS/m | | |
| 2IDA | | 16:30 | PW3 | Down | 0-64 mg/l ^{***} | NO ₃ | |
| 2IDA | N/R | | PW3 | Up | | | |
| 12/14 | | | | | | | |
| 9041 | | 08:31 | RIMW14 | Down | | | Yes |
| 9041 | | 08:42 | RIMW14 | Up | | | |
| 2IDA | | 10:04 | RIMW14 | Down | 0-64 mg/l ^{***} | NO ₃ | |
| 2IDA | | 10:08 | RIMW14 | Up | 0-6400 ug/l ^{***} | NO ₃ | |
| 2EMA | | 12:12 | RIMW13 | Down | 1000mS/m | | Yes |
| 2EMA | | 12:19 | RIMW13 | Up | 1000mS/m | | |
| 2EMA | | 12:25 | RIMW13 | Down | 1000mS/m | | |
| 2EMA | | 12:32 | RIMW13 | Up | 1000mS/m | | |
| 2IDA | | 12:48 | RIMW13 | Down | 0-6400 ug/l ^{***} | NO ₃ | |
| 2IDA | | 12:52 | RIMW13 | Up | 0-6400 ug/l ^{***} | NO ₃ | |
| 2IDA | | 13:03 | RIMW13 | Down | 0-6400 ug/l ^{***} | NH ₄ | |
| 2IDA | | 13:09 | RIMW13 | Up | 0-6400 ug/l ^{***} | NH ₄ | |
| 9065 | N/A | | RIMW13 | Down | | | |
| 9065 | | 13:24 | RIMW13 | Up | | | |
| 9041 | | 13:40 | RIMW13 | Down | | | |
| 9041 | | 14:05 | RIMW13 | Up | | | |
| 12/15 | | | | | | | |
| 9065 | N/A | | RIMW18 | Down | | | Yes |
| 9065 | | 09:00 | RIMW18 | Up | | | |
| 9041 | | 09:25 | RIMW18 | Down | | | |
| 9041 | | 09:33 | RIMW18 | Up | | | |
| 2EMA | | 10:38 | RIMW18 | Down | 1000mS/m | | |
| 2EMA | | 10:43 | RIMW18 | Up | 1000mS/m | | |
| 2IDA | | 10:56 | RIMW18 | Down | 0-6400 ug/l ^{***} | NH ₄ | |
| 2IDA | | 11:00 | RIMW18 | Up | 0-6400 ug/l ^{***} | NH ₄ | |
| 2IDA | | 11:19 | RIMW18 | Down | 0-6400 ug/l ^{***} | NO ₃ | |
| 2IDA | N/R | | RIMW18 | Up | | | |

^x photographs taken 8/2007

APPENDIX A (continued)

| <u>Date</u> | <u>Tool*</u> | <u>Time</u> | <u>Well</u> | <u>Traverse Direction</u> | <u>Scale Options</u> | <u>Parameter Option</u> | <u>Well Photo</u> |
|--------------|--------------|--------------|---------------|---------------------------|----------------------------|-------------------------|-------------------|
| 12/15 | | | | | | | |
| | 2IDA | 15:15 | P3 | Down | 0-6400 ug/l ^{***} | NO ₃ | Yes ^x |
| | 2IDA | 15:18 | P3 | Up | 0-6400 ug/l ^{***} | NO ₃ | |
| | 2IDA | 15:25 | P3 | Down | 0-6400 ug/l ^{***} | NH ₄ | |
| | 2IDA | 15:28 | P3 | Up | 0-6400 ug/l ^{***} | NH ₄ | |
| | 2EMA | 15:53 | P3 | Down | 1000mS/m | | |
| | 2EMA | 15:57 | P3 | Up | 1000mS/m | | |
| 12/16 | | | | | | | |
| | 2IDA | 09:10 | OB109B | Down | 0-6400 ug/l ^{***} | NO ₃ | Yes ^x |
| | 2IDA | 09:14 | OB109B | Up | 0-6400 ug/l ^{***} | NO ₃ | |
| | 2EMA | 09:48 | OB109B | Down | 1000mS/m | | |
| | 2EMA | 09:53 | OB109B | Up | 1000mS/m | | |
| | 9060 | 10:07 | OB109B | Down | | | |
| | <u>9060</u> | <u>10:15</u> | <u>OB109B</u> | Up | | | |
| | 2IDA | 11:07 | W1 | Down | 0-6400 ug/l ^{***} | NO ₃ | Yes |
| | 2IDA | 11:09 | W1 | Up | 0-6400 ug/l ^{***} | NO ₃ | |
| | 2EMA | 11:38 | W1 | Down | 1000mS/m | | |
| | <u>2EMA</u> | <u>11:41</u> | <u>W1</u> | Up | 1000mS/m | | |
| | 2IDA | 13:33 | BP1B | Down | 0-6400 ug/l ^{***} | NO ₃ | Yes |
| | 2IDA | 13:36 | BP1B | Up | 0-6400 ug/l ^{***} | NO ₃ | |
| | 2IDA | 13:53 | BP1B | Down | 0-6400 ug/l ^{***} | NH ₄ | |
| | 2IDA | 13:58 | BP1B | Up | 0-6400 ug/l ^{***} | NH ₄ | |
| | 2EMA | 14:22 | BP1B | Down | 1000mS/m | | |
| | 2EMA | 14:29 | BP1B | Up | 1000mS/m | | |
| | 9060 | 14:42 | BP1B | Down | | | |
| | <u>9060</u> | <u>14:46</u> | <u>BP1B</u> | Up | | | |
| | 2IDA | 16:07 | MW113B | Down | 0-6400 ug/l ^{***} | NH ₄ | Yes |
| | 2IDA | 16:10 | MW113B | Up | 0-6400 ug/l ^{***} | NH ₄ | |
| | 2IDA | 16:20 | MW113B | Down | 0-6400 ug/l ^{***} | NO ₃ | |
| | 2IDA | 16:23 | MW113B | Up | 0-6400 ug/l ^{***} | NO ₃ | |
| | 2EMA | 16:46 | MW113B | Down | 1000mS/m | | |
| | 2EMA | 16:49 | MW113B | Up | 1000mS/m | | |
| | 9060 | 16:54 | MW113B | Down | | | |
| | 9060 | 16:58 | MW113B | Up | | | |
| 12/17 | | | | | | | |
| | 2IDA | 08:11 | MW100 | Down | 0-6400 ug/l ^{***} | NO ₃ | Yes |
| | 2IDA | 08:14 | MW100 | Up | 0-6400 ug/l ^{***} | NO ₃ | |
| | 2IDA | 08:25 | MW100 | Down | 0-6400 ug/l ^{***} | NH ₄ | |
| | 2IDA | 08:27 | MW100 | Up | 0-6400 ug/l ^{***} | NH ₄ | |
| | 9060 | 08:50 | MW100 | | | | |
| | <u>9060</u> | <u>08:54</u> | <u>MW100</u> | | | | |
| | 9065 | N/A | RIPZ2 | Down | | | Yes |
| | 9065 | 12:00 | RIPZ2 | Up | | | |
| | 9041 | 12:36 | RIPZ2 | | | | |
| | 9041 | 12:42 | RIPZ2 | | | | |
| | 2EMA | 13:14 | RIPZ2 | Down | 1000mS/m | | |
| | 2EMA | 13:21 | RIPZ2 | Up | 1000mS/m | | |
| | 2IDA | 13:33 | RIPZ2 | Down | 0-6400 ug/l ^{***} | NH ₄ | |

^x photographs taken 8/2007

APPENDIX A (continued)

| <u>Date</u> | <u>Tool*</u> | <u>Time</u> | <u>Well</u> | <u>Traverse Direction</u> | <u>Scale Options</u> | <u>Parameter Option</u> | <u>Well Photo</u> |
|--------------|--------------|-------------|-------------|---------------------------|----------------------------|-------------------------|-------------------|
| 12/17 | | | | | | | |
| | 2IDA | 13:40 | RIPZ2 | Up | 0-6400 ug/l ^{***} | NH ₄ | |
| | 2IDA | 13:52 | RIPZ2 | Down | 0-6400 ug/l ^{***} | NO ₃ | |
| | 2IDA | 13:58 | RIPZ2 | Up | 0-6400 ug/l ^{***} | NO ₃ | |
| | 9065 | N/A | RIMW19 | Down | | | Yes |
| | 9065 | 15:48 | RIMW19 | Up | | | |
| | 9041 | 16:11 | RIMW19 | Down | | | |
| | 9041 | 16:22 | RIMW19 | Up | | | |
| | 2EMA | 17:03 | RIMW19 | Down | 1000mS/m | | |
| | 2EMA | 17:08 | RIMW19 | Up | 1000mS/m | | Yes |
| | 2IDA | 17:20 | RIMW19 | Down | 0-6400 ug/l ^{***} | NO ₃ | |
| | 2IDA | 17:27 | RIMW19 | Up | 0-6400 ug/l ^{***} | NO ₃ | |
| | 2IDA | 17:38 | RIMW19 | Down | 0-6400 ug/l ^{***} | NH ₄ | |
| | 2IDA | 17:44 | RIMW19 | Up | 0-6400 ug/l ^{***} | NH ₄ | |
| 12/18 | | | | | | | |
| | 2IDA | 10:03 | MW122B | Down | 0-6400 ug/l ^{***} | NH ₄ | Yes |
| | 2IDA | 10:07 | MW122B | Up | 0-6400 ug/l ^{***} | NH ₄ | |
| | 2IDA | 10:15 | MW122B | Down | 0-6400 ug/l ^{***} | NO ₃ | |
| | 2IDA | 10:18 | MW122B | Up | 0-6400 ug/l ^{***} | NO ₃ | |
| | 2EMA | 10:43 | MW122B | Down | 1000mS/m | | |
| | 2EMA | 10:46 | MW122B | Up | 1000mS/m | | |
| | 9060 | 10:52 | MW122B | Down | | | |
| | 9060 | 10:55 | MW122B | Up | | | |
| | 2IDA | 12:26 | EW4 | Down | 0-6400 ug/l ^{***} | NO ₃ | Yes |
| | 2IDA | 12:31 | EW4 | Up | 0-6400 ug/l ^{***} | NO ₃ | |
| | 2IDA | 12:55 | EW4 | Down | 0-6400 ug/l ^{***} | NH ₄ | |
| | 2IDA | 13:01 | EW4 | Up | 0-6400 ug/l ^{***} | NH ₄ | |
| | 9060 | 13:07 | EW4 | Down | | | |
| | 9060 | 13:12 | EW4 | Up | | | |
| | 2IDA | 15:32 | MW123B | Down | 0-64 mg/l ^{***} | NH ₄ | Yes |
| | 2IDA | 15:36 | MW123B | Up | 0-64 mg/l ^{***} | NH ₄ | |
| | 2IDA | 15:53 | MW123B | Down | 0-6400 ug/l ^{***} | NO ₃ | |
| | 2IDA | 15:56 | MW123B | Up | 0-6400 ug/l ^{***} | NO ₃ | |
| | 9060 | 16:08 | MW123B | Down | | | |
| | 9060 | 16:11 | MW123B | Up | | | |

* Tool designators
 9041 Century Geophysical multi-parameter formation & resistivity tool
 9060 Century Geophysical slim hole natural gamma tool (without SP option)
 9065 Century Geophysical 3-arm caliper tool
 2EMA Mount Sopris formation conductivity tool (electromagnetic induction)
 2IDA Mount Sopris multi-parameter water chemistry tool

** Traverse selected for print-out

*** Applies only to Idronaut fluid conductivity value

N/R Not recorded

N/A Not applicable

APPENDIX B
Well Information; Rock Hill, South Carolina

| Well | New or Old Well | Old Well Style | Outer Casing Dia. | Inner Casing Dia. & Type | End Of Casing From GS | Outer Casing Stickup From GS | Inner Casing Distance From Top Open Outer Casing | DTW From TIC or TOC; Time; Date | Well Depth From TIC or TOC | Screen Interval From GS or (proposed) | TOC Elevation | Latitude Longitude |
|--------|-----------------|----------------|-------------------|--------------------------|-----------------------|------------------------------|--------------------------------------------------|----------------------------------|----------------------------|---------------------------------------|---------------|---------------------------------|
| RIMW14 | New | N/A | 6" | None | 46.4' | 0.20' | N/A | 20.25' TOC ~08:15 12/14 | 86.23' TOC | (65'-75') | N/A | 34.88725°N -81.07275°W |
| PW3 | Old | Stickup | 6" | None | 20.5' | 2.90' | N/A | 12.53' TOC ~14:30 12/13 | 58.24' TOC | N/A | 523.98' | 34.88748138°N -81.07422663°W |
| RIMW13 | New | N/A | 6" | None | 37' | 0.56' | N/A | 44.71' TOC ~12:00 12/14 | 101.55' TOC | (72'-82') | N/A | 34.88914°N -81.07303°W |
| RIMW18 | New | N/A | 6" | None | 39' | 1.60' | N/A | 12.90' TOC ~08:45 12/15 | 79.26' TOC | (45.5'-55.5') | N/A | 34.88844°N -81.07347°W |
| P3 | Old | Stickup | N/A | 2" PVC | 30' | 0' | -0.2 | 14.25' TIC ~15:00 12/15 | 34.49' TIC | 30' to 35' | 526.12' | 34.88858218°N -81.07199365°W |
| OB109B | Old | Flush | N/A | 2" pvc to 51' | 51' | 0' | -0.4' | 18.55' TIC ~09:00 12/16 | 60.51' TIC | SS Screen 51' to 52' | 530.38' | 34.88801120°N -81.07295565°W |
| W1 | Old | Stickup | N/A | 4" PVC | 24' | 2.77' | -2.4 | 25.10' TOC ~11:00 12/16 | 31.85' TOC | 24' to 29' | 537.66' | 34.88917554°N -81.07304471°W |

| Well | New or Old Well | Old Well Type | Outer Casing Dia. | Inner Casing Dia. & Type | End Of Casing From GS | Outer Casing Stickup From GS | Inner Casing Distance From Top Open Outer Casing | DTW From TIC or TOC; Time; Date | Well Depth From TIC or TOC | Screen Interval From GS or (proposed) | TOC Elevation | Latitude Longitude |
|--------|-----------------|---------------|-------------------|--------------------------|-----------------------|------------------------------|--------------------------------------------------|----------------------------------|----------------------------|---------------------------------------|---------------|---------------------------------|
| BP1B | Old | Stickup | N/A | 2" PVC | 28' | 2.66' | +0.15 | 13.59' TIC ~13:00 12/16 | 39.49' TIC | 28' to 38' | 523.74' | 34.88892596°N -81.07072095°W |
| MW113B | Old | Flush | N/A | 2" PVC | 34' | 0' | -0.32' | 12.28' TIC ~15:45 12/16 | 40.67' TIC | 34' to 44' | 521.20' | 34.88800182°N -81.07116168°W |
| MW100 | Old | Stickup | N/A | 4" PVC & galv. steel | 32' | 3.4' | -0.73' | 17.19' TIC ~08:00 12/17 | 40.45' TIC | 32' to 37' | 530.04' | 34.88979593°N -81.07125209°W |
| RIPZ2 | New | N/A | 4" PVC | N/A | 40' | 1.88' | N/A | 8.67' TOC ~11:50 12/17 | 76.85' TOC | (63' - 73') | N/A | 34.887718°N -81.070799°W |
| RIMW19 | New | N/A | 6" steel | N/A | 55' | 0.67' | N/A | 18.60' TOC ~15:00 12/17 | 96.26' TOC | (70' - 80') | N/A | 34.88887421°N -81.07201329°W |
| MW122B | Old | Stickup | N/A | 2" PVC | 25.5' | 3.7' | -0.02' | 10.04' TOC ~09:50 12/18 | 38.89' TOC | SS Screen 25.5' to 35.5' | 520.32' | 34.887378°N -81.070457°W |
| EW4 | Old | Flush | N/A | 6" steel | N/A | 0' | -0.36' | 15.16' TIC ~12:10 12/18 | 77.40' TIC | N/A | 528.18' | 34.888632°N -81.072096°W |
| MW123B | Old | Stickup | N/A | 2" SS | 39' | 2.86' | +0.01 | 17.48' TIC ~15:15 12/18 | 51.41' TIC | 39' to 49' | 529.06' | 34.888253°N -81.072554°W |

APPENDIX C

Photographic Log; December 13-18, 2006



RIMW14



RIMW13



RIMW18



W1 (center yellow pipe left of rig)



BP1B



MW113B (view 1)

Photographic Log



MW113B (view 2)



MW100



RIPZ2



RIMW19



MW122B



EW4

Photographic Log



MW123B (left-most well)



MW OB109B (photo taken 8/2007)



MW PW3 (photo taken 8/2007)



MW P3 (photo taken 8/2007)

Photographs continued on next page

Photographic Log

Continued from previous page



Path off main dirt road to MW121B



Continuation of path to MW121B



End of path to MW121B



Path off main dirt road to MW120B



Continuation of path to MW120B

Photographic Log



End of path to MW120B



Extracting core from RIMW19



Continued core extraction: RIMW19



Drill rig



Borehole logging ^{1 of 2}

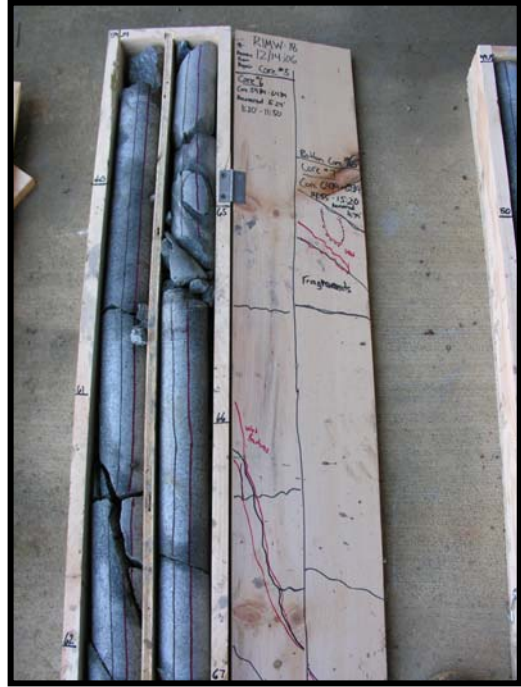


Borehole logging ^{2 of 2}

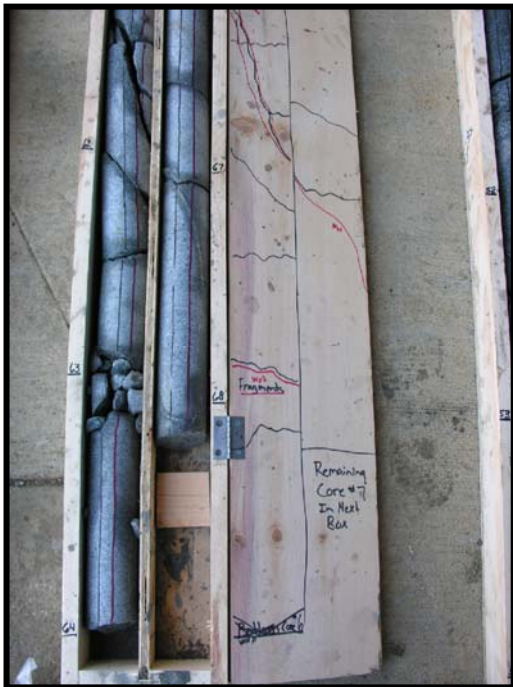
Photographic Log



Core box for RIMW18 1 of 5



Core box for RIMW18 2 of 5



Core box for RIMW18 3 of 5



Core box for RIMW18 4 of 5

Photographic Log



Core box for RIMW18 ^{5 of 5}



Drilling RIMW13 ^{1 of 15}



Drilling RIMW13 ^{2 of 15}



Drilling RIMW13 ^{3 of 15}

Photographic Log



Drilling RIMW13 4 of 15



Drilling RIMW13 5 of 15



Drilling RIMW13 6 of 15



Drilling RIMW13 7 of 15

Photographic Log



Drilling RIMW13 8 of 15



Drilling RIMW13 9 of 15



Drilling RIMW13 10 of 15



Drilling RIMW13 11 of 15



Drilling RIMW13 12 of 15



Drilling RIMW13 13 of 15

Photographic Log



Drilling RIMW13 14 of 15



Drilling RIMW13 15 of 15



Drill rig at RIMW19 1 of 4



Drilling RIMW19 2 of 4

Photographic Log



Drilling rig at RIMW19 ^{3 of 4}



Drill rig at RIMW19 ^{4 of 4}



Drill rig operations ^{1 of 2}



Drill rig operations ^{2 of 2}

Photographic Log



Ground Water Sampling 1 of 3



Ground Water Sampling 2 of 3



Ground Water Sampling 1 of 3



Water intakes on 10' packer assembly



Inflatable bladder (left) water intakes (right)



Lower inflatable bladder of packer assy.

Photographic Log



Ten foot packer assembly



Sampling from packer assy. ^{1 of 2}



Sampling from packer assy. ^{2 of 2}

End of Photographs

**Borehole Geophysical Survey Report
PSC Site
Rock Hill, South Carolina**

Date of Survey: August 22-28, 2007



**James Ursic
Superfund Division – Innovative Systems and Technology Branch
Field Services Section
United States Environmental Protection Agency
Region 5
Chicago, Illinois**

Introduction

Requests for a borehole geophysical survey were presented to Kevin Beswick of U.S. Environmental Protection Agency (USEPA) Region 4 Office of Regional Counsel by Judy Canova from the South Carolina Department of Health and Environmental Control. This request is the second call for assistance from Region 5 to provide borehole geophysical surveys to aid positioning of well screens during a well construction phase. The first survey was conducted in December, 2006. The survey commenced on August 22 and continued consecutively through the 28, 2006 at the PSC - Thermalkem site in Rock Hill, South Carolina. Funding for the borehole geophysical survey was provided by Region 4 of USEPA.

Geophysical Methods

Data were collected using a borehole logging platform mounted in a modified four wheel drive Suburban vehicle owned and operated by Region 5 USEPA. The vehicle has two on-board geophysical logging collection systems which run independently through a single Century winch system. The two data collection systems are a Century Geophysical unit and a Mount Sopris Instruments unit.

A combination of five logging tools were used at the site which included Century probes: 9041, 9065 and Mount Sopris Obi40-2, 2EMA and 2IDA. Table 1 provides information describing each of the tools, while Appendix A presents a chronology of tool applications for each well investigated. Table 2 is a summary of which logging tools were used at each well.

Table 1
Geophysical Tool Descriptions

| Probe → | 9041 Multi-Parameter Formation & Resistivity | Obi40-2 Optical Televiwer | 9065 3-Arm Caliper | 2EMA Formation Conductivity (Electromagnetic Induction or EM) | 2IDA Multi-Parameter Fluid Chemistry |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|---------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Purpose | Geologic & limited fluid data | Continuous digital borehole images | Hole & casing diameter | Geologic conductive- resistive intervals | General fluid chemistry parameters |
| Operating System | Century | Mount Sopris | Century | Mount Sopris | Mount Sopris |
| Diameter | 2.5" | 1.6" | 1.7" | 1.5" | 2" |
| Length | 84" | 86.16" | 61.6" | 62.2" | 24.1" |
| Parameters Measured | Natural gamma Temperature Fluid resistivity Spontaneous Potential Single Point Resistance Normal resistivity: 16 inch 64 inch Lateral resistivity: 48 inch | Records color borehole images. requires centralizers | Diameter | Collective geologic/fluid conductivity | Pressure (depth) Temperature Fluid Conductivity Oxygen Redox Chloride Ammonia Nitrate (note NO ₃ & NH ₄ sensors are interchangeable – cannot be operated simultaneously) |

Table 2
Geophysical Tools Applied in Various Wells at PSC Site

| WELL ID ↓ | 9065 (Century Inc.) 3-Arm Caliper Tool | 9041 (Century Inc.) Multi Parameter Formation & Resistivity Tool | Obi40-2 (Mount Sopris Inc.) Color Optical Televiwer | 2EMA (Mount Sopris Inc.) Formation Conductivity (EM) Tool | 2IDA (Mount Sopris Inc.) Multi Parameter Fluid Analysis Tool |
|---------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| RIMW-20 | X | X | X | X | X ^{1, 2} |
| RIMW-21 | X | X | X | X | X ^{1, 2} |
| RIMW-22 | X | X | X | X | X ^{1, 2} |
| RIMW-23 | X | X | X | X | X ^{1, 2} |
| RIMW-25 | X | X | X | X | X ^{1, 2} |
| RIMW-26 | X | X | X | X | X ^{1, 2} |
| RIMW-28 | X | X | X | X | X ^{1, 2} |
| RIMW-29 | X | X | X | X | X ^{1, 2} |

X¹ = NO₃

X² = NH₄

It is important to note that certain tool parameters can only obtain measurements in specific borehole environments. For example, the 9041 tool (i.e. spontaneous potential, single point resistance, normal and lateral resistivity) requires an open hole (no casing) and fluid conditions to operate properly. Although fluid parameters can be obtained in wells with or without casing, those data obtained without casing or inside screen intervals will be most representative of formation conditions. Generally, fluid measurements obtained within casing are measuring stagnant conditions, unless recently purged. It is also important to note that all fluid measurements can be affected by multiple tool traverses which agitates and disrupts the fluid column each time a tool traverse is initiated.

Natural gamma and caliper measurements can be obtained through all commonly used well casings and open hole conditions. Formation or electromagnetic (EM) conductivity measurements can be obtained through commonly used plastic casing material and within open hole conditions, it cannot be used within metal casing. Any metal near the EM induction tool will interfere with the data; this includes any metal external to PVC casing such as metal well casing stabilizers within the annulus between the casing and borehole wall. The optical televiwer functions best in dry wells or wells with clear fluids. Visibility will be limited in deeper side-wall cavities or vugs where light from the tool's lamps will dissipate with distance.

Field Procedures

Standardization checks for logging tools were conducted in Chicago prior to arrival at Rock Hill. A quick field check was conducted on-site for the optical televiwer when it was received after being shipped from Texas. All tools were operating properly.

The primary goal of the survey was to log wells RIMW-20, RIMW-21, RIMW-22, RIMW-23, RIMW-25, RIMW-26, RIMW-28 and RIMW-29 as initial drilling activities were completed at each location.

Sequencing the order of tool applications were established by the logging operator based on well conditions reported by the driller, time constraints, drilling schedules, casing conditions and water levels. Wells with rock wall stability concerns were usually logged with a caliper tool for the initial traverse to evaluate down hole conditions. When possible, tools measuring water parameters were logged moving down hole to fully expose sensors without backwash issues and also to avoid additional mixing of the fluid column. Draft well logs were provided to on-site officials as the logging process was completed at each well.

Data Processing

Well log data for on-site draft logs and this report were created using WellCAD version 4.1. In some cases a smoothing algorithm (moving average) built into WellCAD program was applied for easier comprehension of certain logs, most often natural gamma logs. When such an algorithm was used, a note was made on the log header as well as the range of the moving average calculation.

For those tools having multiple sensors, note that not all data terminates at the same elevation, this is due to varied sensor locations throughout the length of the tool. The most varied sensor separations can be seen from data obtained by the 9041 tool.

Table 3 summaries how various data sets of well log information were combined to display data for each well. Note that tool 2IDA can be configured using two optional modes, either with an ammonia sensor or nitrate sensor. Both of these sensors use the same sensor base and thus cannot be used at the same time, therefore it requires two separate traverses if both sets of data are desired. When both sets of options are obtained, the acquisition process results in the duplication of the remaining multiple sensor data as the second traverse is completed. Minor differences will exist when comparing the duplicate data from each traverse due to the agitation of well fluids from the previous traverses.

Table 3
Presentation Combinations for Geophysical Log Data

| WELL ID ↓ | Log Combinations 9041 & 9065 | Log Combinations 9065; 2EMA; Obi40 & Partial 9041 | Log Presentation 2IDA ¹ | Log Presentation 2IDA ² | Total Log Presentation Sets Per Well |
|-----------------|---------------------------------|---------------------------------------------------------|---------------------------------------|---------------------------------------|-----------------------------------------|
| RIMW-20 | X | X | X¹ | X² | 4 |
| RIMW-21 | X | X | X¹ | X² | 4 |
| RIMW-22 | X | X | X¹ | X² | 4 |
| RIMW-23 | X | X | X¹ | X² | 4 |
| RIMW-25 | X | X | X¹ | X² | 4 |
| RIMW-26 | X | X | X¹ | X² | 4 |
| RIMW-28 | X | X | X¹ | X² | 4 |
| RIMW-29 | X | X | X¹ | X² | 4 |

X¹ = NO₃

X² = NH₄

Results

Combinations of thirty two log sets are attached to this report presenting all data collected at the site. Each combination was grouped in a manner which complemented similar parameters, some of which may have been duplicated and incorporated into other data sets such as caliper and natural gamma logs added to an EM log. When possible, photographs were taken of logging sites in addition to GPS coordinates if acceptable satellite reception conditions existed. A Trimble Pathfinder Pro and Recon data recorder were used to acquire GPS data.

Most all field measurements were referenced from the top of the inner casing, when present, or the outer casing. The height of the various above/below ground risers/casings were also measured and noted on log headers so that references to ground level could be established, if needed. Final log plots had all well elevations referenced to ground surface at the well head. Locations of wells logged are illustrated on Figure 1; following page.

Generally all of the new wells drilled had water levels which stabilized within a day.

Locations of proposed well screen placement locations were noted on well logs to better assist the reader in log interpretation.



Conclusions

Please refer to the attached well logs.

The proposed screen intervals are as follows:

| | |
|---------|------------------------------------------|
| RIMW-20 | 104.6' – 119.6' from ground surface (GS) |
| RIMW-21 | 77' – 87' from ground surface (GS) |
| RIMW-22 | 124.9' – 134.9' from ground surface (GS) |
| RIMW-23 | 45.8' – 57.8' from ground surface (GS) |
| RIMW-25 | 45' – 55' from ground surface (GS) |
| RIMW-26 | 83.2' – 93.2' from ground surface (GS) |
| RIMW-28 | 56.4' – 66.4' from ground surface (GS) |
| RIMW-29 | 54' – 64' from ground surface (GS) |

(GS) = Ground Surface

Any questions regarding this report can be directed to:

James Ursic
77 West Jackson Boulevard
Mail Stop SRT-4J
Chicago, IL 60604
312.353.2536
Ursic.James@EPA.GOV

Attachments: Appendix A, B, C
Well logs (total of 32 logs)

APPENDIX A

Chronology of Geophysical Logging Events PSC Site Rock Hill, South Carolina

| <u>Date</u> | <u>Tool*</u> | <u>Time</u> | <u>Well</u> | <u>Traverse Direction</u> | <u>Scale Options</u> | <u>Parameter Option</u> | <u>Well Photo</u> |
|--------------|--------------|-------------|----------------|-------------------------------|--------------------------|-----------------------------|-----------------------|
| 08/22 | | | | | | | |
| | 2IDA | 07:30 | RIMW-22 | Down | 0-6400 ug/l | NH ₄ | Yes |
| | 2IDA | 08:04 | RIMW-22 | Down | 0-6400 ug/l | NO ₃ | |
| | 2EMA | 08:25 | RIMW-22 | Down | 1000 mS/m | | |
| | 9065 | 08:55 | RIMW-22 | Up | | | |
| | 9041 | 09:20 | RIMW-22 | Down | | | |
| | 2IDA | N/R | RIMW-26 VOIDED | Down | | | Yes |
| | 2IDA | N/R | RIMW-26 VOIDED | Down | | | |
| | 2IDA | N/R | RIMW-26 | Down | | | |
| | 2IDA | 12:10 | RIMW-26 | Down | 0-64 mg/l** | NO ₃ | |
| | 2IDA | 12:18 | RIMW-26 | Down | 0-64 mg/l** | NH ₄ | |
| | 2EMA | 13:26 | RIMW-26 | Up | 1000 mS/m | | |
| | 9065 | 14:12 | RIMW-26 | Up | | | |
| | 9041 | 15:47 | RIMW-26 | Down | | | |
| 08/23 | | | | | | | |
| | 2IDA | 08:13 | RIMW-29 | Down | 0-64 mg/l** | NH ₄ | Yes |
| | 2IDA | 08:40 | RIMW-29 | Down | 0-64 mg/l** | NO ₃ | |
| | 2EMA | 09:40 | RIMW-29 | Up | 1000 mS/m | | |
| | 9065 | 10:05 | RIMW-22 | Up | | | |
| | 9041 | 10:37 | RIMW-22 | Down | | | |
| | 2IDA | 14:25 | RIMW-28 | Down | 0-64 mg/l** | NO ₃ | Yes |
| | 2IDA | 14:50 | RIMW-28 | Down | 0-64 mg/l** | NH ₄ | |
| | 2EMA | N/R | RIMW-28 VOIDED | Up | 1000 mS/m | | |
| | 2EMA | 15:25 | RIMW-28 | Up | 1000 mS/m | | |
| | 9065 | 15:33 | RIMW-28 | Up | | | |
| | 9041 | 16:00 | RIMW-28 | Down | | | |
| 08/24 | | | | | | | |
| | 2IDA | N/R | RIMW-20 VOIDED | Down | 0-64 mg/l** | NH ₄ | Yes |
| | 2IDA | 07:50 | RIMW-20 | Down | 0-64 mg/l** | NH ₄ | |
| | 2IDA | 08:20 | RIMW-20 | Down | 0-64 mg/l** | NO ₃ | |
| | 2EMA | 08:45 | RIMW-20 | Up | 1000 mS/m | | |
| | 2IDA | 09:30 | RIMW-20 | Down | 0-64 mg/l** | NH ₄ | |
| | 9065 | 09:45 | RIMW-20 | Up | | | |
| | 9041 | 10:20 | RIMW-20 | Down | | | |
| | 9041 | 10:45 | RIMW-20 | Down | | | |
| | 2IDA | 13:45 | RIMW-23 | Down | 0-64 mg/l** | NH ₄ | Yes |
| | 2IDA | 14:05 | RIMW-23 | Down | 0-64 mg/l** | NO ₃ | |
| | 2EMA | 14:30 | RIMW-23 | Up | 1000 mS/m | | |
| | 9065 | 15:00 | RIMW-23 | Up | | | |
| | 9041 | 15:15 | RIMW-23 | Down | | | |

APPENDIX A (continued)

| <u>Date</u> | <u>Tool*</u> | <u>Time</u> | <u>Well</u> | <u>Traverse Direction</u> | <u>Scale Options</u> | <u>Parameter Option</u> | <u>Well Photo</u> |
|--------------|--------------|-------------|-------------|---------------------------|----------------------|-------------------------|-------------------|
| 08/25 | | | | | | | |
| | 2IDA | 09:05 | RIMW-21 | Down | 0-64 mg/l** | NO ₃ | Yes |
| | 2IDA | 09:40 | RIMW-21 | Down | 0-64 mg/l** | NH ₄ | |
| | 2EMA | 10:07 | RIMW-21 | Up | 1000 mS/m | | |
| | 9065 | 10:30 | RIMW-21 | Up | | | |
| | 9041 | 11:30 | RIMW-21 | Down | | | |
| 08/27 | | | | | | | |
| | Obi40 | 12:30 | RIMW-22 | Up | | | |
| | Obi40 | 14:35 | RIMW-21 | Down | | | |
| | Obi40 | 15:37 | RIMW-28 | Up | | | |
| | Obi40 | 16:12 | RIMW-26 | Down | | | |
| | Obi40 | 17:40 | RIMW-28 | Down | | | |
| 08/28 | | | | | | | |
| | Obi40 | 07:40 | RIMW-23 | Down | | | |
| | Obi40 | 08:25 | RIMW-29 | Down | | | |
| | 2IDA | 09:30 | RIMW-25 | Down | 0-64 mg/l** | NH ₄ | Yes |
| | 2IDA | 09:55 | RIMW-25 | Down | 0-64 mg/l** | NO ₃ | |
| | 2EMA | 10:15 | RIMW-25 | Up | 1000 mS/m | | |
| | 9065 | 10:47 | RIMW-25 | Up | | | |
| | 9041 | 11:00 | RIMW-25 | Down | | | |
| | Obi40 | 11:30 | RIMW-25 | Up | | | |
| | Obi40 | 08:29 | RIMW-20 | Down | | | |

* Tool designators
 9041 Century Geophysical multi-parameter formation & resistivity tool
 Obi40 Mount Sopris color optical televiewer
 9065 Century Geophysical 3-arm caliper tool
 2EMA Mount Sopris formation conductivity tool (electromagnetic induction)
 2IDA Mount Sopris multi-parameter water chemistry tool

** Later converted from mg/l to ug/l as shown and noted on well logs

N/R Not recorded

APPENDIX B
Well Information at Time of Logging; Rock Hill, South Carolina

| Well | New or Old Well | Outer Casing Dia. | Inner Casing Dia. & Type | End Of Casing From GS | Outer Casing Stickup From GS | Inner Casing Distance From Top Open Outer Casing | DTW From TIC or TOC; Time; Date | Well Depth From TIC or TOC | Screen Interval From GS or (proposed) | TOC Elevation (before final casing was set) | Latitude Longitude |
|---------|-----------------|-------------------|--------------------------|-----------------------|------------------------------|--------------------------------------------------|----------------------------------|----------------------------|---------------------------------------|---------------------------------------------|---------------------------------|
| RIMW-20 | New | 6" | N/A | 100' | 0.20' | N/A | 20.25' TOC ~08:15 12/14 | 86.23' TOC | (104.6'-119.6') | N/A | 34.88959760°N -81.07119817°W |
| RIMW-21 | New | 6" | N/A | 70' | 2.90' | N/A | 12.53' TOC ~14:30 12/13 | 58.24' TOC | (77.3'-87.3') | N/A | 34.88930735°N -81.07101464°W |
| RIMW-22 | New | 6" | N/A | 117' | 0.56' | N/A | 44.71' TOC ~12:00 12/14 | 101.55' TOC | (124.9'-134.9') | N/A | 34.88911822°N -81.07154162°W |
| RIMW-23 | New | 6" | N/A | 37' | 1.60' | N/A | 12.90' TOC ~08:45 12/15 | 79.26' TOC | (45.8'-57.8') | N/A | 34.88862735°N -81.07101140°W |
| RIMW-25 | New | 6" | N/A | 40' | 0.7' | N/A | 14.25' TIC ~15:00 12/15 | 34.49' TIC | (44.7'-54.7') | N/A | 34.888535°N -81.072158°W |
| RIMW-26 | New | 6" | N/A | 71' | -0.4' | N/A | 18.55' TIC ~09:00 12/16 | 60.51' TIC | (83.2'-93.2') | N/A | 34.88837161°N -81.07170296°W |
| RIMW-28 | New | 6" | N/A | 46' | -2.4' | N/A | 25.10' TOC ~11:00 12/16 | 31.85' TOC | (56.4'-68.4') | N/A | 34.88824904°N -81.07256796°W |

| Well | New or Old Well | Outer Casing Dia. | Inner Casing Dia. & Type | End Of Casing From GS | Outer Casing Stickup From GS | Inner Casing Distance From Top Open Outer Casing | DTW From TIC or TOC; Time; Date | Well Depth From TIC or TOC | Screen Interval From GS or (proposed) | TOC Elevation | Latitude Longitude |
|---------|-----------------|-------------------|--------------------------|-----------------------|------------------------------|--------------------------------------------------|----------------------------------|----------------------------|---------------------------------------|---------------|----------------------------------|
| RIMW-29 | New | 6" | N/A | 47' | -2.66' | N/A | 13.59' TIC ~13:00 12/16 | 39.49' TIC | (54'-64') | N/A | 34.88756758°N -81.075156490°W |

N/A = Not Available

APPENDIX C

Photographic Log of Well Sites; August 22-28, 2007



RIMW-20



RIMW-21



RIMW-22



RIMW-23



RIMW-25

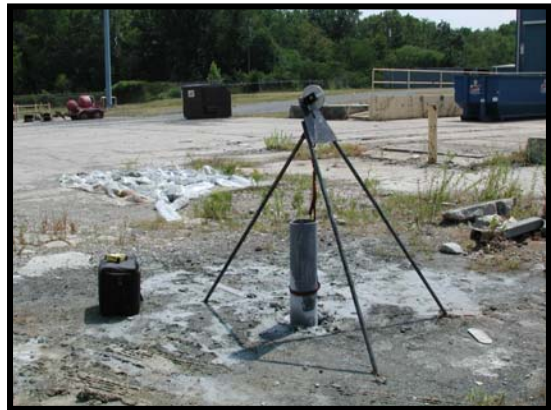


RIMW-26 1 of 2

Photographic Log



RIMW-26 2 of 2



RIMW-28



RIMW-29

PSC Site
December 13 -18, 2006
Rock Hill, South Carolina

Geophysical Logs

Well Logs for BP1B

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log BP1B – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L

Log BP1B – B

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log 18 - C

Natural gamma – cps (9060 Tool)
Formation conductivity – mS/m

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool (2.5" diameter)
Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity – Ohm/M
Computed lateral resistivity – Ohm/M


Century 9060 tool (1.4" diameter)
Natural gamma – cps

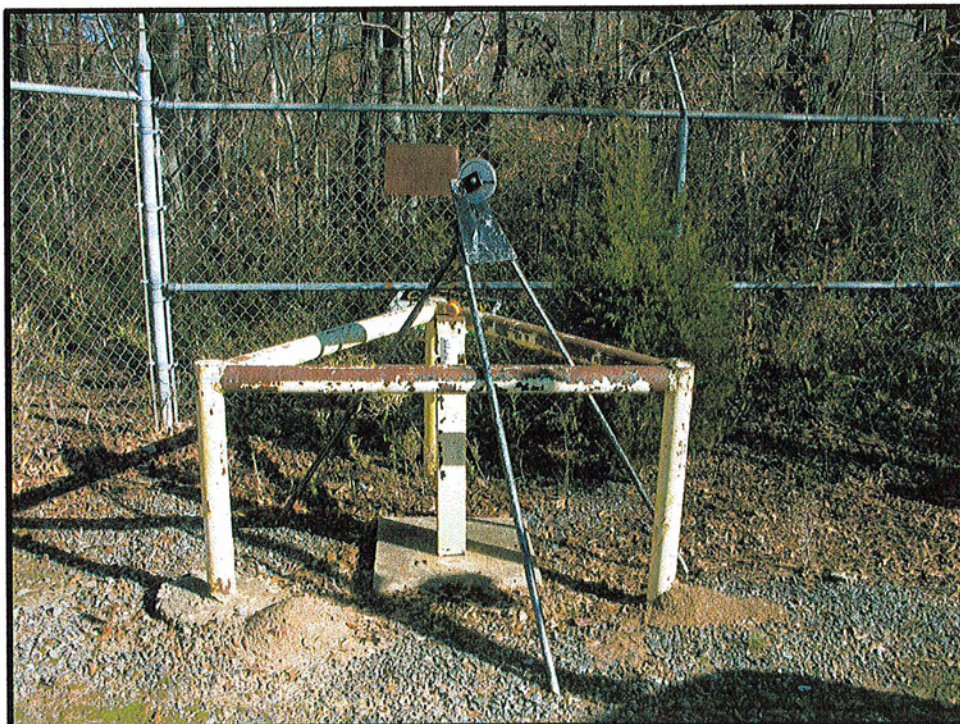
Century 9065 tool
Caliper, 3-arm - inches

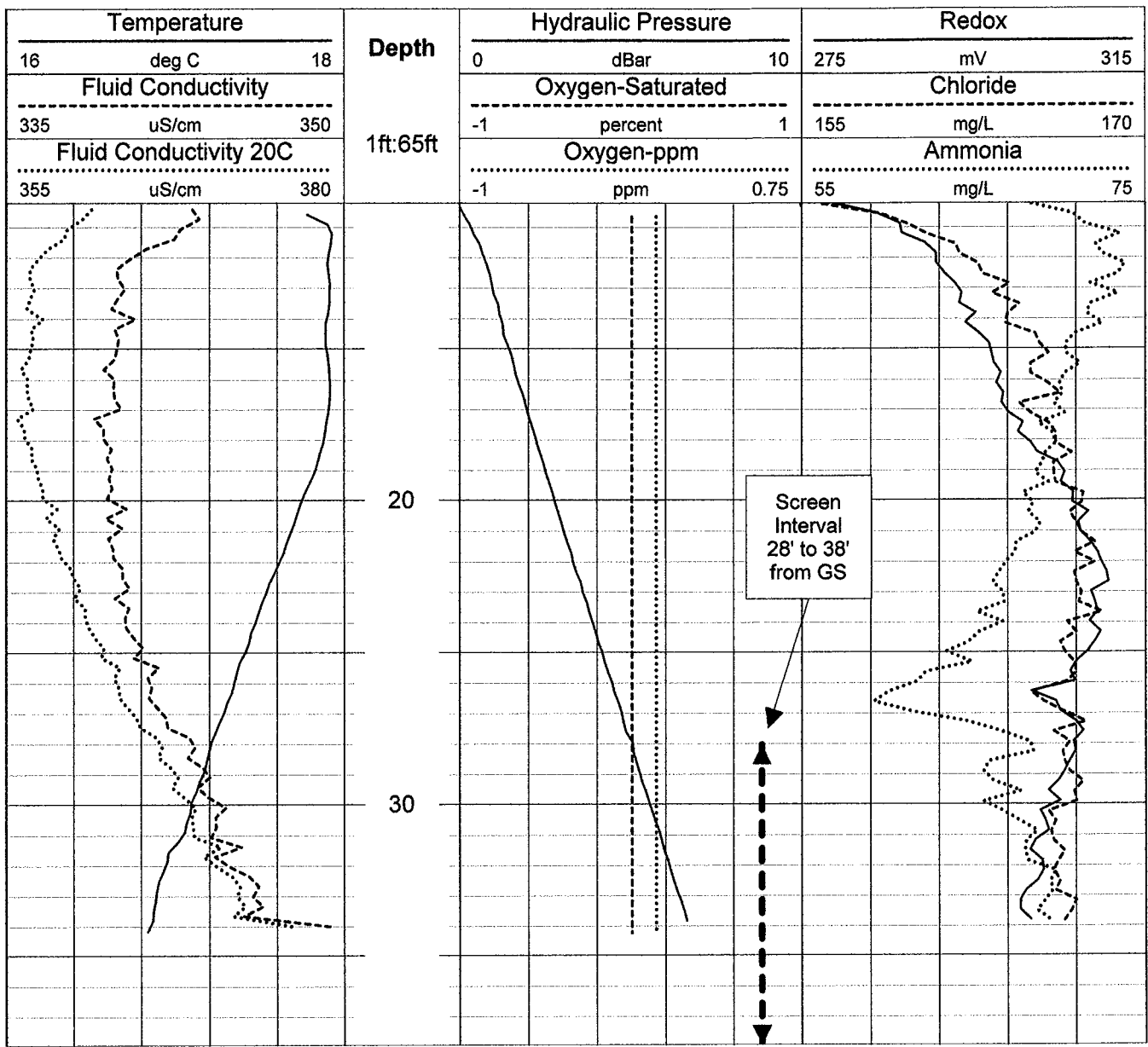
Mount Sopris 2IDA tool – ammonia configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L (option sensor)

Mount Sopris 2IDA tool – nitrate configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L (option sensor)

Mount Sopris 2EMA-1000 tool
Formation conductivity – mS/m

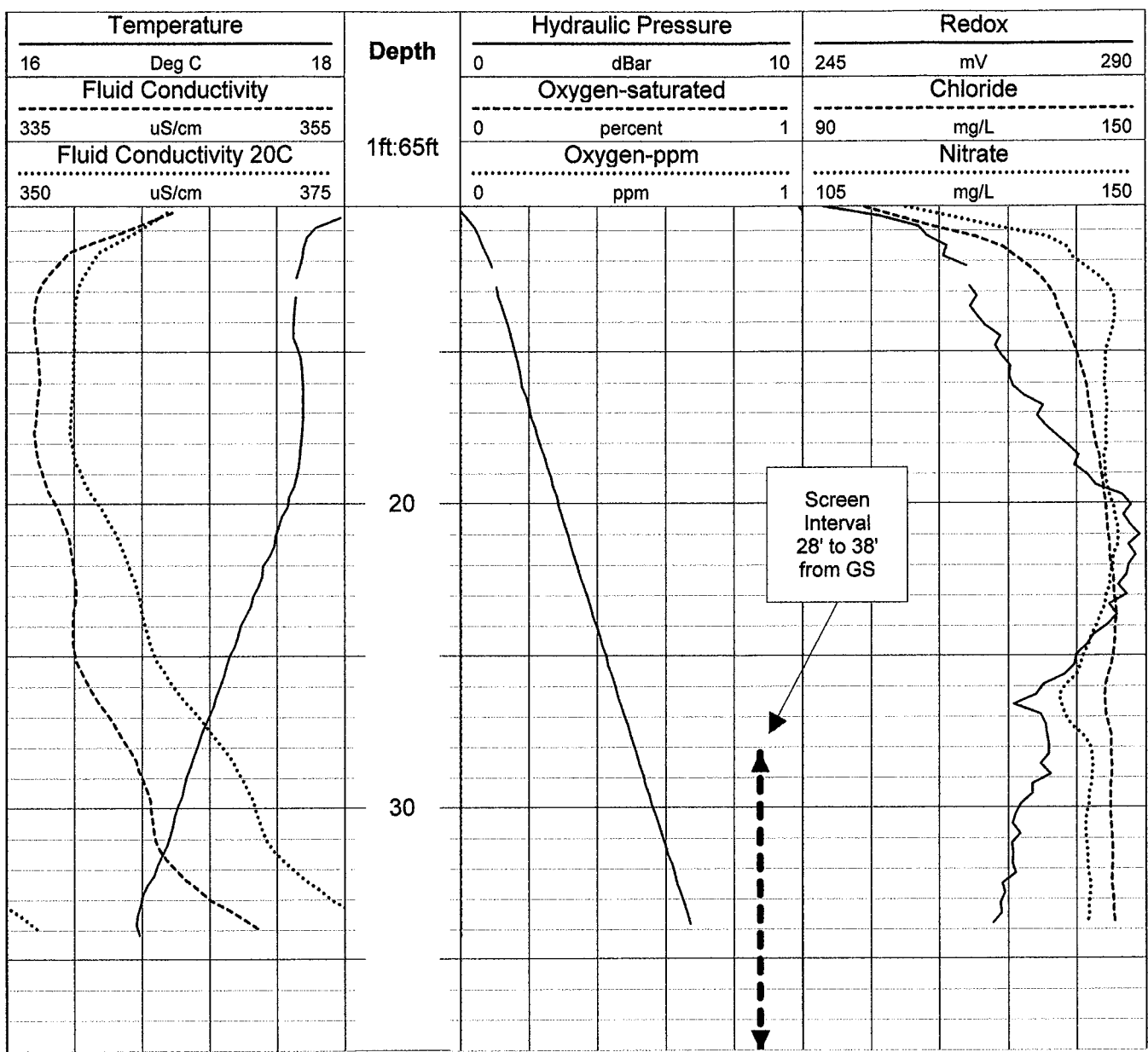
| | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|-------------------------------|--------------------|--|
| Well: | | BP1B | | Log: BP1B-A | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/16/06 | | | Time: 13:53 | | |
| System Configuration: Mount Sopris 2IDA with ammonia option | | | | | |
| Water Level: 10.63' | | Measured From: GS @ ~ 13:00 | | | |
| Outer Casing Height AGL (with cap open/removed): 2.81' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: +0.15' | | | Casing Type: PVC | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 15 fpm | |
| Log Top: 10.64' | Log Bottom: 34.24' | | Reference Point: GS | | |
| Analysis Software: WellCAD | | Smoothing Points: Redox = 1 | | | |
| Operator: JRU | Witness: None | | Other Tools Used: 9060, 2EMA | | |
| Well Diameter: 2" | Well Depth: 38' | | Referenced From: GS | | |
| Casing Material: PVC | | | Non-Cased Interval: all cased | | |
| Screen Interval: 28' to 38'; GS | | | Screen Type: unknown | | |
| Latitude: 34.88892596°N | | | Longitude: -81.07072095°W | | |
| Notes: Two logging traverses preceeded this log. Screen interval data obtained from previous well construction documents. GS references converted from a TIC height of 2.96' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |





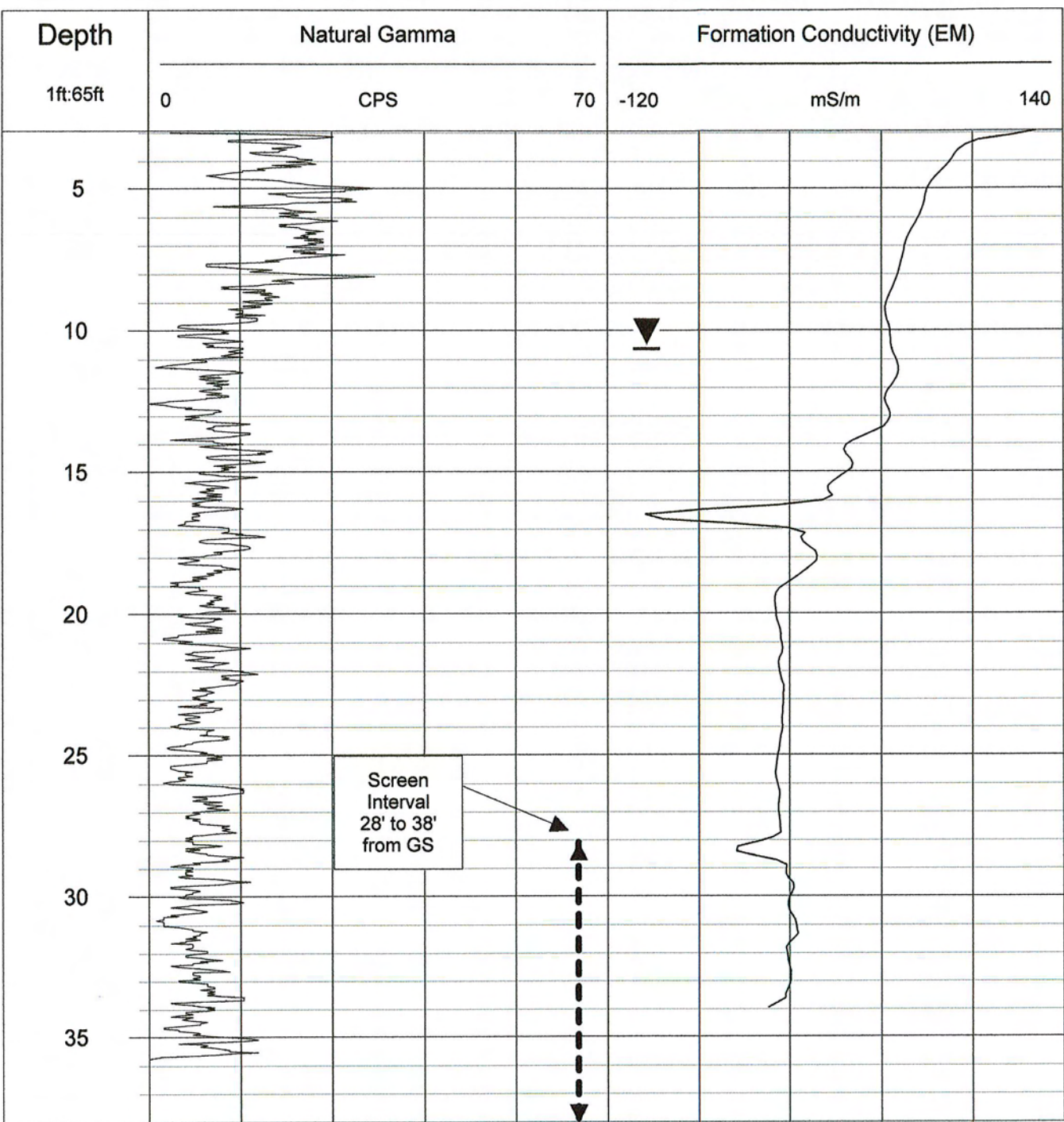
| | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------|-------------------------------|------------------------------|--|
| Well: | | BP1B | | Log: BP1B-B | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/16/06 | | | Time: 13:33 | | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | | | | |
| Water Level: 10.63' | | Measured From: GS @ ~ 13:00 | | | |
| Outer Casing Height AGL (with cap open/removed): 2.81' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: +0.15' | | | Casing Type: PVC | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 18 fpm | |
| Log Top: 10.64' | | Log Bottom: 34.24' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: see notes | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 9060, 2EMA | |
| Well Diameter: 2" | | Well Depth: 38' | | Referenced From: GS | |
| Casing Material: PVC | | | Non-Cased Interval: all cased | | |
| Screen Interval: 28' to 38'; GS | | | Screen Type: unknown | | |
| Latitude: 34.88892596°N | | | Longitude: -81.07072095°W | | |
| Notes: This was the first logging traverse. Screen interval data obtained from previous well construction documents. Smoothing; redox = 1; conductivities, NO3 & Cl = 5. GS references converted from a TIC height of 2.96' (org. ref. pt.) | | | | | |





| | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------|-------------------------------------|------------------------|--|
| Well: | | BP1B | | Log: BP1B-C | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/16/06 | | | Time: See notes | | |
| System Configuration: Century 9060; Mount Sopris 2EMA | | | | | |
| Water Level: 10.63' | | Measured From: GS @ ~ 13:00 | | | |
| Outer Casing Height AGL (with cap open/removed): 2.81' Type: Steel riser | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: +0.15 | | | Casing Type: PVC | | |
| Log Direction: Up | | Measured from: GS | | Log Speed: see notes | |
| Log Top: 3.04' | | Log Bottom: 36.54' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: natural gamma = 9 | | |
| Operator: JRJ | | Witness: None | | Other Tools Used: 2IDA | |
| Well Diameter: 2" | | Well Depth: 38' | | Referenced From: GS | |
| Casing Material: PVC | | | Non-Cased Interval: all cased | | |
| Screen Interval: 28' to 38'; GS | | | Screen Type: unknown | | |
| Latitude: 34.88892596°N | | | Longitude: -81.07072095°W | | |
| Notes: Natural gamma logged @ 14:49; speed 16 fpm Formation conductivity logged @ 13:58; speed 11 fpm. Screen interval data obtained from previous well construction documents. GPS values; NAD83 2EMA stabilized within 14 minutes. GS references converted from a TIC height of 2.96' (org. ref. pt.) | | | | | |





PSC Site
December 13 -18, 2006
Rock Hill, South Carolina

Geophysical Logs

Well Logs for EW4

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log EW4 – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L

Log EW4 – B

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log EW4 - C

Natural gamma – cps (9060 Tool)

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool (2.5" diameter)
Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity – Ohm/M
Computed lateral resistivity – Ohm/M


Century 9060 tool (1.4" diameter)
Natural gamma – cps

Century 9065 tool
Caliper, 3-arm - inches

Mount Sopris 2IDA tool – ammonia configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L (option sensor)

Mount Sopris 2IDA tool – nitrate configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L (option sensor)

Mount Sopris 2EMA-1000 tool
Formation conductivity – mS/m

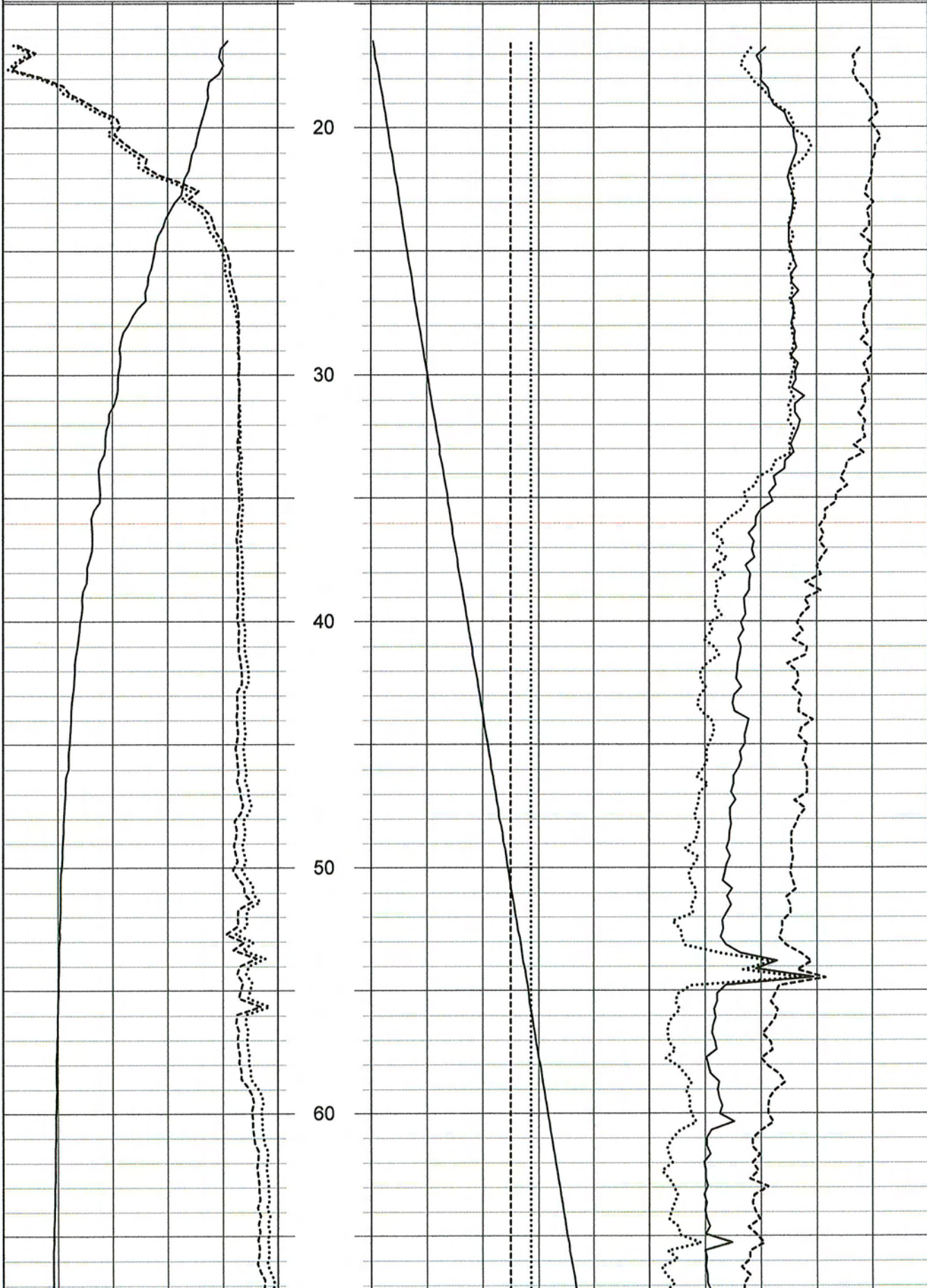
| | | |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Well: | EW4 | Log: EW4-A |
| Site: | PSC | |
| City/State: Rock Hill, South Carolina | | |
| Date: 12/18/06 | Time: 13:01 | |
| System Configuration: Mount Sopris 2IDA with ammonia option | | |
| Water Level: 15.81' | Measured From: GS @ ~ 12:10 | |
| Outer Casing Height AGL (with cap open/removed): 0' Type: Flush mount | | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.65' | | Casing Type: 6" steel |
| Log Direction: Up | Measured from: GS | Log Speed: 13.5 fpm |
| Log Top: 15.9' | Log Bottom: 75.6' | Reference Point: GS |
| Analysis Software: WellCAD | | Smoothing Points: redox = 1 |
| Operator: JRU | Witness: None | Other Tools Used: 9060 |
| Well Diameter: 6" | Well Depth: 78.8' | Referenced From: GS |
| Casing Material: steel | | Non-Cased Interval: N/A |
| Screen Interval: Unknown | | Screen Type: N/A |
| Latitude: 34.888632°N | | Longitude: -81.072096°W |
| Notes: | Down traverse for ammonia was voided, thus this log recorded on a traverse up hole. GS references converted from a TIC height -0.65' (org. ref. pt.) GPS values; NAD83 Probe hung at 25' going down hole; voided traverse. Logged up. | |
|  | | |

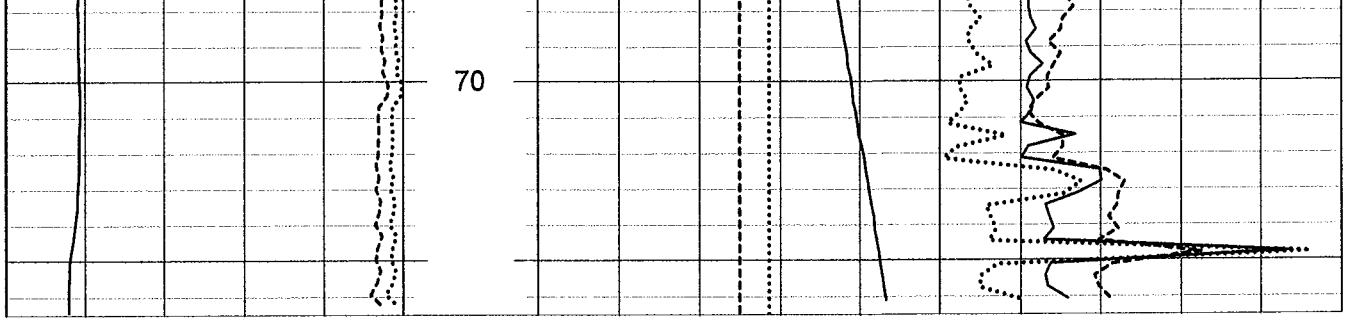



| Temperature | | |
|------------------------|-------|-----|
| 18 | deg C | 21 |
| Fluid Conductivity | | |
| 155 | uS/cm | 265 |
| Fluid Conductivity 20C | | |
| 155 | uS/cm | 270 |

| Depth | Hydraulic Pressure | |
|----------|--------------------|---------|
| | 0 | dBar |
| 1ft:65ft | Oxygen-Saturated | |
| | 1 | percent |
| | Oxygen-ppm | |
| | -1 | ppm |

| Redox | | |
|----------|------|------|
| -200 | mV | -130 |
| Chloride | | |
| 165 | mg/L | 185 |
| Ammonia | | |
| 50 | mg/L | 95 |





| | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------|-----------------------------|------------------------|--|
| Well: | | EW4 | | Log: EW4-B | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/18/06 | | | Time: 12:26 | | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | | | | |
| Water Level: 15.81' | | Measured From: GS @ ~ 12:10 | | | |
| Outer Casing Height AGL (with cap open/removed): 0' Type: Flush mount | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.65' | | | Casing Type: 6" steel | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 13 fpm | |
| Log Top: 16.55' | | Log Bottom: 77.2' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: see notes | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 9060 | |
| Well Diameter: 6" | | Well Depth: 78.8' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: N/A | | |
| Screen Interval: Unknown | | | Screen Type: N/A | | |
| Latitude: 34.888632°N | | | Longitude: -81.072096°W | | |
| Notes: Smoothing; redox = 1; Cl & NO3 = 5; conductivities = 7. GS references converted from a TIC height -0.65' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |

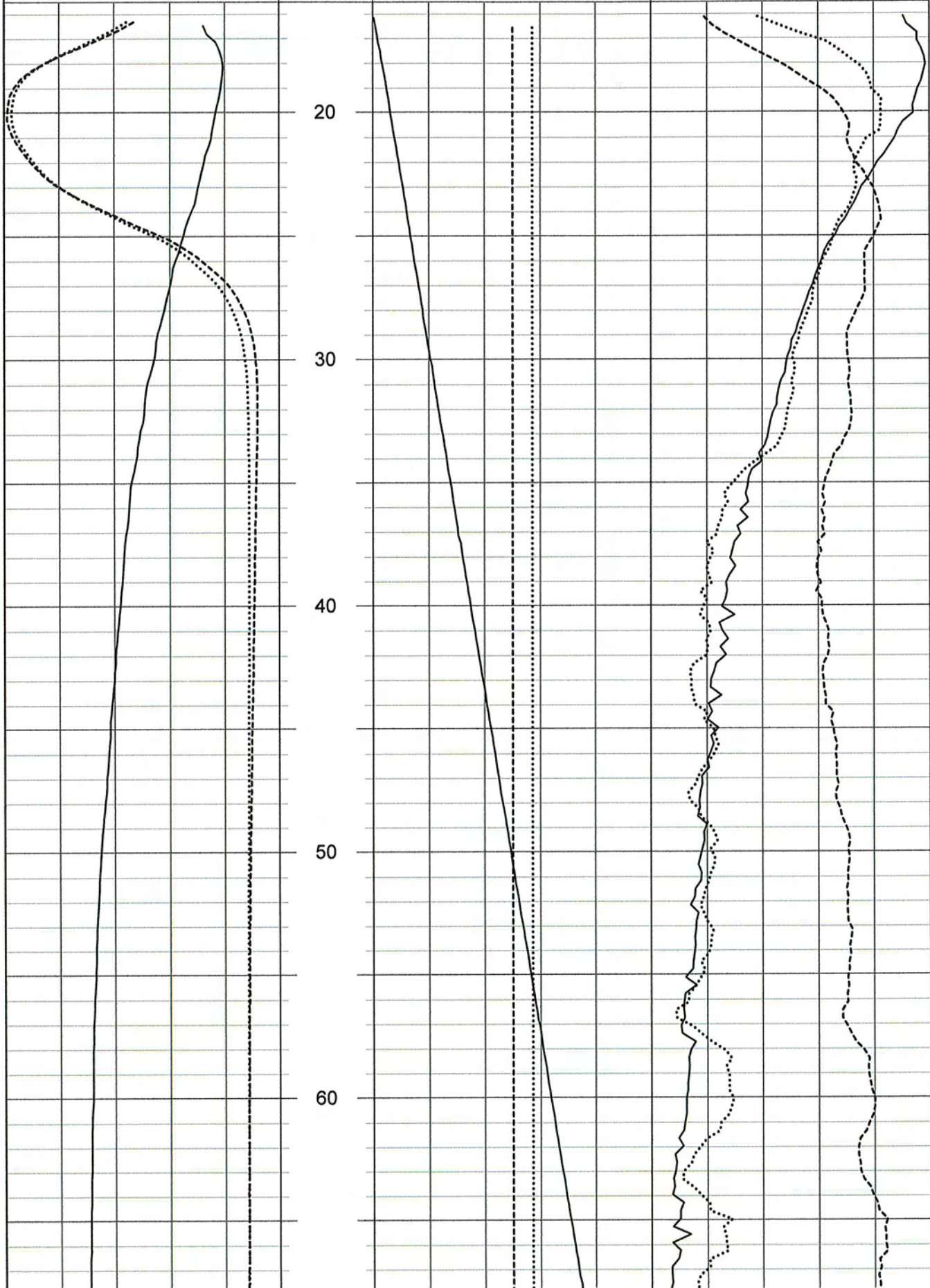


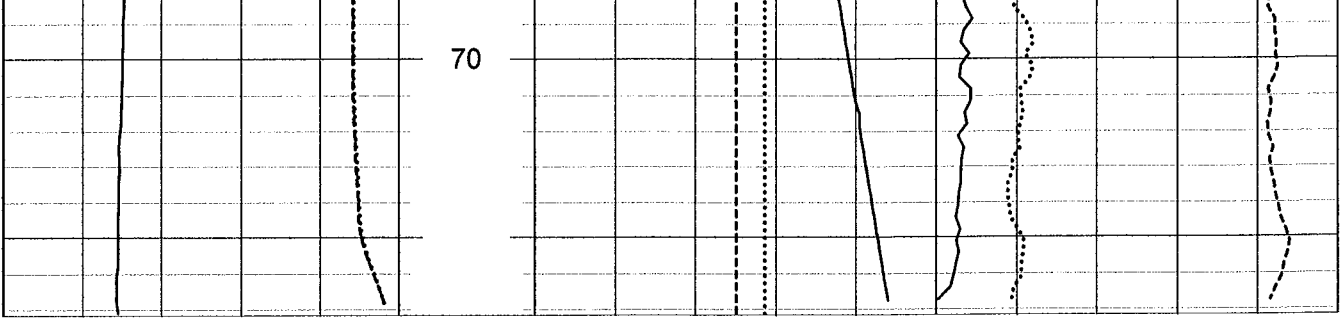
| Temperature | | |
|------------------------|-------|-----|
| 17 | Deg C | 22 |
| Fluid Conductivity | | |
| 100 | uS/cm | 265 |
| Fluid Conductivity 20C | | |
| 95 | uS/cm | 275 |


| Depth | Hydraulic Pressure | | |
|------------|--------------------|---------|----|
| | 0 | dBar | 20 |
| | Oxygen-saturated | | |
| | -1 | percent | 1 |
| Oxygen-ppm | | | |
| -1 | ppm | 0.75 | |

| Redox | | |
|----------|------|-----|
| -175 | mV | 135 |
| Chloride | | |
| 90 | mg/L | 115 |
| Nitrate | | |
| 135 | mg/L | 175 |

1ft:65ft





| | | | | | |
|----------------------------------------------------------------------------------------------|--|-----------------------------|--------------------------------------|---------------------|--|
| Well: | | EW4 | | Log: EW4-C | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/18/06 | | | Time: 13:12 | | |
| System Configuration: Century 9060 | | | | | |
| Water Level: 15.81' | | Measured From: GS @ ~ 12:10 | | | |
| Outer Casing Height AGL (with cap open/removed): 0' | | | | Type: Flush mount | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.65' | | | Casing Type: 6" steel | | |
| Log Direction: Up | | Measured from: GS | | Log Speed: 18 fpm | |
| Log Top: 6.4' | | Log Bottom: 78.4' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: natural gamma = 23 | | |
| Operator: JRJ | | Witness: None | | Other Tools Used: | |
| Well Diameter: 6" | | Well Depth: 78.8' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: N/A | | |
| Screen Interval: Unknown | | | Screen Type: N/A | | |
| Latitude: 34.888632°N | | | Longitude: -81.072096°W | | |
| Notes: GS references converted from a TIC height -0.65' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |



Depth

Natural Gamma

1ft:65ft

0

CPS

50

10

15

20

25

30

35

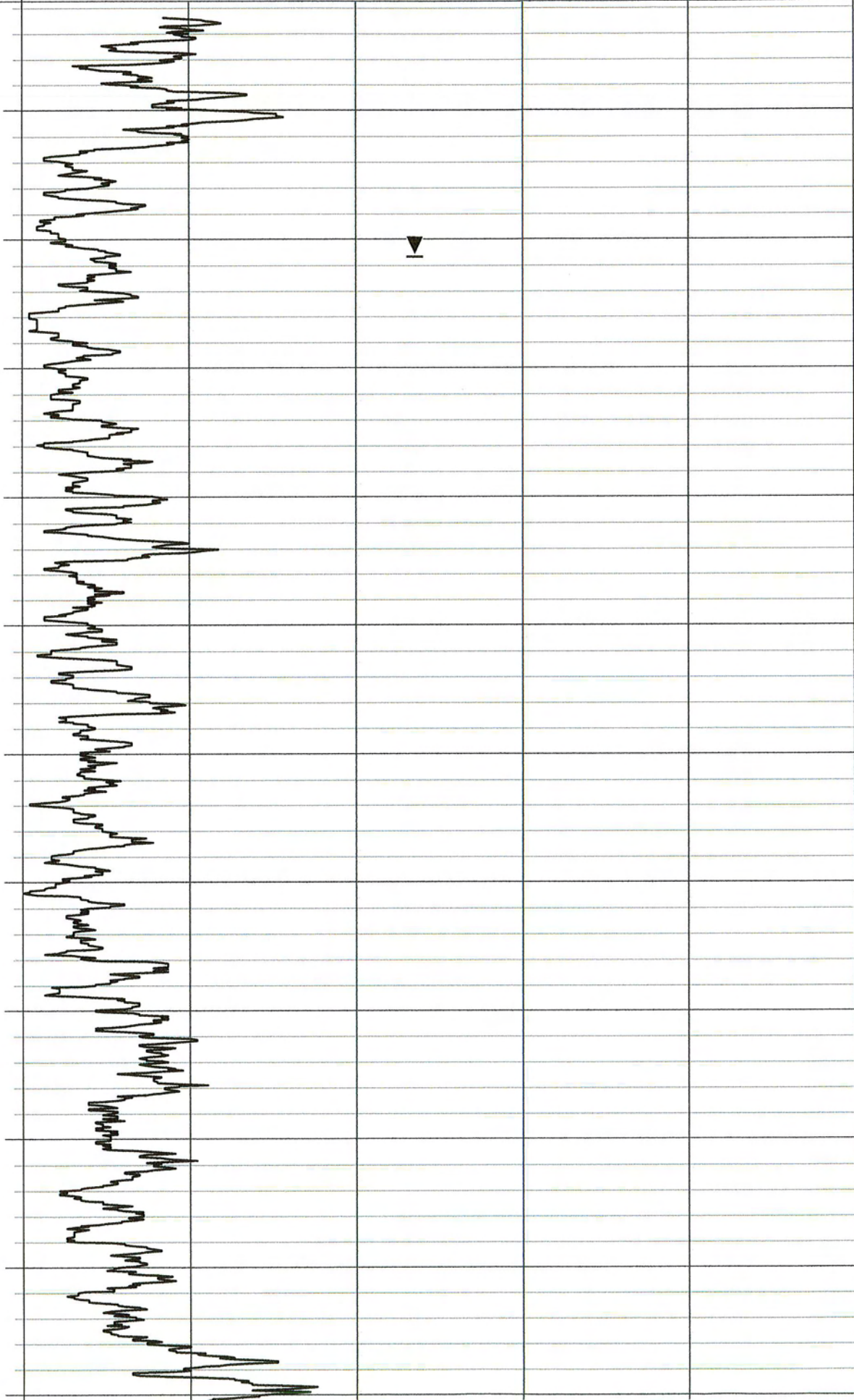
40

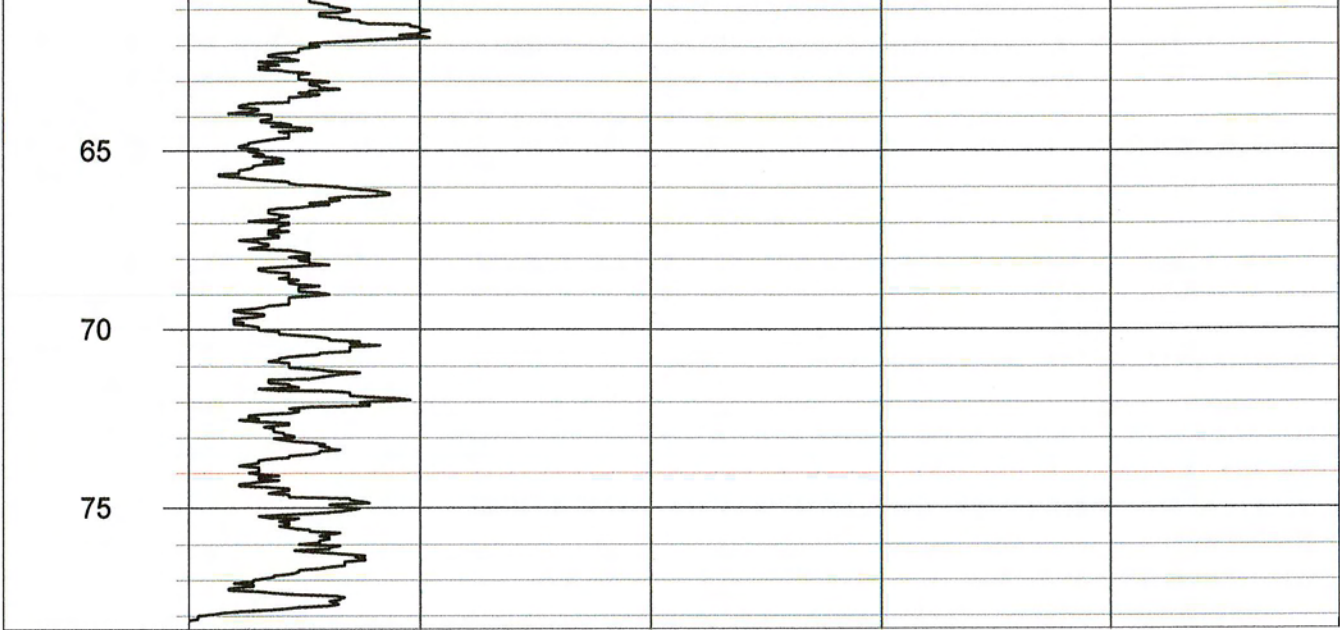
45

50

55

60





PSC Site
December 13 -18, 2006
Rock Hill, South Carolina

Geophysical Logs

Well Logs for MW100

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log 100 – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L

Log 100 – B

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log 100 - C

Natural gamma – cps (9060 Tool)

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool (2.5" diameter)
Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity – Ohm/M
Computed lateral resistivity – Ohm/M

Century 9060 tool (1.4" diameter)
Natural gamma – cps

Century 9065 tool
Caliper, 3-arm - inches

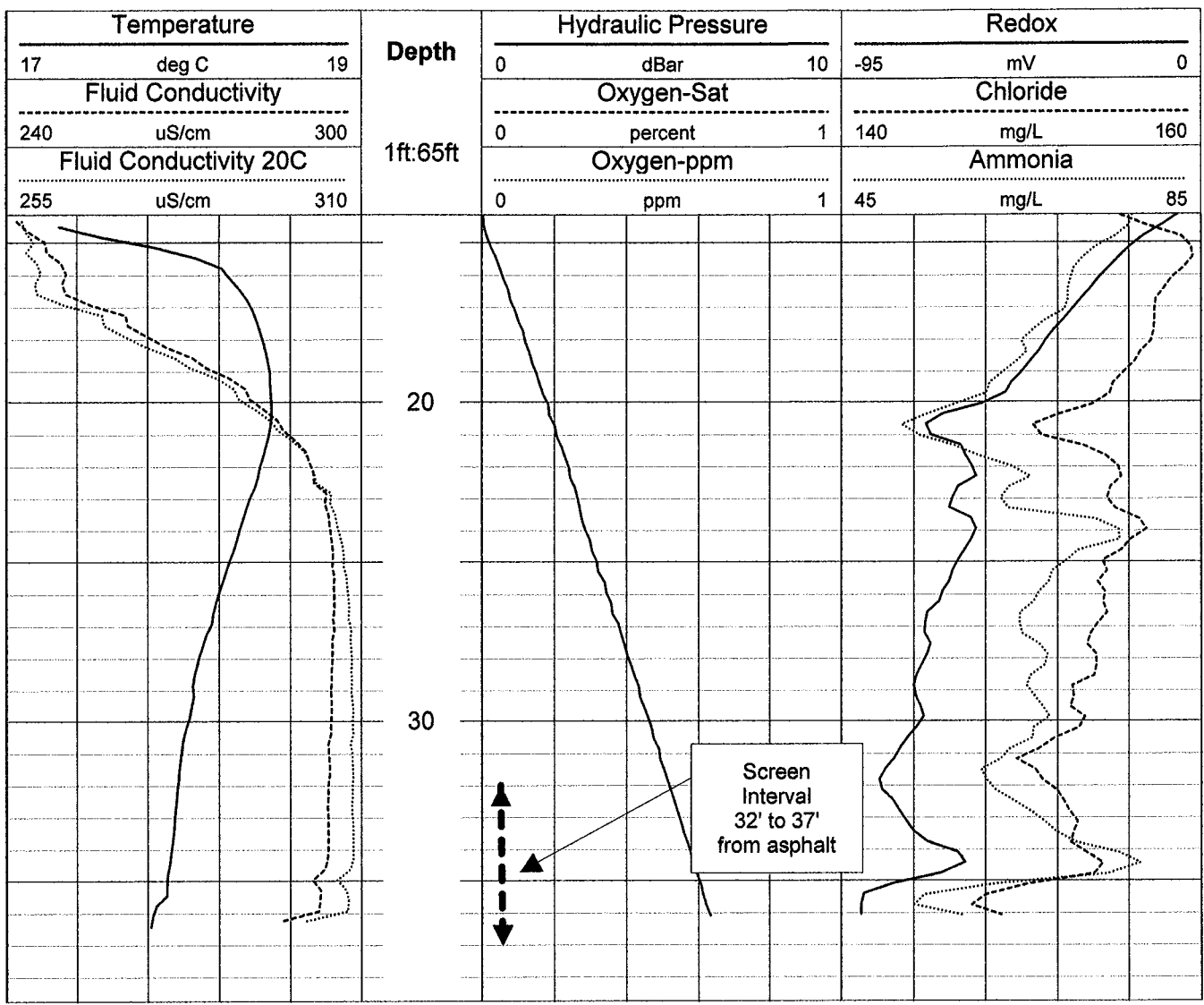
Mount Sopris 2IDA tool – ammonia configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L (option sensor)

Mount Sopris 2IDA tool – nitrate configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L (option sensor)

Mount Sopris 2EMA-1000 tool
Formation conductivity – mS/m

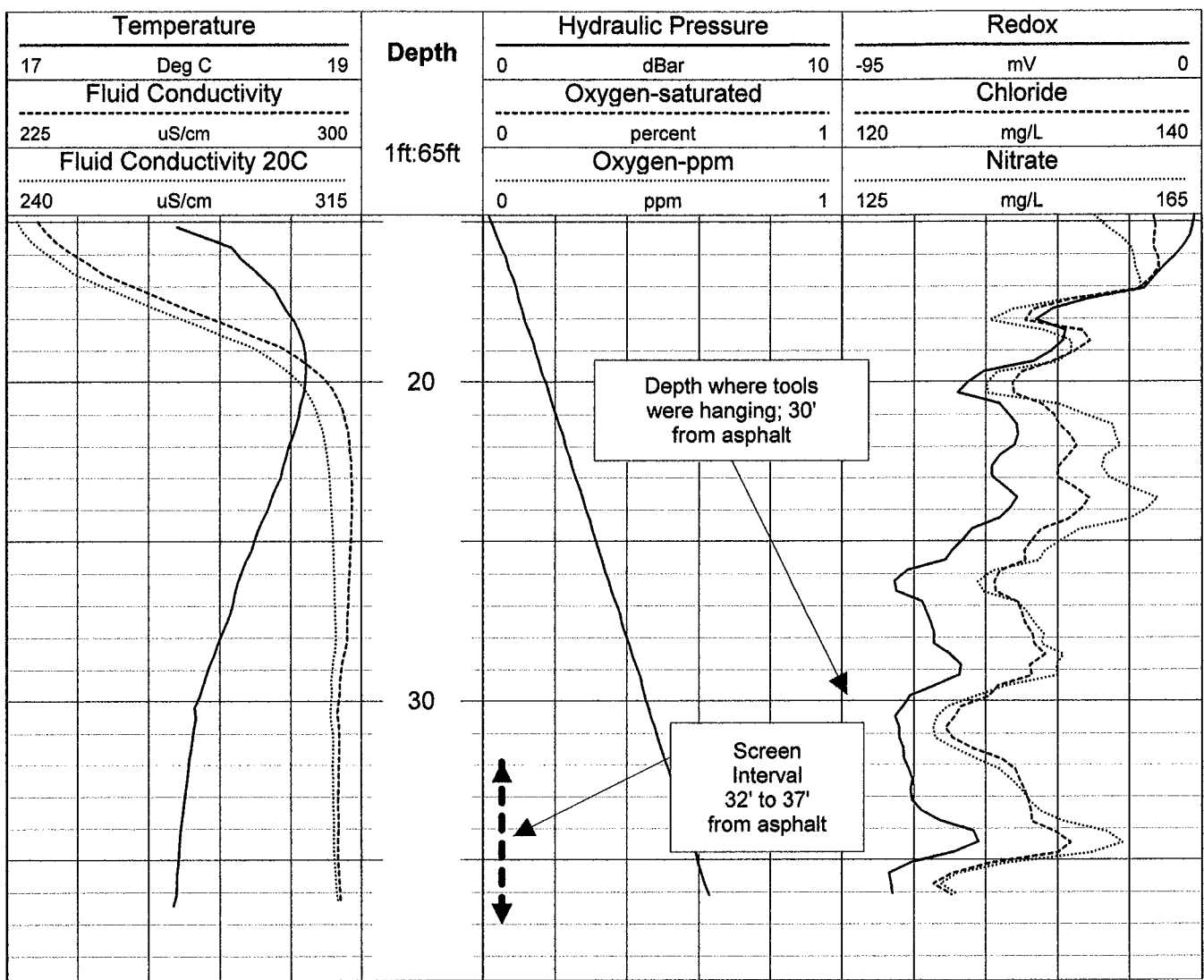
| | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------|-----------------------------|--------------------------|--|
| Well: | | MW100 | | Log: 100-A | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/17/06 | | | Time: 08:25 | | |
| System Configuration: Mount Sopris 2IDA with ammonia option | | | | | |
| Water Level: 14.52' | | Measured From: Asphalt @ ~ 08:00 | | | |
| Outer Casing Height AGL (with cap open/removed): 3.4' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.73' | | | Casing Type: See notes | | |
| Log Direction: Down | | Measured from: Asphalt | | Log Speed: 13 fpm | |
| Log Top: 14.53' | | Log Bottom: 36.43' | | Reference Point: Asphalt | |
| Analysis Software: WellCAD | | | Smoothing Points: see notes | | |
| Operator: JRJ | | Witness: None | | Other Tools Used: 9060 | |
| Well Diameter: 4" | | Well Depth: 38' | | Referenced From: Asphalt | |
| Casing Material: See notes | | | Non-Cased Interval: N/A | | |
| Screen Interval: 32' to 37'; asphalt | | | Screen Type: Unknown | | |
| Latitude: 34.88979593°N | | | Longitude: -81.07125209°W | | |
| Notes: Upper part of well (distance unknown) has inner casing of PVC, remainder of well is cased in steel. GPS values; NAD83 Tools were hanging on an obstruction near 30' from asphalt. This log was obtained after two previous traverses. Screen interval obtained from previous construction documents. GS references converted from a TIC height of 2.67' (org. ref. pt.) | | | | | |





| | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------|-----------------------------|--------------------------|--|
| Well: | | MW100 | | Log: 100-B | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: | | | Time: 08:11 | | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | | | | |
| Water Level: 14.52' | | Measured From: Asphalt @ ~ 08:00 | | | |
| Outer Casing Height AGL (with cap open/removed): 3.4' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.73' | | | Casing Type: See notes | | |
| Log Direction: Down | | Measured from: Asphalt | | Log Speed: 13.8 fpm | |
| Log Top: 15.13' | | Log Bottom: 36.43' | | Reference Point: Asphalt | |
| Analysis Software: Down | | | Smoothing Points: see notes | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 9060 | |
| Well Diameter: 4" | | Well Depth: 38' | | Referenced From: Asphalt | |
| Casing Material: See notes | | | Non-Cased Interval: N/A | | |
| Screen Interval: 32' to 37'; asphalt | | | Screen Type: Unknown | | |
| Latitude: 34.88979593°N | | | Longitude: -81.07125209°W | | |
| Notes: Upper part of well (distance unknown) has inner casing of PVC, remainder of well is cased in steel. GPS values; NAD83 Tools were hanging on an obstruction near 30' from asphalt. This log is the first traverse downhole. GS references converted from a TIC height of 2.67' (org. ref. pt.) Smoothing; redox, Cl, NO3 = 3; conductivities = 7 | | | | | |





| | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------|---------------------------|--------------------------|--|
| Well: | | MW100 | | Log: 100-C | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/17/06 | | | Time: 08:25 | | |
| System Configuration: Century 9060 | | | | | |
| Water Level: 14.52' | | Measured From: asphalt @ ~ 08:00 | | | |
| Outer Casing Height AGL (with cap open/removed): 3.4' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.73' | | | Casing Type: See notes | | |
| Log Direction: Up | | Measured from: asphalt | | Log Speed: 18 fpm | |
| Log Top: 3.73' | | Log Bottom: 38.83' | | Reference Point: asphalt | |
| Analysis Software: WellCAD | | | Smoothing Points: 21 | | |
| Operator: JRJ | | Witness: None | | Other Tools Used: 2IDA | |
| Well Diameter: 4" | | Well Depth: 38' | | Referenced From: asphalt | |
| Casing Material: See notes | | | Non-Cased Interval: N/A | | |
| Screen Interval: 32' to 37'; asphalt | | | Screen Type: Unknown | | |
| Latitude: 34.88979593°N | | | Longitude: -81.07125209°W | | |
| Notes: Upper part of well (distance unknown) has inner casing of PVC, remainder of well is cased in steel. Screen interval data obtained from previous well construction documents. GPS values; NAD83 GS references converted from a TIC height of 2.67' (org. ref. pt.) Tools were hanging on an obstruction near 30' from asphalt. | | | | | |



Depth

Natural Gamma

1ft:65ft

0

CPS

50

5

10

15

20

25

30

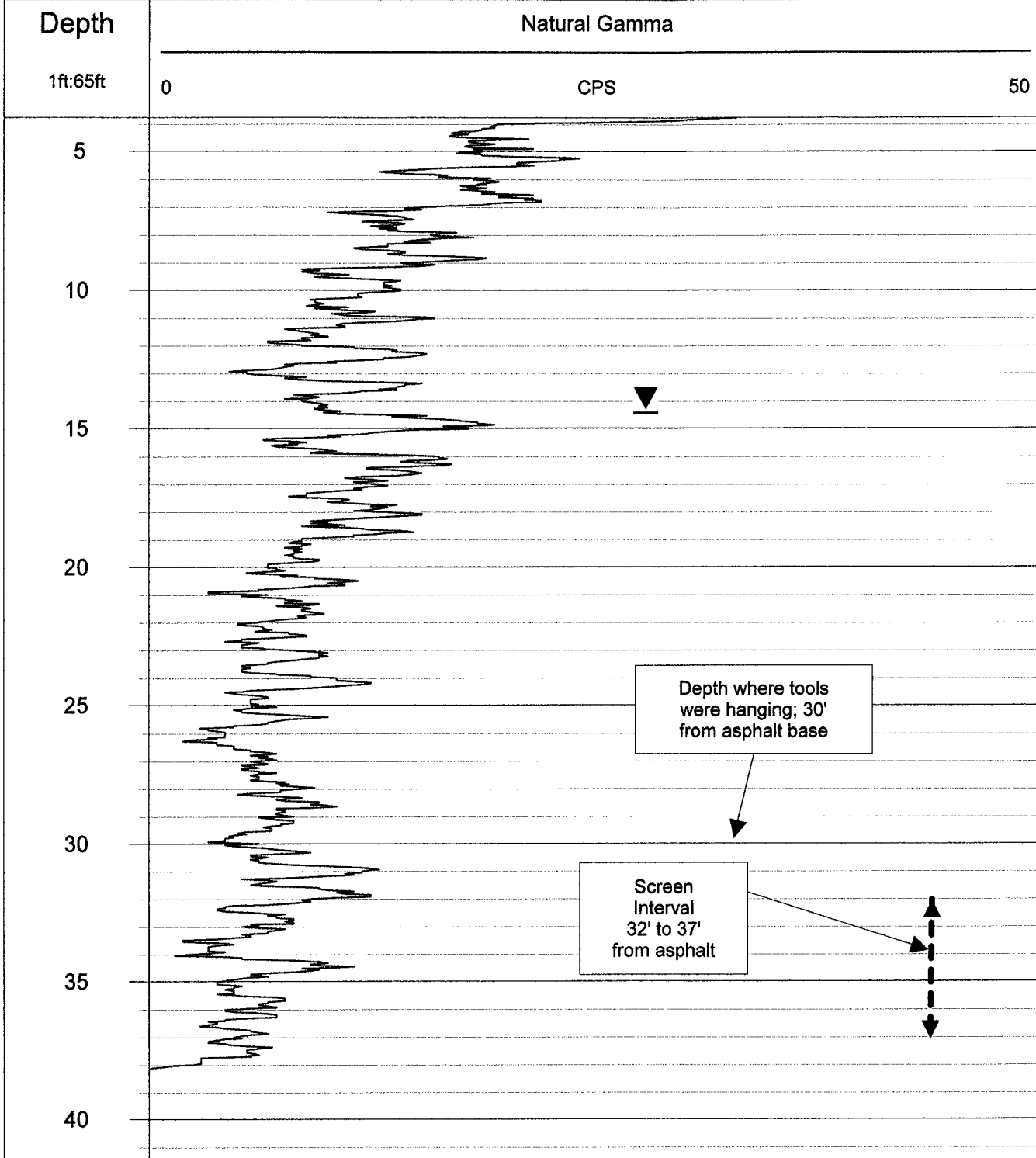
35

40



Depth where tools
were hanging; 30'
from asphalt base

Screen
Interval
32' to 37'
from asphalt



PSC Site
December 13 -18, 2006
Rock Hill, South Carolina

Geophysical Logs

Well Logs for 113B

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log 113B – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L

Log 113B – B

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log 113B - C

Natural gamma – cps (9060 Tool)
Formation conductivity – mS/m

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool (2.5" diameter)
Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity – Ohm/M
Computed lateral resistivity – Ohm/M


Century 9060 tool (1.4" diameter)
Natural gamma – cps

Century 9065 tool
Caliper, 3-arm - inches

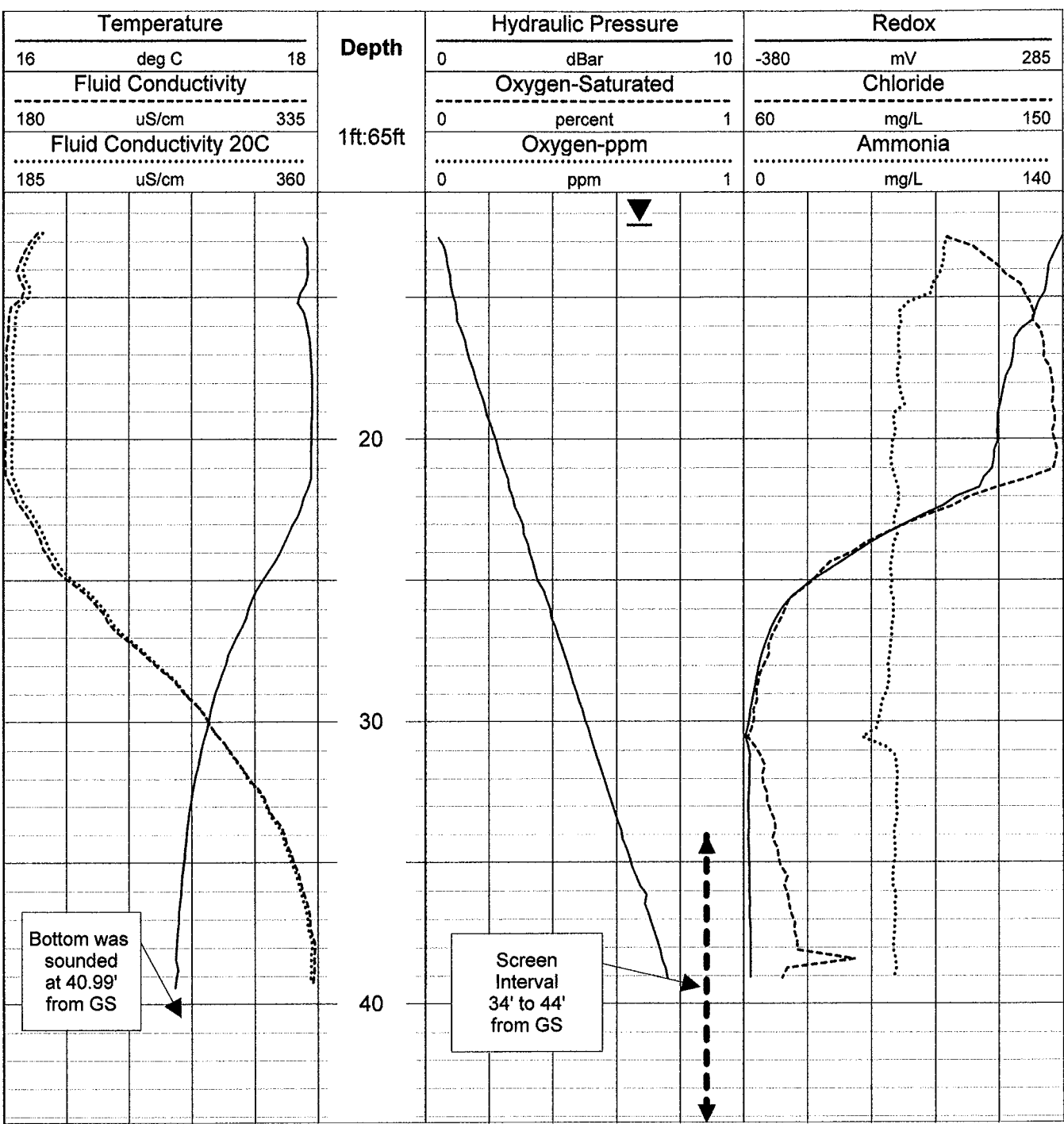
Mount Sopris 2IDA tool – ammonia configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L (option sensor)


Mount Sopris 2IDA tool – nitrate configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L (option sensor)

Mount Sopris 2EMA-1000 tool
Formation conductivity – mS/m

| | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------|-----------------------------|------------------------------|--|
| Well: | | MW113B | | Log: 113B-A | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/16/06 | | | Time: 16:07 | | |
| System Configuration: Mount Sopris 2IDA with ammonia option | | | | | |
| Water Level: 12.6' | | Measured From: GS @ ~ 15:45 | | | |
| Outer Casing Height AGL (with cap open/removed): 0' | | | | Type: Flush Mount | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.32' | | | Casing Type: PVC | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 18 fpm | |
| Log Top: 12.92' | | Log Bottom: 39.42' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: redox = 1 | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 9060; 2EMA | |
| Well Diameter: 2" | | Well Depth: 40.62' | | Referenced From: GS | |
| Casing Material: PVC | | | Non-Cased Interval: N/A | | |
| Screen Interval: 34' to 44.'; GS | | | Screen Type: Unknown | | |
| Latitude: 34.88800182°N | | | Longitude: -81.07116168°W | | |
| Notes: This was the first traverse to be logged in the well. Screen interval data obtained from previous well construction documents showing 10' interval. Bottom was sounded @ 40.99'. GS references converted from a TIC height of -0.32' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |





| | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|------------------------------|---------------------|--|
| Well: | | MW113B | | Log: 113B-B | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/16/06 | | | Time: 16:20 | | |
| System Configuration: Mount Sopris 2EMA with nitrate option | | | | | |
| Water Level: 12.6' | | Measured From: GS @ ~ 15:45 | | | |
| Outer Casing Height AGL (with cap open/removed): 0' | | | | Type: Flush Mount | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.32' | | | Casing Type: PVC | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 12.5 fpm | |
| Log Top: 12.92' | Log Bottom: 39.72' | | Reference Point: GS | | |
| Analysis Software: WellCAD | | Smoothing Points: see notes | | | |
| Operator: JRU | Witness: None | | Other Tools Used: 9060; 2EMA | | |
| Well Diameter: 2" | Well Depth: 40.62' | | Referenced From: GS | | |
| Casing Material: PVC | | | Non-Cased Interval: N/A | | |
| Screen Interval: 34' to 44'; GS | | | Screen Type: Unknown | | |
| Latitude: 34.88800182°N | | | Longitude: -81.07116168°W | | |
| Notes: Screen interval data obtained from previous well construction documents showing 10' interval. Bottom was sounded @ 40.99'. Smoothing; redox =1; conductivities, NO3 & Cl = 5. Two well traverses occurred prior to this log. GS references converted from a TIC height of -0.32' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |

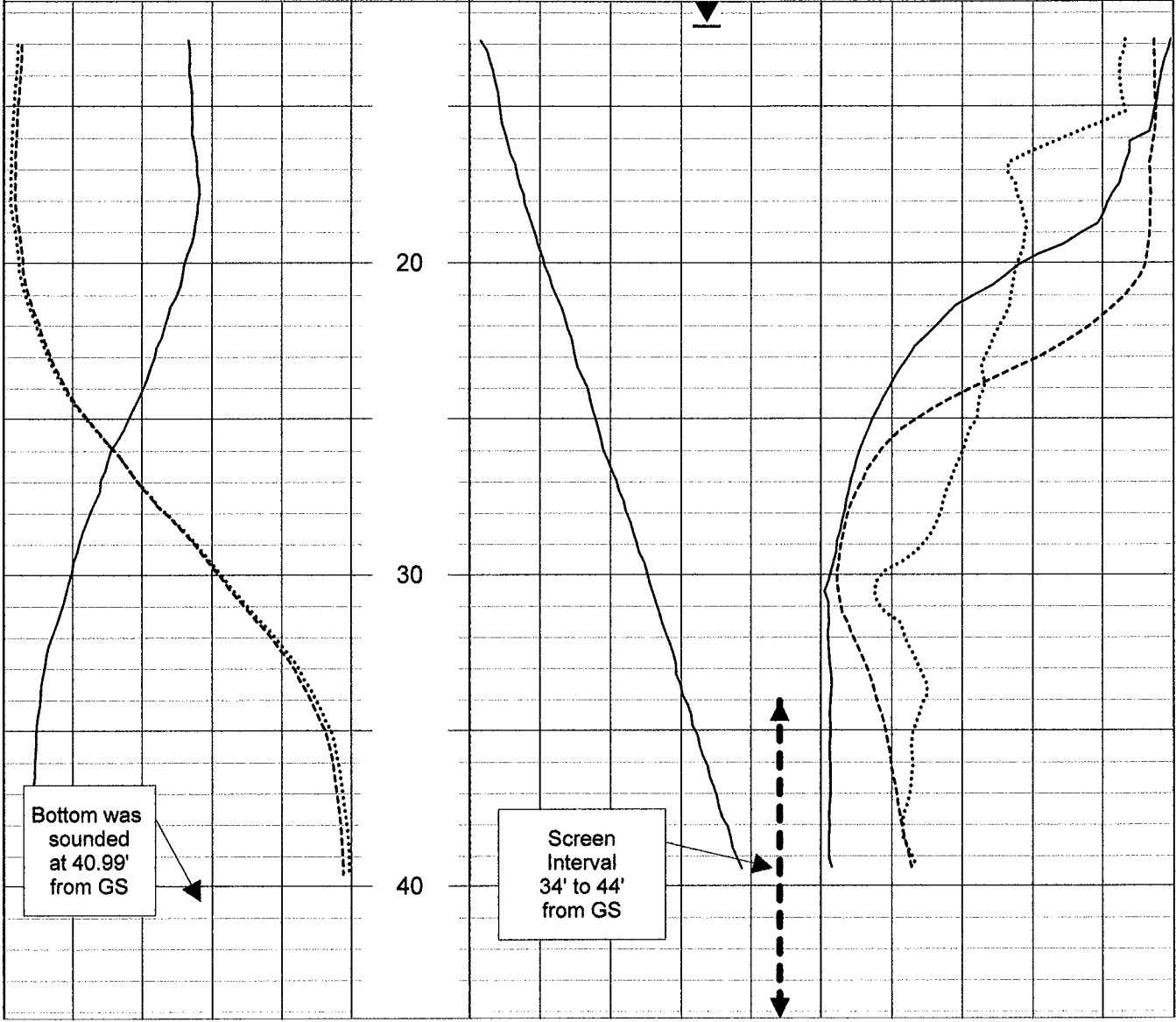



| Temperature | | |
|------------------------|-------|-----|
| 17 | Deg C | 19 |
| Fluid Conductivity | | |
| 180 | uS/cm | 335 |
| Fluid Conductivity 20C | | |
| 190 | uS/cm | 355 |

| Depth | Hydraulic Pressure | |
|------------|--------------------|-----------|
| | 0 | dBar 10 |
| | Oxygen-saturated | |
| | 0 | percent 1 |
| Oxygen-ppm | | |
| 0 | ppm 1 | |

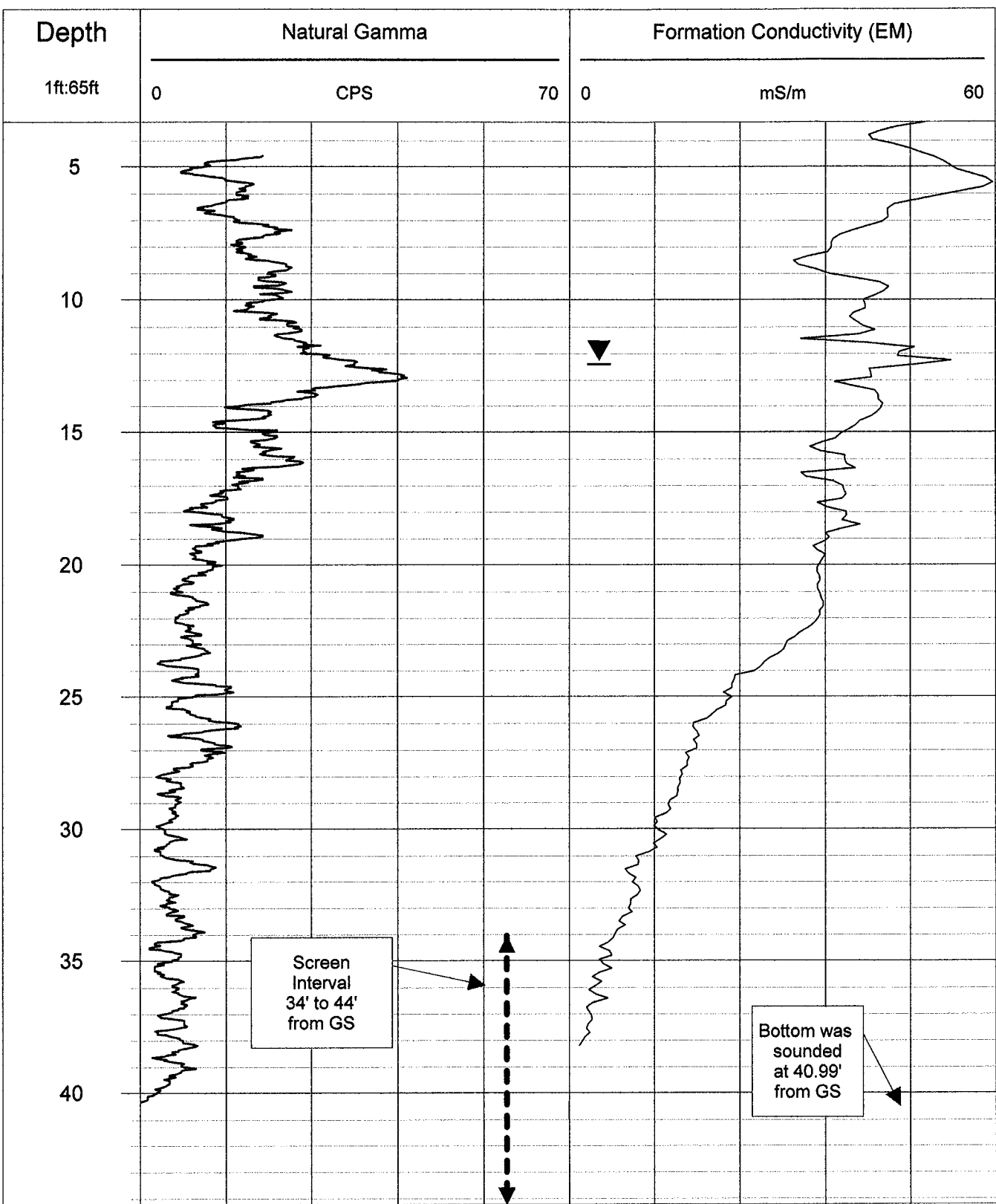
| Redox | | |
|----------|------|-----|
| -280 | mV | 100 |
| Chloride | | |
| 65 | mg/L | 165 |
| Nitrate | | |
| 130 | mg/L | 165 |

1ft:65ft



| | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------|---------------------------|----------------------|--|
| Well: | | MW113B | | Log: 113B-C | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/16/06 | | | Time: See notes | | |
| System Configuration: Century 9060; Mount Sopris 2EMA | | | | | |
| Water Level: 12.6' | | Measured From: GS @ ~ 15:45 | | | |
| Outer Casing Height AGL (with cap open/removed): 0' | | | | Type: Flush Mount | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.32' | | | Casing Type: PVC | | |
| Log Direction: Up | | Measured from: GS | | Log Speed: see notes | |
| Log Top: 3.32' | Log Bottom: 40.12' | | Reference Point: GS | | |
| Analysis Software: WellCAD | | Smoothing Points: natural gamma = 21 | | | |
| Operator: JRJ | Witness: None | | Other Tools Used: 2IDA | | |
| Well Diameter: 2" | Well Depth: 40.99' | | Referenced From: GS | | |
| Casing Material: PVC | | | Non-Cased Interval: N/A | | |
| Screen Interval: 34' to 44'; GS | | | Screen Type: Unknown | | |
| Latitude: 34.88800182°N | | | Longitude: -81.07116168°W | | |
| Notes: 9060 logged at 17:00; speed 16 fpm. GPS values; NAD83 2EMA logged at 16:49; speed 16 fpm. Screen interval data obtained from previous well construction documents showing 10' interval. Bottom was sounded @ 40.99'. 2EMA stabilized after 14 minutes. GS references converted from a TIC height of -0.32' (org. ref. pt.) | | | | | |
|  | | | | | |





PSC Site
December 13 -18, 2006
Rock Hill, South Carolina

Geophysical Logs

Well Logs for MW122B

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log 122B – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L

Log 122B – B

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log 122B - C

Natural gamma – cps (9060 Tool)
Formation conductivity – mS/m

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool (2.5" diameter)
Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity – Ohm/M
Computed lateral resistivity – Ohm/M


Century 9060 tool (1.4" diameter)
Natural gamma – cps

Century 9065 tool
Caliper, 3-arm - inches

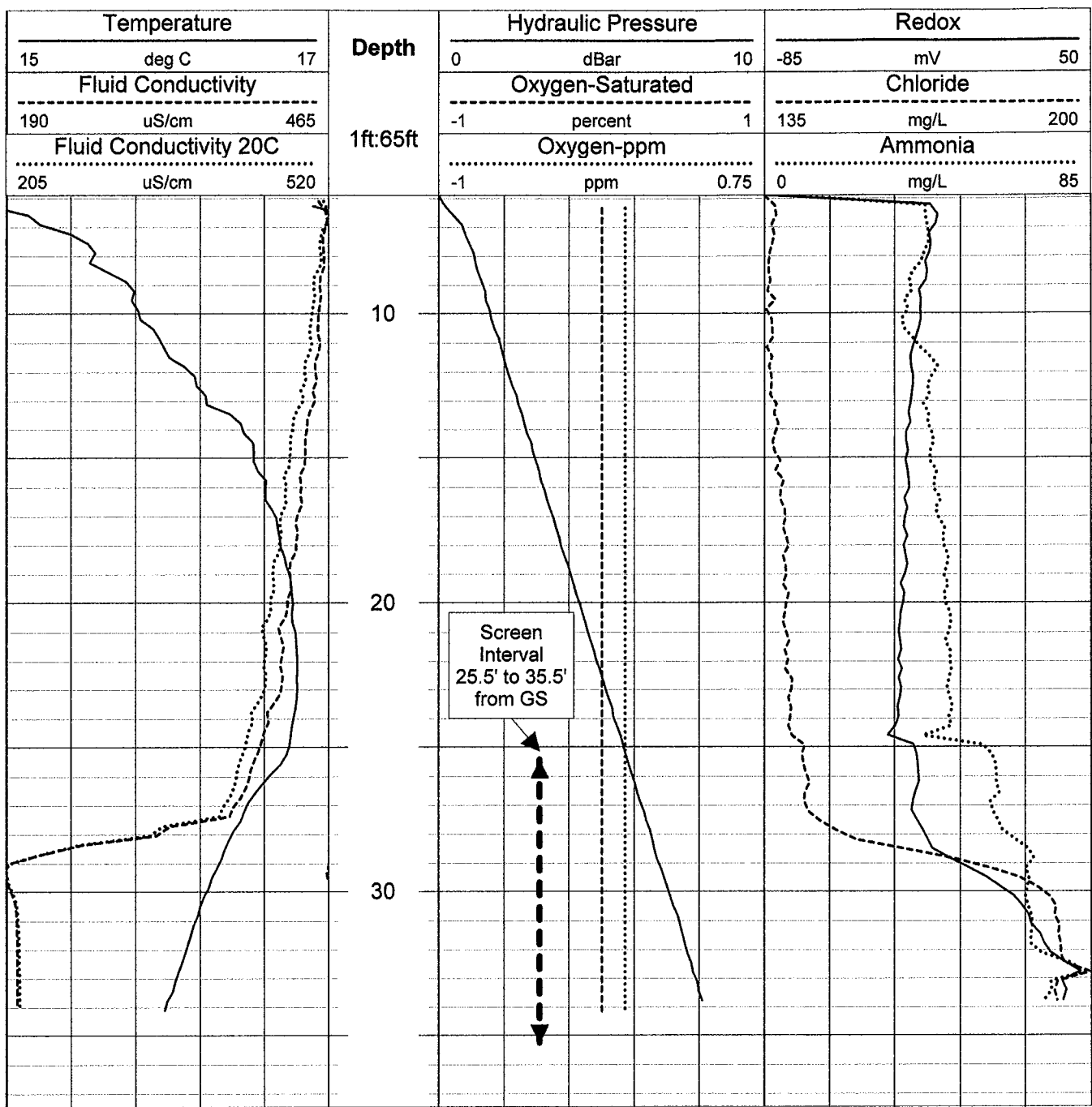
Mount Sopris 2IDA tool – ammonia configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L (option sensor)


Mount Sopris 2IDA tool – nitrate configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L (option sensor)

Mount Sopris 2EMA-1000 tool
Formation conductivity – mS/m

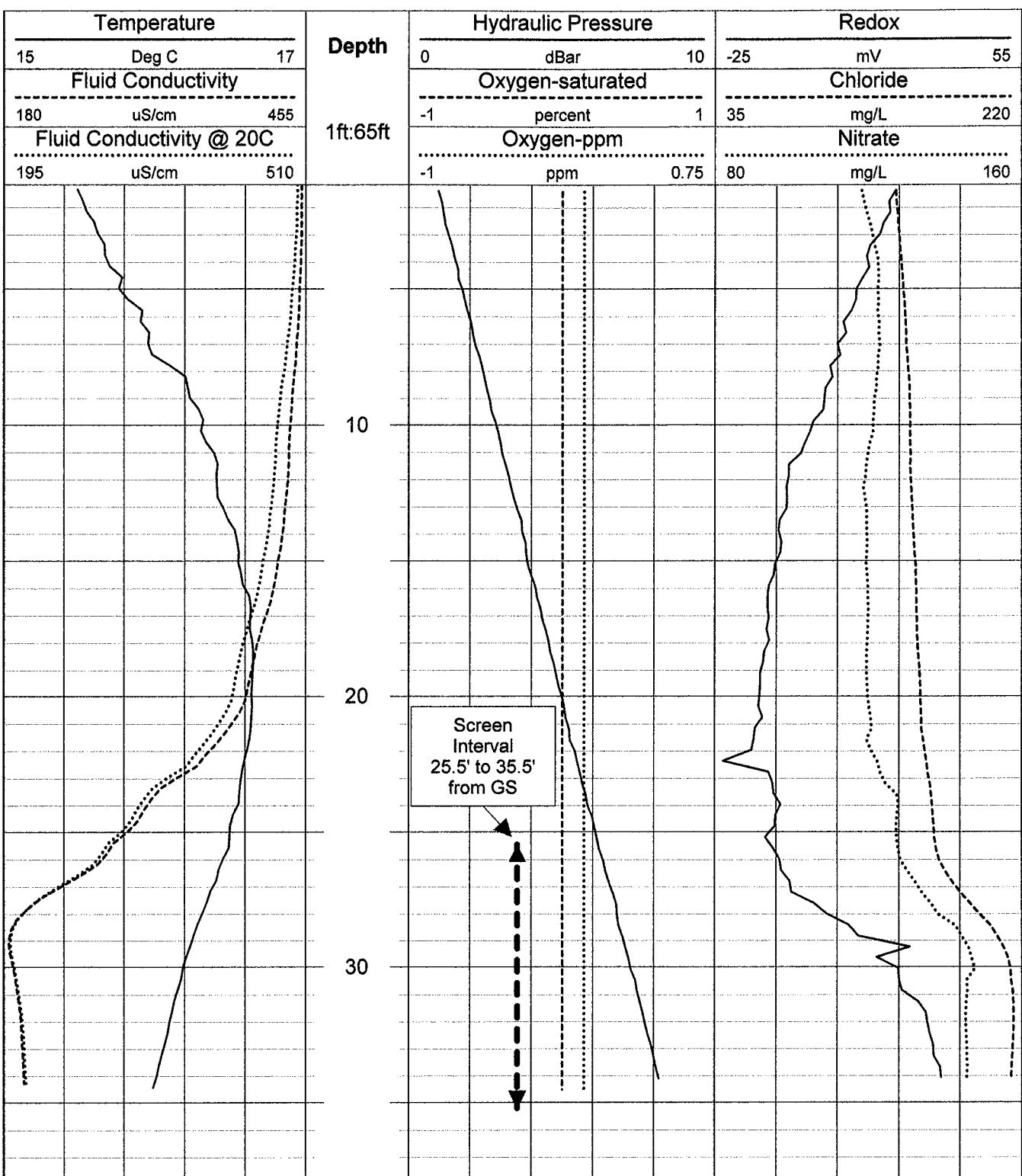
| | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------|-----------------------------|------------------------------|--|
| Well: | | MW122B | | Log: 122B-A | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/18/06 | | | Time: 10:03 | | |
| System Configuration: Mount Sopris 2IDA with ammonia option | | | | | |
| Water Level: 6.36' | | Measured From: GS @ ~ 09:50 | | | |
| Outer Casing Height AGL (with cap open/removed): 3.7' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.02 | | | Casing Type: PVC | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 16.4 fpm | |
| Log Top: 6.3' | | Log Bottom: 34.2' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: see notes | | |
| Operator: JRJ | | Witness: None | | Other Tools Used: 9060, 2EMA | |
| Well Diameter: 2" | | Well Depth: 35.21' | | Referenced From: GS | |
| Casing Material: PVC | | | Non-Cased Interval: N/A | | |
| Screen Interval: 25.5' to 35.5'; GS | | | Screen Type: steel | | |
| Latitude: 34.887378°N | | | Longitude: -81.070457°W | | |
| Notes: Screen interval data obtained from previous well construction documents. Smoothing points: redox = 1; NO3, Cl = 5; conductivities = 7. GS references converted from a TIC height of 3.68' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |






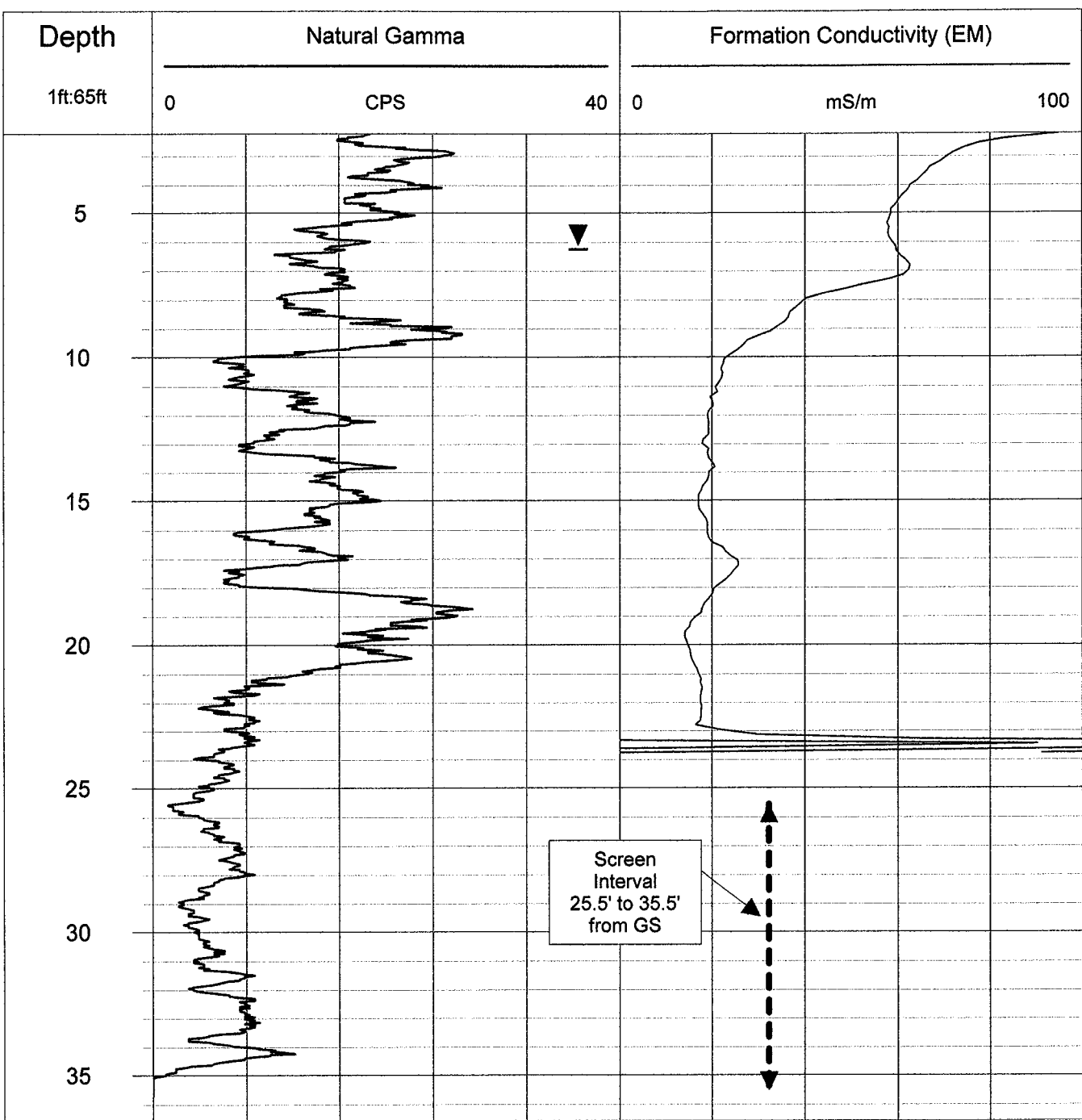
| | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------|-----------------------------|------------------------------|--|
| Well: | | MW122B | | Log: 122B-B | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/18/06 | | | Time: 10:15 | | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | | | | |
| Water Level: 6.36' | | Measured From: GS @ ~ 09:50 | | | |
| Outer Casing Height AGL (with cap open/removed): 3.7' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.02 | | | Casing Type: PVC | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 15 fpm | |
| Log Top: 6' | | Log Bottom: 34.2' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: see notes | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 9060, 2EMA | |
| Well Diameter: 2" | | Well Depth: 35.21' | | Referenced From: GS | |
| Casing Material: PVC | | | Non-Cased Interval: N/A | | |
| Screen Interval: 25.5' to 35.5'; GS | | | Screen Type: steel | | |
| Latitude: 34.887378°N | | | Longitude: -81.070457°W | | |
| Notes: Screen interval data obtained from previous well construction documents. Smoothing points: redox = 1; NO3, Cl = 5; conductivities = 7. GS references converted from a TIC height of 3.68' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |





| | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------|--------------------------------------|------------------------|--|
| Well: | | MW122B | | Log: 122B-C | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/18/06 | | | Time: 10:46 2EMA; 10:58 9060 | | |
| System Configuration: Mount Sopris 2EMA; Century 9060 | | | | | |
| Water Level: 6.36' | | Measured From: GS @ ~ 09:50 | | | |
| Outer Casing Height AGL (with cap open/removed): 3.7' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.02 | | | Casing Type: PVC | | |
| Log Direction: see notes | | Measured from: GS | | Log Speed: see notes | |
| Log Top: 2.32' | | Log Bottom: 35.12' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: Natural gamma = 23 | | |
| Operator: JRJ | | Witness: None | | Other Tools Used: 2IDA | |
| Well Diameter: 2" | | Well Depth: 38.89' | | Referenced From: GS | |
| Casing Material: PVC | | | Non-Cased Interval: N/A' | | |
| Screen Interval: 25.5' to 35.5'; GS | | | Screen Type: steel | | |
| Latitude: 34.887378°N | | | Longitude: -81.070457°W | | |
| Notes: Screen interval data obtained from previous well construction documents. 9060 logged up; speed 16 fpm. 2EMA logged up; speed 15.7 fpm. GS references converted from a TIC height of 3.68' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |





PSC Site
December 13 -18, 2006
Rock Hill, South Carolina

Geophysical Logs

Well Logs for MW123B

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log 123B – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L

Log 123B – B

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log 123B - C

Natural gamma – cps (9060 Tool)

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool (2.5" diameter)
Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity – Ohm/M
Computed lateral resistivity – Ohm/M


Century 9060 tool (1.4" diameter)
Natural gamma – cps

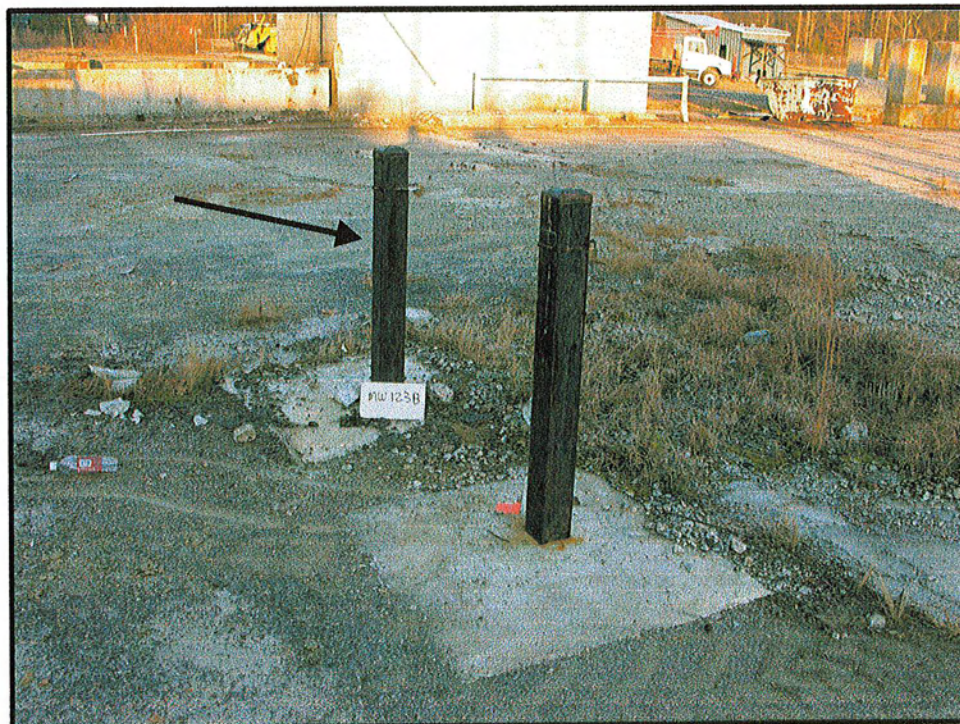
Century 9065 tool
Caliper, 3-arm - inches

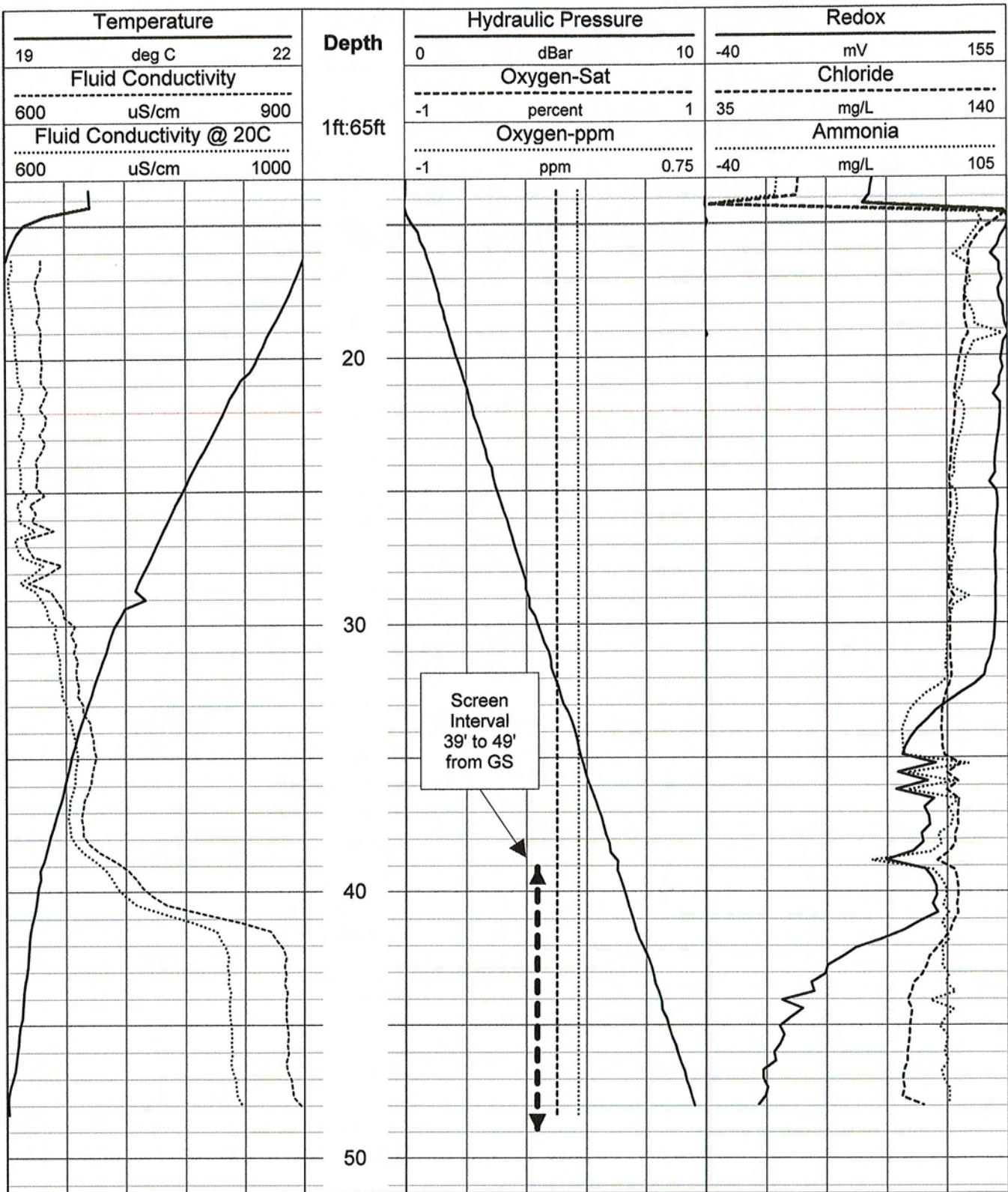
Mount Sopris 2IDA tool – ammonia configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L (option sensor)


Mount Sopris 2IDA tool – nitrate configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L (option sensor)

Mount Sopris 2EMA-1000 tool
Formation conductivity – mS/m

| | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------|------------------------------|---------------------|--|
| Well: | | MW123B | | Log: 123B-A | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/18/06 | | | Time: 15:32 | | |
| System Configuration: Mount Sopris 2IDA with ammonia option | | | | | |
| Water Level: 14.61' | | Measured From: GS @ ~ 15:15 | | | |
| Outer Casing Height AGL (with cap open/removed): 2.86' Type: steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: +0.01 | | | Casing Type: Stainless steel | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 12.5 fpm | |
| Log Top: 14.5' | Log Bottom: 48.5' | | Reference Point: GS | | |
| Analysis Software: WellCAD | | Smoothing Points: redox = 1 | | | |
| Operator: JRU | Witness: None | | Other Tools Used: 9060 | | |
| Well Diameter: 2" | Well Depth: 49' | | Referenced From: GS | | |
| Casing Material: Stainless steel | | | Non-Cased Interval: N/A | | |
| Screen Interval: 39' to 49'; GS | | | Screen Type: Stainless Steel | | |
| Latitude: 34.888253°N | | | Longitude: -81.072554°W | | |
| Notes: Screen interval data obtained from previous well construction documents. Fluid conductivity logs were recored at mS/cm scale, but converted to uS/cm for this log presentation. GPS values; NAD83 GS references converted from a TIC height of 2.87' (org. ref. pt.) | | | | | |
|  | | | | | |





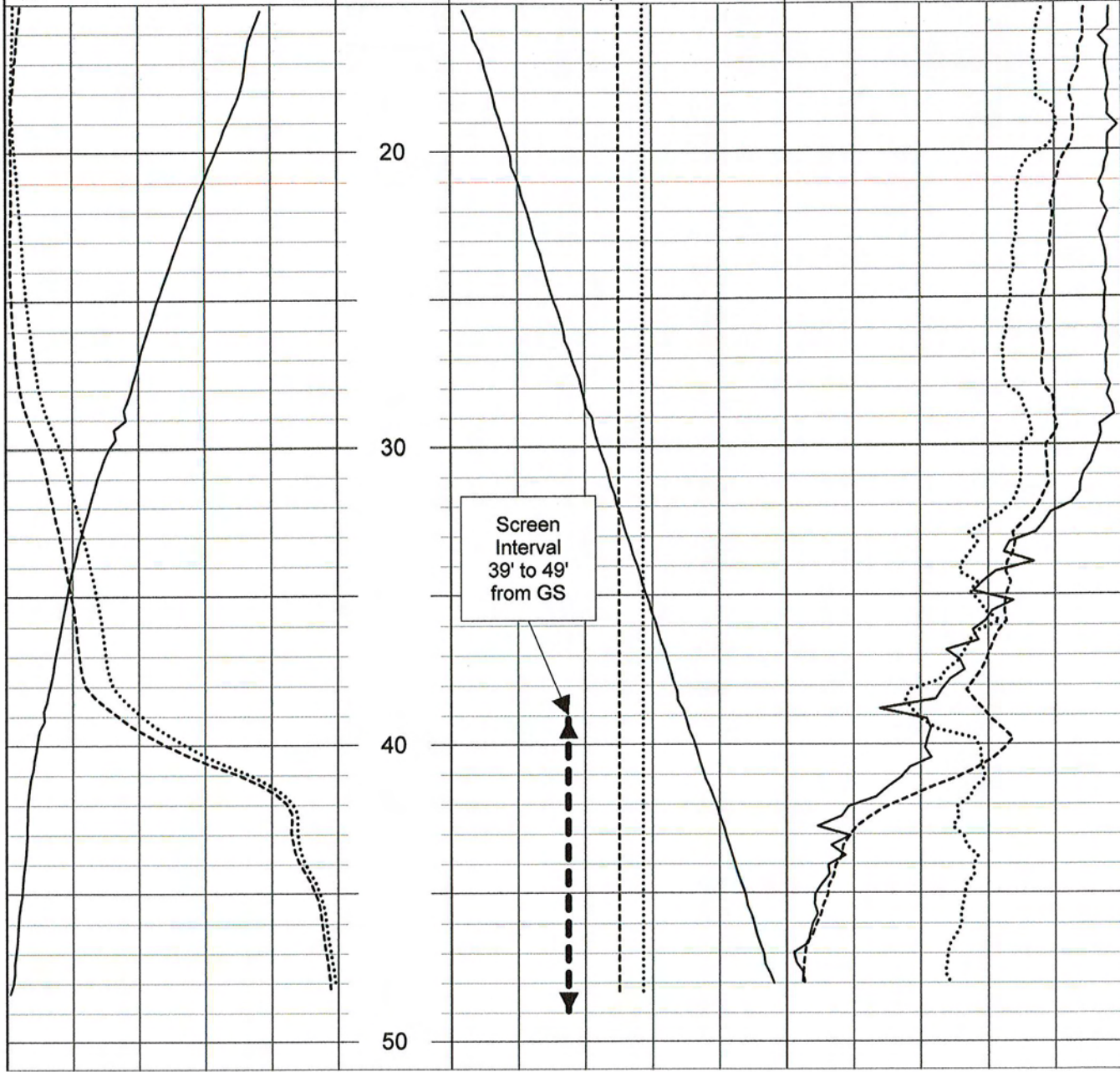
| | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------|------------------------------|------------------------|--|
| Well: | | MW123B | | Log: 123B-B | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/18/06 | | | Time: 15:53 | | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | | | | |
| Water Level: 14.61' | | Measured From: GS @ ~ 15:15 | | | |
| Outer Casing Height AGL (with cap open/removed): 2.86' Type: steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: +0.01 | | | Casing Type: Stainless steel | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 14.4 fpm | |
| Log Top: 15.2' | | Log Bottom: 48.5' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: see notes | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 9060 | |
| Well Diameter: 2" | | Well Depth: 49' | | Referenced From: GS | |
| Casing Material: Stainless steel | | | Non-Cased Interval: N/A | | |
| Screen Interval: 39' to 49'; GS | | | Screen Type: Stainless Steel | | |
| Latitude: 34.888253°N | | | Longitude: -81.072554°W | | |
| Notes: Screen interval data obtained from previous well construction documents. Smoothing points: redox = 1; conductivities, Cl, NO3 = 5. GS references converted from a TIC height 2.87' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |




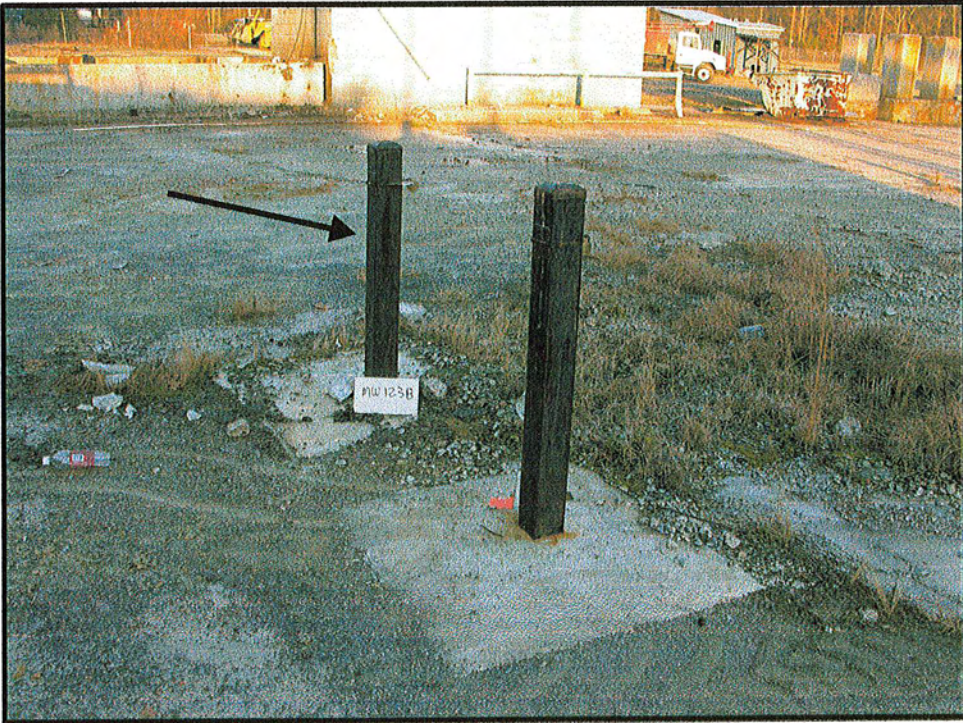
| Temperature | | |
|-------------------------|-------|-----|
| 19 | Deg C | 23 |
| Fluid Conductivity | | |
| 620 | uS/cm | 860 |
| Fluid Conductivity @20C | | |
| 595 | uS/cm | 875 |

| Depth | Hydraulic Pressure | | |
|------------|--------------------|---------|----|
| | 0 | dBar | 10 |
| | Oxygen-saturated | | |
| | -1 | percent | 1 |
| Oxygen-ppm | | | |
| -1 | ppm | 0.75 | |

| Redox | | |
|----------|------|-----|
| -30 | mV | 150 |
| Chloride | | |
| 100 | mg/L | 140 |
| Nitrate | | |
| 95 | mg/L | 155 |



| | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------------------|------------------------------|--------------------|--|
| Well: | | MW123B | | Log: 123B-C | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/18/06 | | | Time: 16:14 | | |
| System Configuration: Century 9060 | | | | | |
| Water Level: 14.61' | | Measured From: GS @ ~ 15:15 | | | |
| Outer Casing Height AGL (with cap open/removed): 2.86' Type: steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: +0.01 | | | Casing Type: Stainless steel | | |
| Log Direction: Up | | Measured from: GS | | Log Speed: 18 fpm | |
| Log Top: 3.1' | Log Bottom: 49.1' | | Reference Point: GS | | |
| Analysis Software: WellCAD | | Smoothing Points: natural gamma = 23 | | | |
| Operator: JRU | Witness: None | | Other Tools Used: 2IDA | | |
| Well Diameter: 2" | Well Depth: 49' | | Referenced From: GS | | |
| Casing Material: Stainless steel | | | Non-Cased Interval: N/A | | |
| Screen Interval: 39' to 49' | | | Screen Type: Stainless Steel | | |
| Latitude: 34.888253°N | | | Longitude: -81.072554°W | | |
| Notes: Screen interval data obtained from previous well construction documents. GS references converted from a TIC height 2.87' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |



Depth

Natural Gamma

1ft:65ft

0

CPS

50

5

10

15

20

25

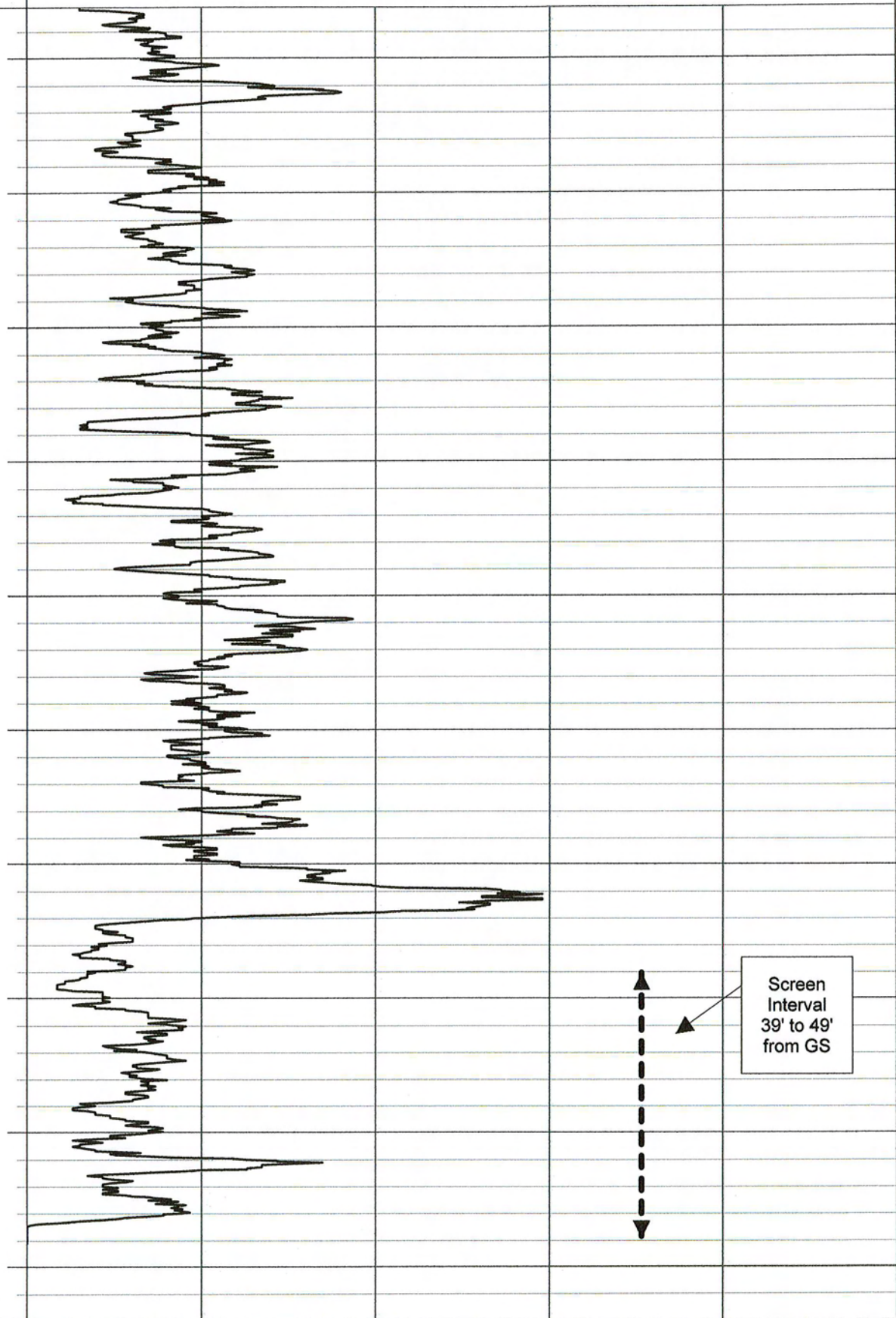
30

35

40

45

50



Screen Interval 39' to 49' from GS

PSC Site
December 13 -18, 2006
Rock Hill, South Carolina

Geophysical Logs

Well Logs for OB 109B

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log 109B – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log 109B – B

Natural gamma – cps (9060 Tool)
Caliper, 3-arm - inches
Formation conductivity – mS/m

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool (2.5" diameter)
Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity – Ohm/M
Computed lateral resistivity – Ohm/M

Century 9060 tool (1.4" diameter)
Natural gamma – cps

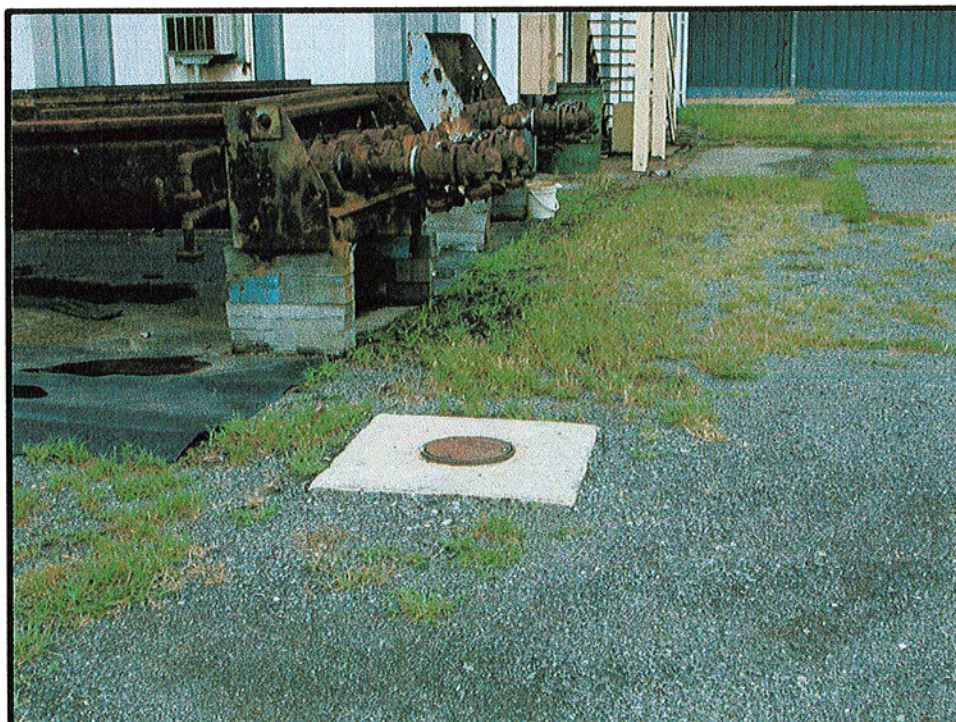
Century 9065 tool
Caliper, 3-arm - inches

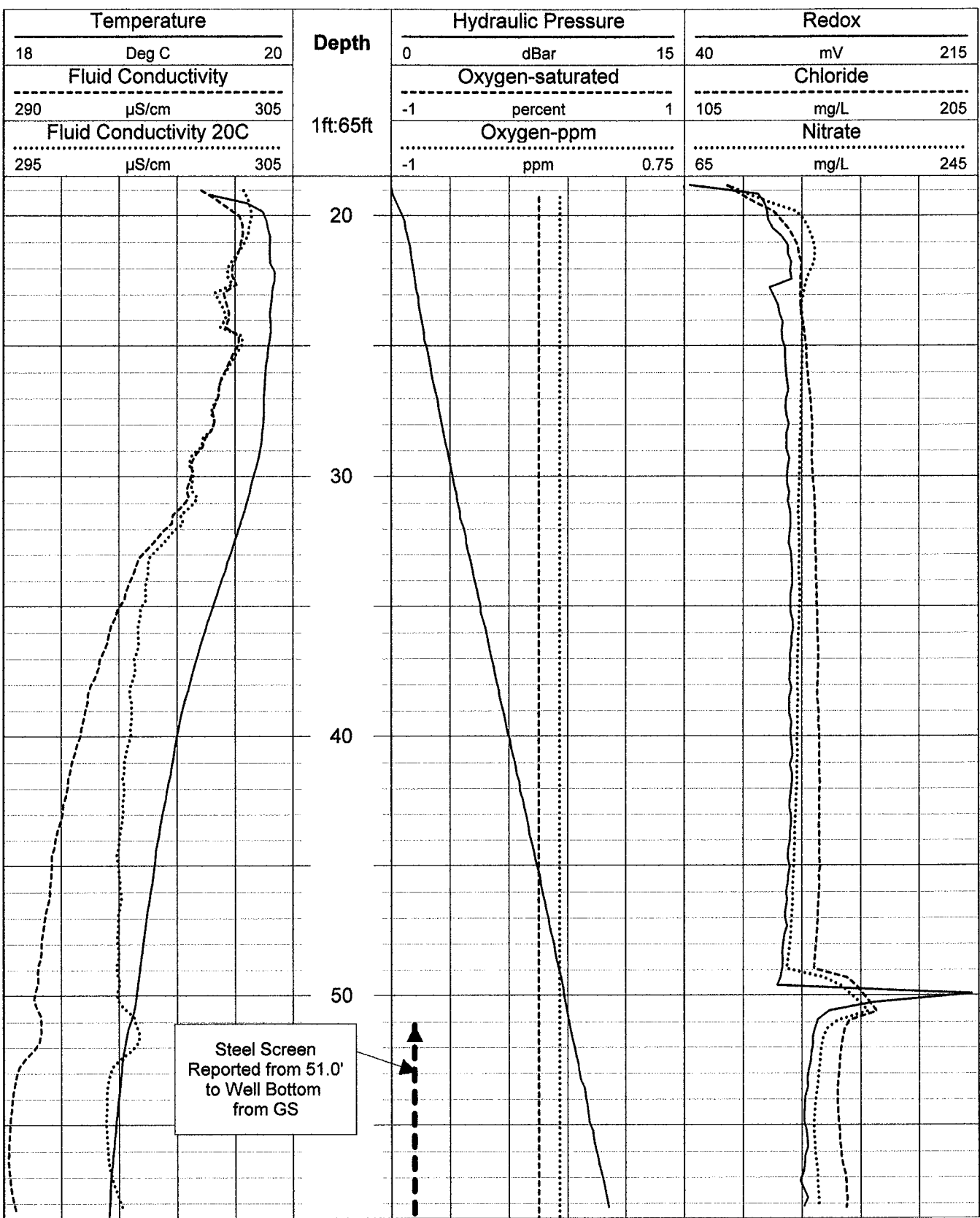
Mount Sopris 2IDA tool – ammonia configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L (option sensor)

Mount Sopris 2IDA tool – nitrate configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L (option sensor)

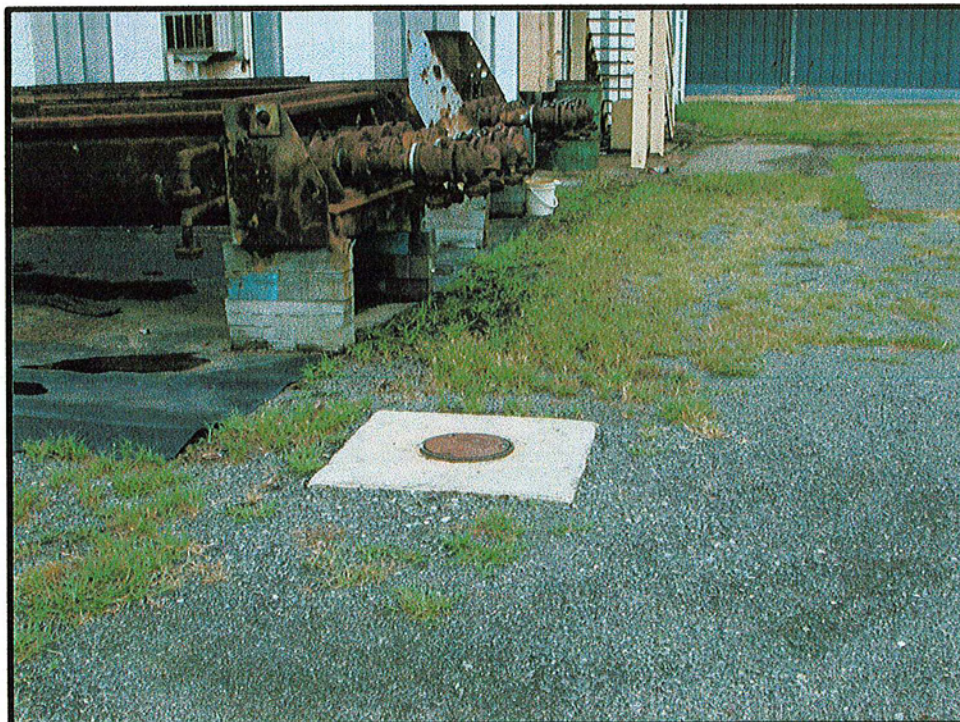
Mount Sopris 2EMA-1000 tool
Formation conductivity – mS/m

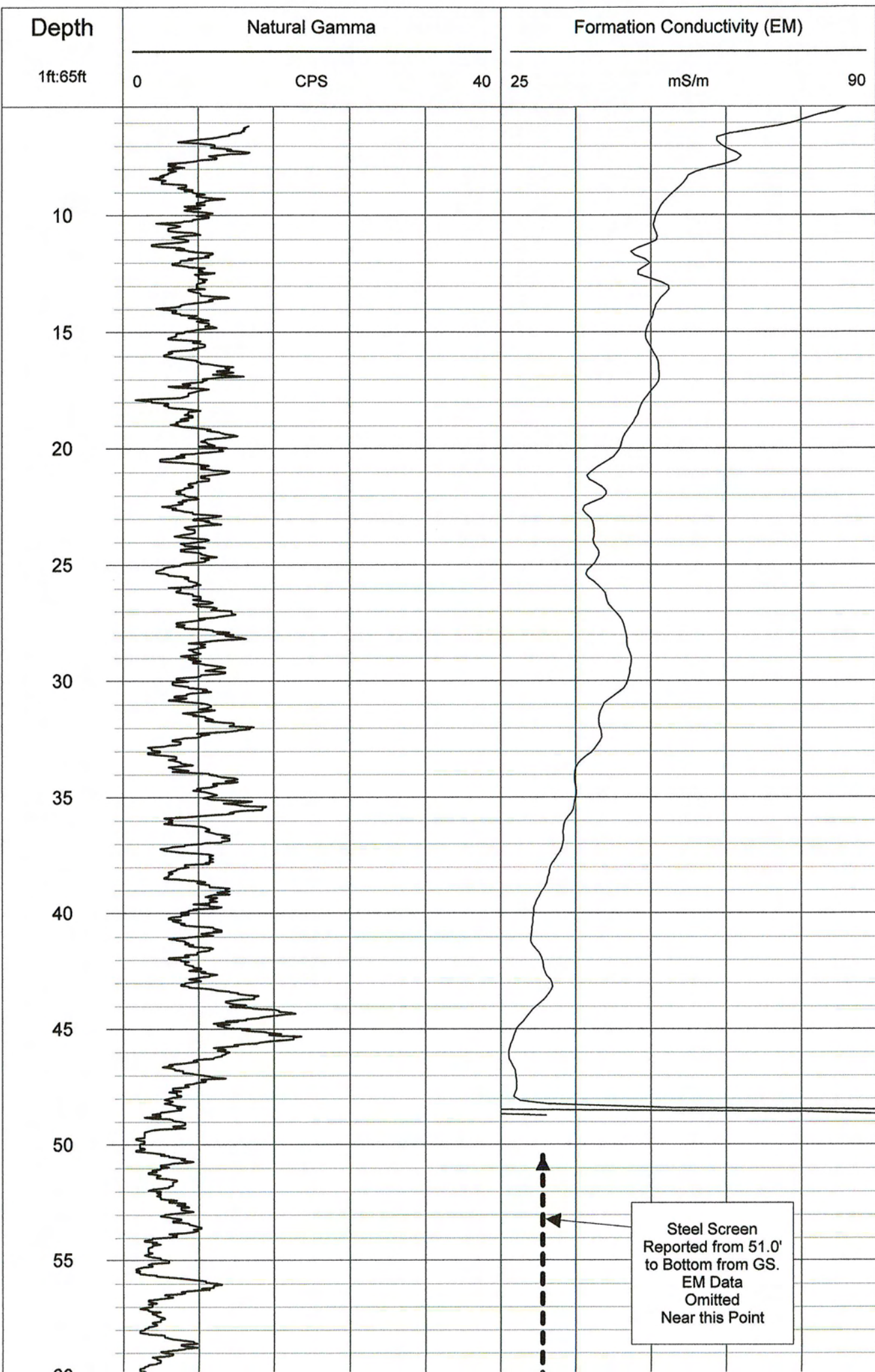
| | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------|-----------------------------|------------------------|--|
| Well: | | OB 109B | | Log: 109B-A | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/16/06 | | | Time: 09:10 | | |
| System Configuration: Mount sopris 2IDA with nitrate option | | | | | |
| Water Level: 18.95' | | Measured From: GS @ ~ 09:00 | | | |
| Outer Casing Height AGL (with cap open/removed): 0' | | | | Type: Flush mount | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.4 | | | Casing Type: see notes | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 11.8 fpm | |
| Log Top: 18.9' | | Log Bottom: 58.6' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: see notes | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 9060 | |
| Well Diameter: 2" | | Well Depth: 62' | | Referenced From: GS | |
| Casing Material: See notes | | | Non-Cased Interval: N/A | | |
| Screen Interval: 51.0' to end; GS | | | Screen Type: Steel | | |
| Latitude: 34.88801120°N | | | Longitude: -81.07295565°W | | |
| Notes: PVC casing to 51.0'; Steel well screen from 51.0' to bottom. Screen interval data obtained from previous well construction documents. Smoothing; redox = 1; conductivities, NO3, and Cl = 5. This log was the first well traverse. GS references converted from a casing height -0.4' (org. ref. pt.) | | | | | |





| | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------|--------------------------------------|------------------------|--|
| Well: | | OB 109B | | Log: 109B-B | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/16/06 | | | Time: See notes | | |
| System Configuration: Century 9060; mount sopris 2EMA | | | | | |
| Water Level: 18.95' | | Measured From: GS @ ~ 09:00 | | | |
| Outer Casing Height AGL (with cap open/removed): 0' | | | | Type: Flush mount | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.4 | | | Casing Type: see notes | | |
| Log Direction: Up | | Measured from: GS | | Log Speed: see notes | |
| Log Top: 5.3' | | Log Bottom: 60.1' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: natural gamma = 23 | | |
| Operator: JRJ | | Witness: None | | Other Tools Used: 2IDA | |
| Well Diameter: 2" | | Well Depth: 62' | | Referenced From: GS | |
| Casing Material: See notes | | | Non-Cased Interval: N/A | | |
| Screen Interval: 51.0' to bottom | | | Screen Type: Steel | | |
| Latitude: 34.88801120°N | | | Longitude: -81.07295565°W | | |
| Notes: PVC casing to 51.0'; Steel well screen from 51.0' to bottom. 2EMA 09:53@ 14.4 fpm; natural gamma 10:19 @ 17 fpm. Screen interval data obtained from previous well construction documents. 2EMA stabilized after 22 minutes. GS references converted from a casing height -0.4' (org. ref. pt.) | | | | | |





PSC Site
December 13 -18, 2006
Rock Hill, South Carolina

Geophysical Logs

Well Logs for P3

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log P3 – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L

Log P3 – B

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log P3 - C

Formation conductivity – mS/m

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool (2.5" diameter)
Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity – Ohm/M
Computed lateral resistivity – Ohm/M


Century 9060 tool (1.4" diameter)
Natural gamma – cps

Century 9065 tool
Caliper, 3-arm - inches

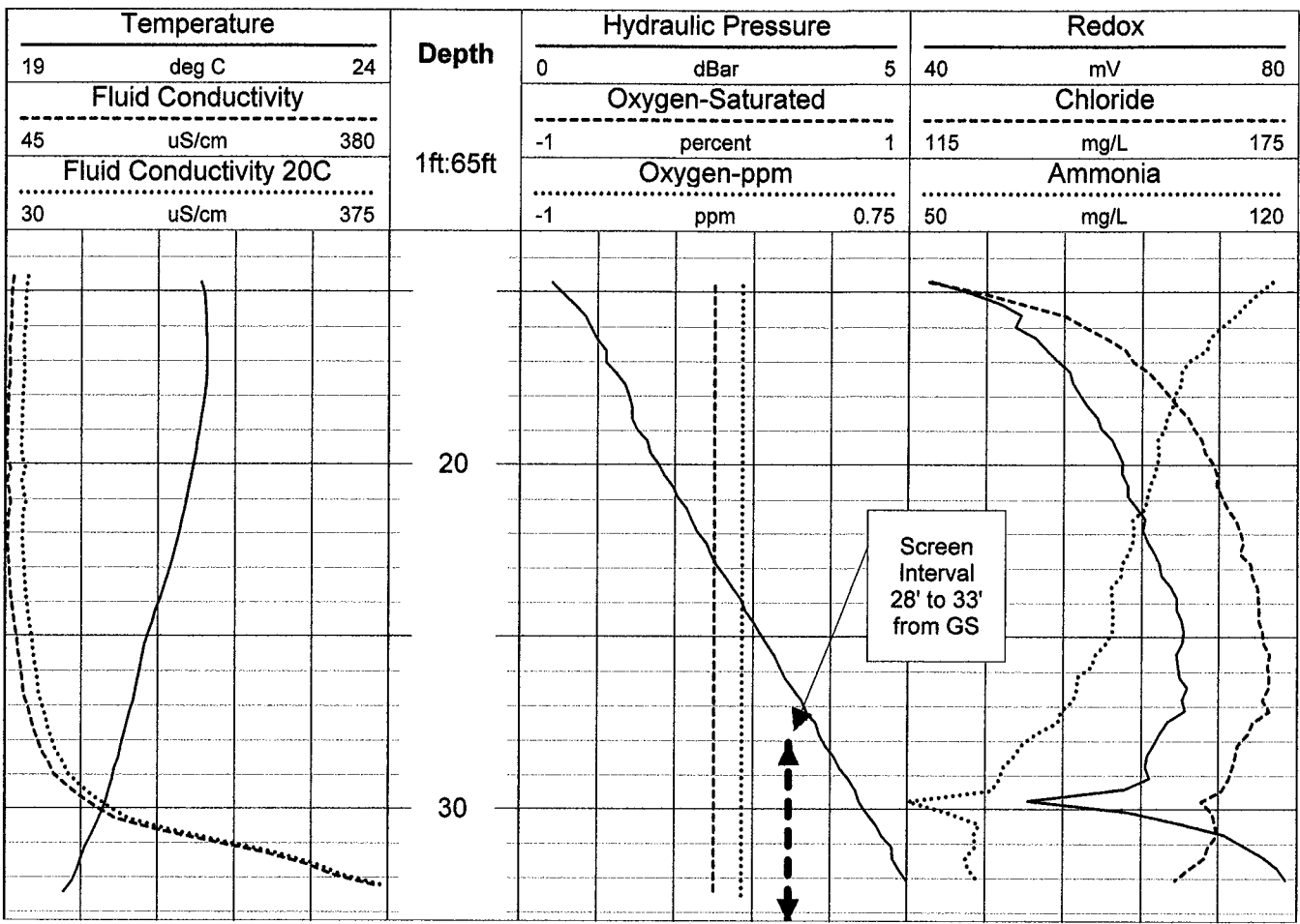
Mount Sopris 2IDA tool – ammonia configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L (option sensor)


Mount Sopris 2IDA tool – nitrate configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L (option sensor)

Mount Sopris 2EMA-1000 tool
Formation conductivity – mS/m

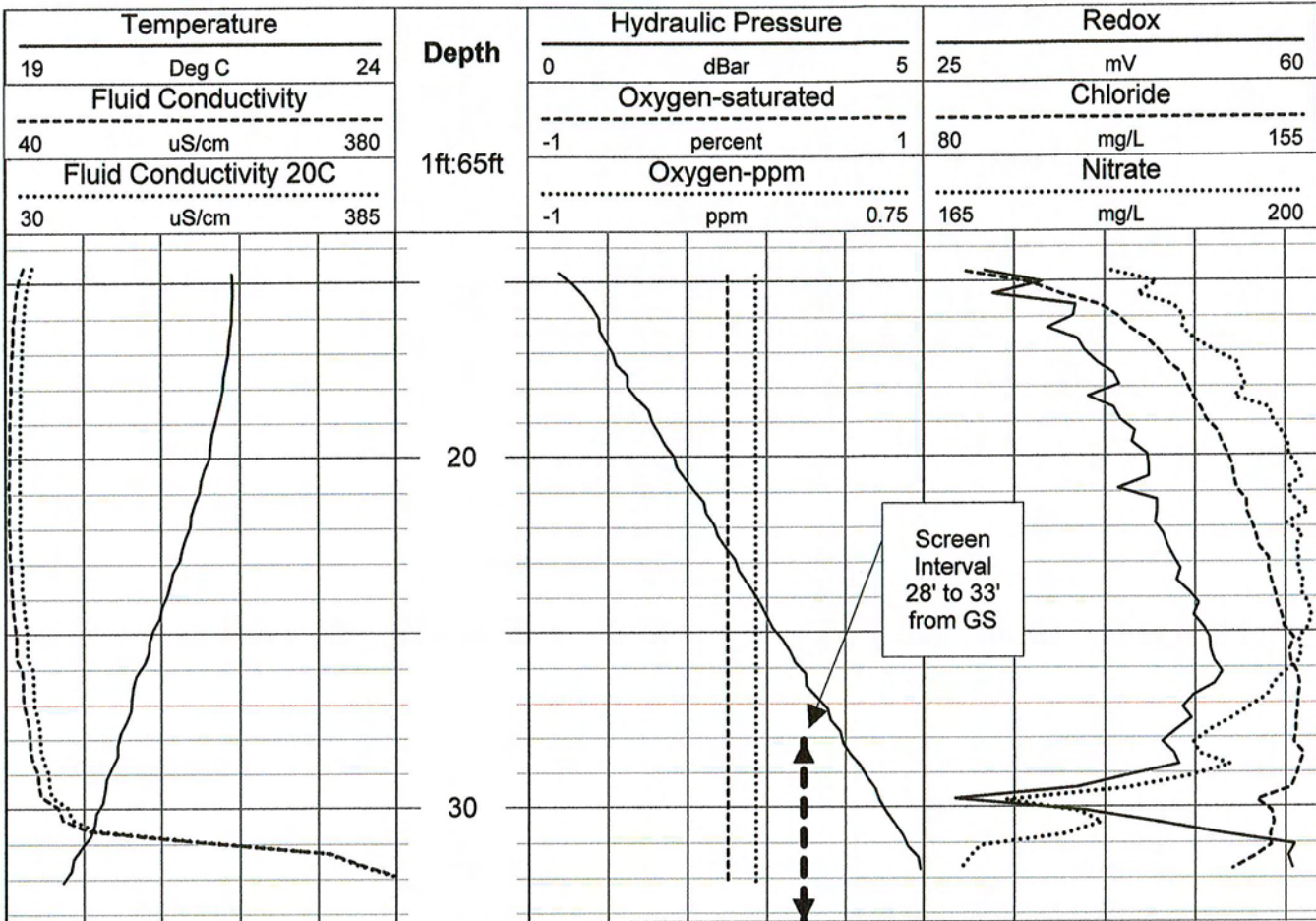
| | | |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------|
| Well: | P3 | Log: P3 - A |
| Site: | PSC | |
| City/State: Rock Hill, South Carolina | | |
| Date: 12/15/06 | Time: 14:25 | |
| System Configuration: Mount Sopris 2IDA with ammonia option | | |
| Water Level: 14.45' | Measured From: GS @ ~ 15:00 | |
| Outer Casing Height AGL (with cap open/removed): 0.0 Type: Flushmount | | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.2 | Casing Type: PVC | |
| Log Direction: Down | Measured from: GS | Log Speed: 18 fpm |
| Log Top: 14.7' | Log Bottom: 32.5' | Reference Point: GS |
| Analysis Software: WellCAD | Smoothing Points: Redox = 1 | |
| Operator: JRJ | Witness: None | Other Tools Used: 2EMA |
| Well Diameter: 2" | Well Depth: 34.69' | Referenced From: GS |
| Casing Material: PVC | Non-Cased Interval: N/A | |
| Screen Interval: 28' to 33' | Screen Type: PVC | |
| Latitude: 34.88858218°N | Longitude: -81.07199365°W | |
| Notes: | Screen interval data obtained from previous well construction documents. | |
|  | GS references converted from a TIC height of +0.2' (org. ref. pt.) | |
| | GPS values; NAD83 | |






| | | |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Well: | P3 | Log: P3 - B |
| Site: | PSC | |
| City/State: Rock Hill, South Carolina | | |
| Date: 12/15/06 | Time: 14:15 | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | |
| Water Level: 14.45' | Measured From: GS @ ~ 15:00 | |
| Outer Casing Height AGL (with cap open/removed): 0.0 Type: Flushmount | | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.2 | Casing Type: PVC | |
| Log Direction: Down | Measured from: GS | Log Speed: 12 fpm |
| Log Top: 14.7' | Log Bottom: 32.2' | Reference Point: GS |
| Analysis Software: WellCAD | Smoothing Points: See notes | |
| Operator: JRU | Witness: none | Other Tools Used: 2EMA |
| Well Diameter: 2" | Well Depth: 34.69' | Referenced From: GS |
| Casing Material: PVC | Non-Cased Interval: N/A | |
| Screen Interval: 28' to 33' | Screen Type: PVC | |
| Latitude: 34.88858218°N | Longitude: -81.07199365°W | |
| Notes: | GS references converted from a TIC height of +0.2' (org. ref. pt.) Smoothing points; Cl, redox, conductivities, NO3 = 1 GPS values; NAD83 | |
|  | | |





| | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------|---------------------------|------------------------|--|
| Well: | | P3 | | Log: P3 - C | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/15/06 | | | Time: 14:57 | | |
| System Configuration: Mount Sopris 2EMA | | | | | |
| Water Level: 14.45' | | Measured From: GS @ ~ 15:00 | | | |
| Outer Casing Height AGL (with cap open/removed): 0.0 Type: Flushmount | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.2 | | | Casing Type: PVC | | |
| Log Direction: Up | | Measured from: GS | | Log Speed: 12.5 fpm | |
| Log Top: 4.2' | | Log Bottom: 32.2' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: None | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2IDA | |
| Well Diameter: 2" | | Well Depth: 34.69' | | Referenced From: GS | |
| Casing Material: PVC | | | Non-Cased Interval: N/A | | |
| Screen Interval: 28' to 33' | | | Screen Type: PVC | | |
| Latitude: 34.88858218°N | | | Longitude: -81.07199365°W | | |
| Notes: Screen interval data obtained from previous well construction documents. 2EMA stabilized after 14 minutes. GS references converted from a TIC height of +0.2' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |



Depth

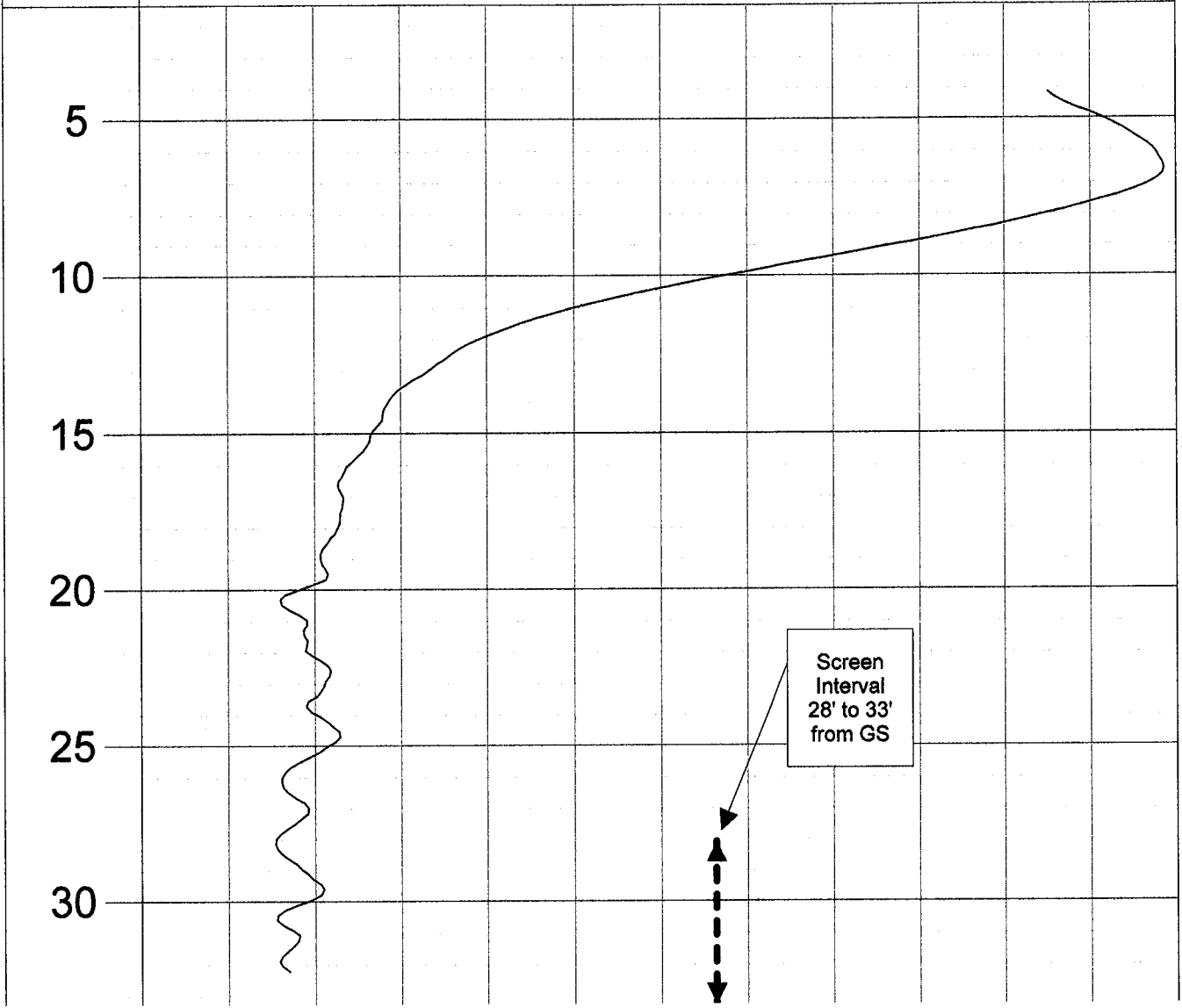
Formation Conductivity (EM)

1ft:65ft

0

mS/m

120



PSC Site
December 13 -18, 2006
Rock Hill, South Carolina

Geophysical Logs

Well Logs for PW3

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log PW3 – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log PW3 – B

Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity - Ohm/M
Computed lateral resistivity – Ohm/M
Caliper – inches

Log PW3 - C

Natural gamma – cps
Caliper, 3-arm - inches
Formation conductivity – mS/m

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool (2.5" diameter)
Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity – Ohm/M
Computed lateral resistivity – Ohm/M


Century 9060 tool (1.4" diameter)
Natural gamma – cps

Century 9065 tool
Caliper, 3-arm - inches

Mount Sopris 2IDA tool – ammonia configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S/cm}$
Fluid conductivity at 20° C – $\mu\text{S/cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L (option sensor)

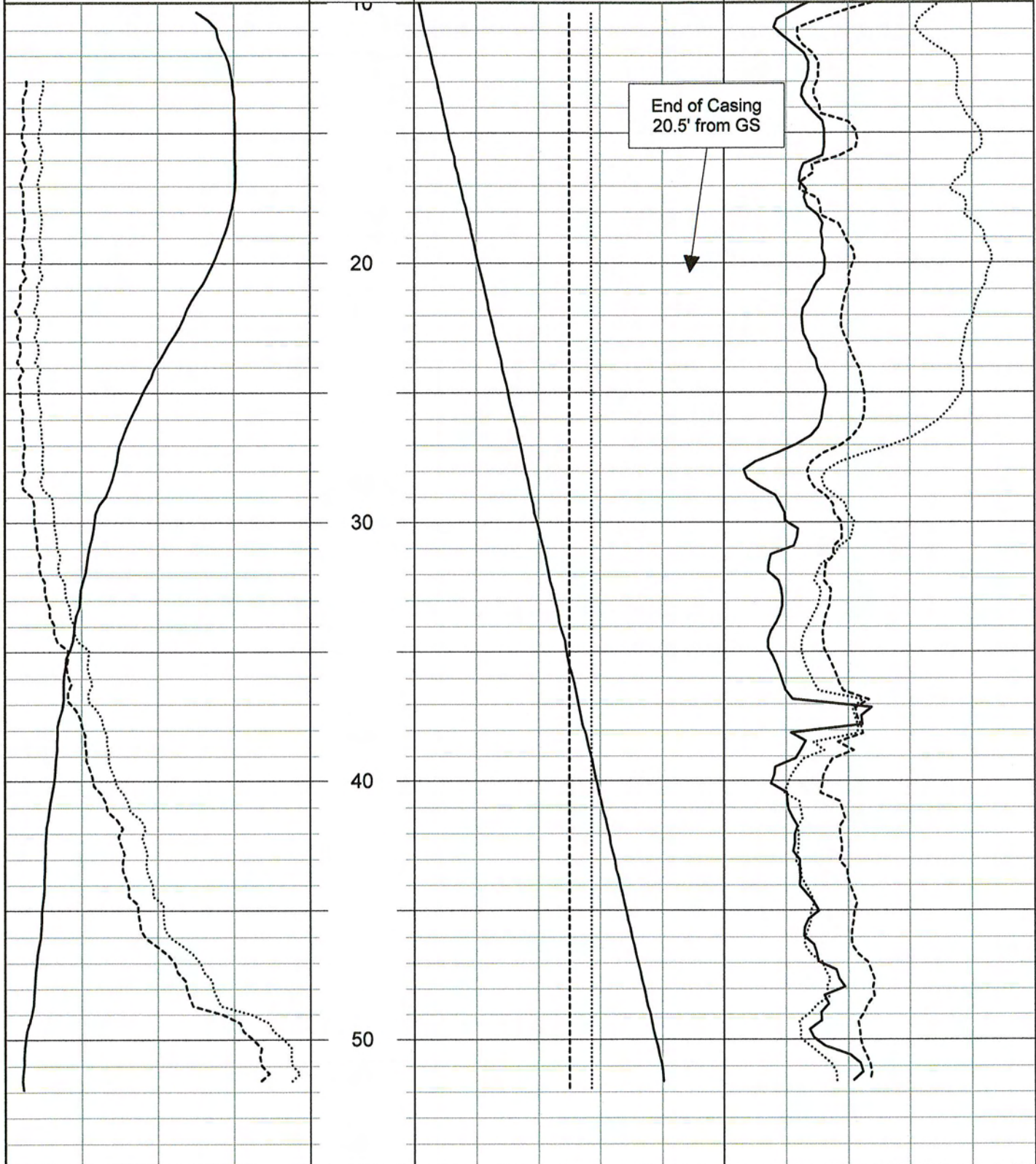
Mount Sopris 2IDA tool – nitrate configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S/cm}$
Fluid conductivity at 20° C – $\mu\text{S/cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L (option sensor)


Mount Sopris 2EMA-1000 tool
Formation conductivity – mS/m

| | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------|-------------------------------------|------------------------|--|
| Well: | | PW3 | | Log: PW3-A | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/13/06 | | | Time: 14:30 | | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | | | | |
| Water Level: 9.63' | | Measured From: GS @ ~ 14:10 | | | |
| Outer Casing Height AGL (with cap open/removed): 2.9' Type: Steel riser | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: none | | | Casing Type: Steel | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 17 fpm | |
| Log Top: 10.0' | | Log Bottom: 52.0' | | Reference Point: GS | |
| Analysis Software: WellCAD | | Smoothing Points: Redox=3; Cl & NO3= 5 | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA | |
| Well Diameter: 6" | | Well Depth: 52.3' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 20.5' to bottom | | |
| Screen Interval: Unknown | | | Screen Type: N/A | | |
| Latitude: 34.88858218°N | | | Longitude: -81.07422663°W | | |
| <p>Notes: GS references converted from a casin height of 2.9' (org. ref. pt.). * Fluid conductivity in uS/cm converted from data collected at mS/cm. GPS values; NAD83</p> | | | | | |
|  | | | | | |



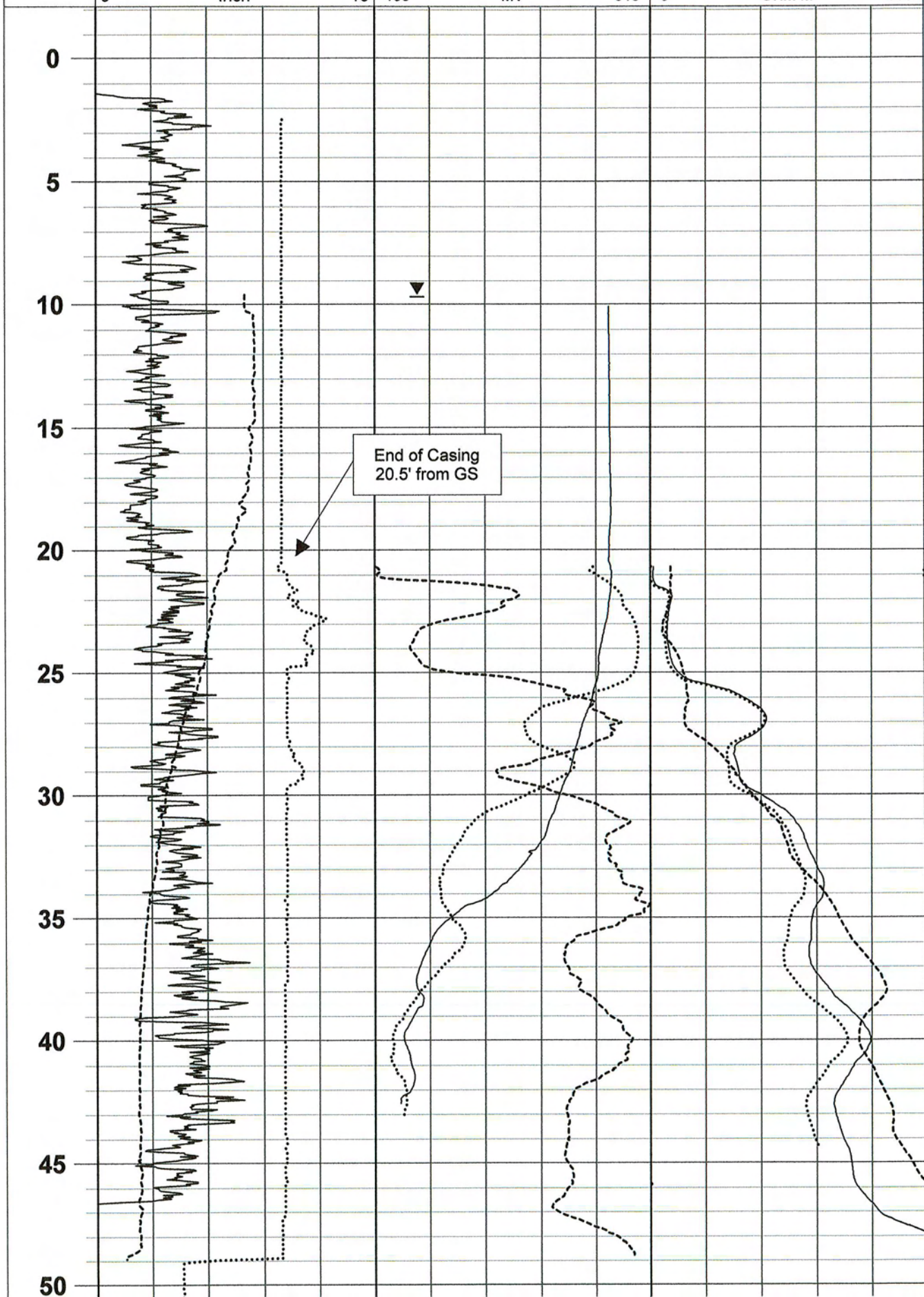
| Temperature | | | Pressure | | | Redox | | |
|----------------------------|--------|-----|------------|---------|------|----------|------|-----|
| 18 | Deg C | 20 | 0 | dBar | 15 | 90 | mV | 220 |
| - Fluid Conductivity - | | | Oxygen-Sat | | | Chloride | | |
| 60 | uS/cm* | 260 | -1 | percent | 1 | 130 | mg/L | 170 |
| - Fluid Conductivity 20C - | | | Oxygen-ppm | | | Nitrate | | |
| 50 | uS/cm* | 250 | -1 | ppm | 0.75 | 140 | mg/L | 220 |




| | | |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Well: | PW3 | Log: PW3-B |
| Site: | PSC | |
| City/State: Rock Hill, South Carolina | | |
| Date: 12/13/06 | Time: See notes | |
| System Configuration: Century 9041 & 9065 | | |
| Water Level: 9.63' | Measured From: GS at ~ 14:30 | |
| Outer Casing Height AGL (with cap open/removed): 2.9' Type: Steel riser | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | Casing Type: N/A | |
| Log Direction: See notes | Measured from: GS | Log Speed: various |
| Log Top: 1.5' | Log Bottom: 52.2' | Reference Point: GS |
| Analysis Software: WellCAD | Smoothing Points: natural gamma = 9 | |
| Operator: JRU | Witness: None | Other Tools Used: 2EMA; 2IDA |
| Well Diameter: 6" | Well Depth: 52.3' | Referenced From: GS |
| Casing Material: Steel | Non-Cased Interval: 20.5' to bottom | |
| Screen Interval: Unknown | Screen Type: N/A | |
| Latitude: 34.88858218°N | Longitude: -81.07422663°W | |
| Notes: | 9065 (caliper) logged up @ 18 fpm at 14:39. 9041 (natural gamma only) logged down @ 18 fpm at 15:19. GS references converted from a casing height of 2.9' (org. ref. pt.). GPS values; NAD83 | |
|  | | |

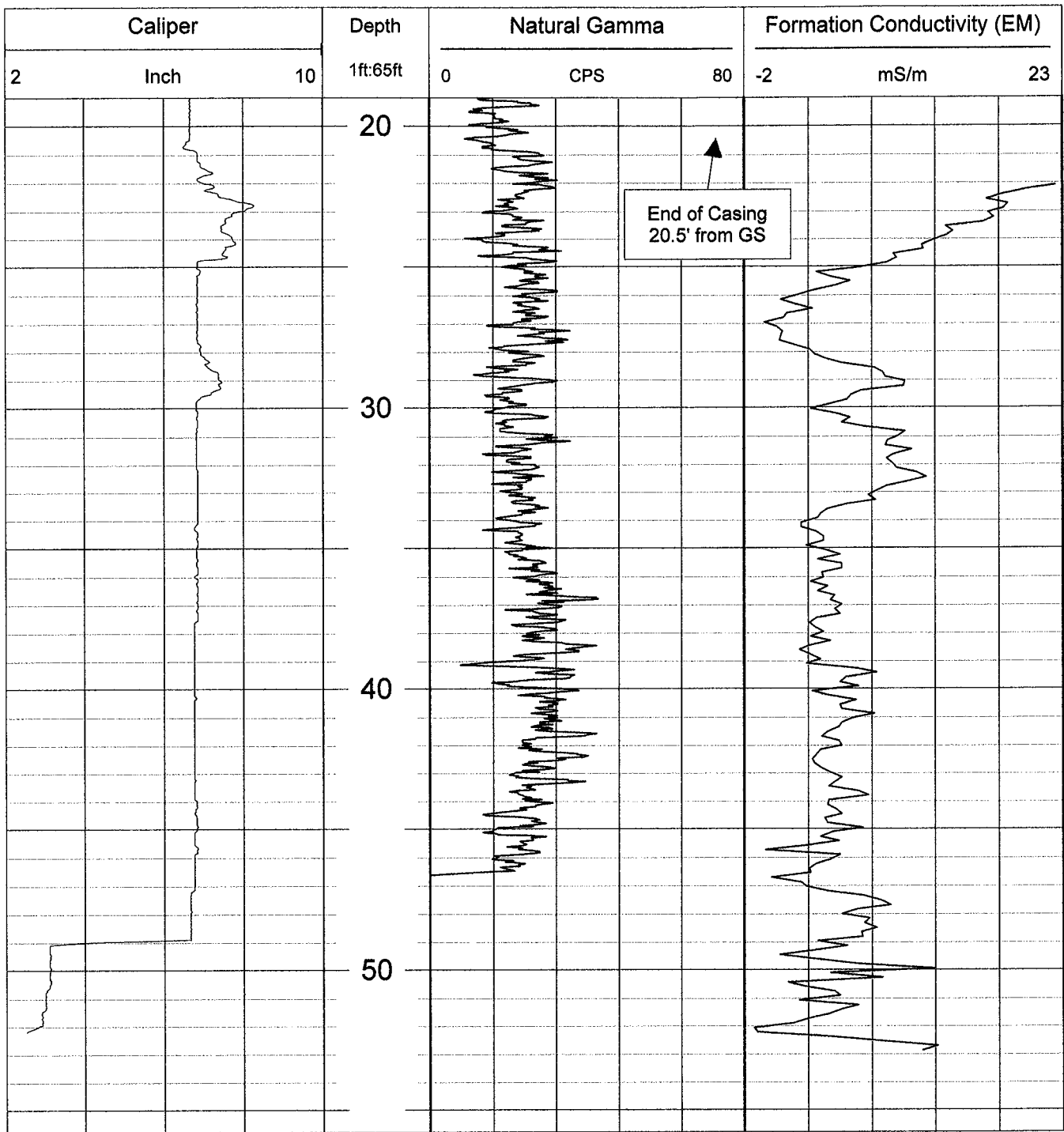


| Depth | Natural Gamma | | Fluid Resistivity | | | Normal Resistivity (16N) | |
|----------|---------------|----|-------------------------|-------|------|--------------------------|-----|
| | 0 | 80 | 60 | OHM-M | 110 | 0 | 280 |
| 1ft:65ft | Temperature | | Single Point Resistance | | | Normal Resistivity (64N) | |
| | 65 | 70 | 870 | OHM | 4100 | 0 | 150 |
| | Caliper | | Spontaneous Potential | | | Computed Lateral | |
| | 0 | 10 | 160 | MV | 310 | 0 | 360 |
| | Inch | | | | | OHM-M | |
| | | | | | | | |



| | | |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| Well: | PW3 | Log: PW3-C |
| Site: | PSC | |
| City/State: Rock Hill, South Carolina | | |
| Date: 12/13/06 | Time: See notes | |
| System Configuration: Century 9065, 9041 (N. gamma only); Mt. Sopris 2EMA | | |
| Water Level: 9.63' | Measured From: GS at ~ 14:30 | |
| Outer Casing Height AGL (with cap open/removed): 2.9' Type: Steel pipe | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | Casing Type: N/A | |
| Log Direction: See notes | Measured from: GS | Log Speed: vairous |
| Log Top: 19' | Log Bottom: 52.9' | Reference Point: GS |
| Analysis Software: WellCAD | Smoothing Points: Natural gamma = 9 | |
| Operator: JRJ | Witness: None | Other Tools Used: Idronaut |
| Well Diameter: 6" | Well Depth: 52.3' | Referenced From: GS |
| Casing Material: Steel | Non-Cased Interval: 20.5' to bottom | |
| Screen Interval: Unknown | Screen Type: N/A | |
| Latitude: 34.88858218°N | Longitude: -81.07422663°W | |
| Notes: | 9065 (caliper) logged up @ 18 fpm at 14:39. 9041 (natural gamma only) logged down @ 18 fpm at 15:19. 2EMA (formation conductivity) logged up @ 12.5 fpm at 16:05. GS references converted from a casing height of 2.9' (org. ref. pt.). GPS values; NAD83 | |
|  | | |





PSC Site
December 13 -18, 2006
Rock Hill, South Carolina

Geophysical Logs

Well Logs for RIMW 13

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log 13 – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L

Log 13 – B

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log 13 - C

Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity - Ohm/M
Computed lateral resistivity – Ohm/M
Caliper – inches

Log 13 - D

Natural gamma – cps
Caliper, 3-arm - inches
Formation conductivity – mS/m

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool (2.5" diameter)

- Temperature – degrees Fahrenheit
- Natural gamma – cps
- Spontaneous potential - mV
- Fluid resistivity – Ohm/M
- Single point resistivity - Ohm
- 16 inch normal resistivity – Ohm/M
- 24 inch normal resistivity – Ohm/M
- Computed lateral resistivity – Ohm/M

Century 9060 tool (1.4" diameter)

- Natural gamma – cps

Century 9065 tool

- Caliper, 3-arm - inches

Mount Sopris 2IDA tool – ammonia configuration


- Temperature – degrees Centigrade
- Fluid conductivity – $\mu\text{S}/\text{cm}$
- Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
- Hydraulic pressure - dBar
- Oxygen – saturated - percent
- Oxygen – ppm
- Redox - mV
- Chloride – mg/L
- Ammonia – mg/L (option sensor)

Mount Sopris 2IDA tool – nitrate configuration

- Temperature – degrees Centigrade
- Fluid conductivity – $\mu\text{S}/\text{cm}$
- Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
- Hydraulic pressure - dBar
- Oxygen – saturated - percent
- Oxygen – ppm
- Redox - mV
- Chloride – mg/L
- Nitrate – mg/L (option sensor)

Mount Sopris 2EMA-1000 tool

- Formation conductivity – mS/m

| | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------|
| Well: RIMW13 | | Log: 13 - A |
| Site: PSC | | |
| City/State: Rock Hill, South Carolina | | |
| Date: 12/14/06 | Time: 12.57 | |
| System Configuration: Mount Sopris 2IDA with ammonia option | | |
| Water Level: See notes | Measured From: GS at ~ 12:00 | |
| Outer Casing Height AGL (with cap open/removed): 0.56' Type: Steel | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | Casing Type: N/A | |
| Log Direction: Down | Measured from: GS | Log Speed: 18 fpm |
| Log Top: 42.94' | Log Bottom: 99.54' | Reference Point: GS |
| Analysis Software: WellCAD | Smoothing Points: Redox = 1 | |
| Operator: JRJ | Witness: None | Other Tools Used: 9065, 9041, 2EMA |
| Well Diameter: 6" | Well Depth: 101.44' | Referenced From: GS |
| Casing Material: Steel | Non-Cased Interval: 37.24' to bottom | |
| Screen Interval: None | Screen Type: N/A | |
| Latitude: 34.88914° N | Longitude: -81.07303° W | |
| Notes: GWL @ 07:30 = 47.89'; 11:30 = 44.15' GS references converted from a casing height 0.56' (org. ref. pt.) GPS values; NAD83 | | |
|  | | |

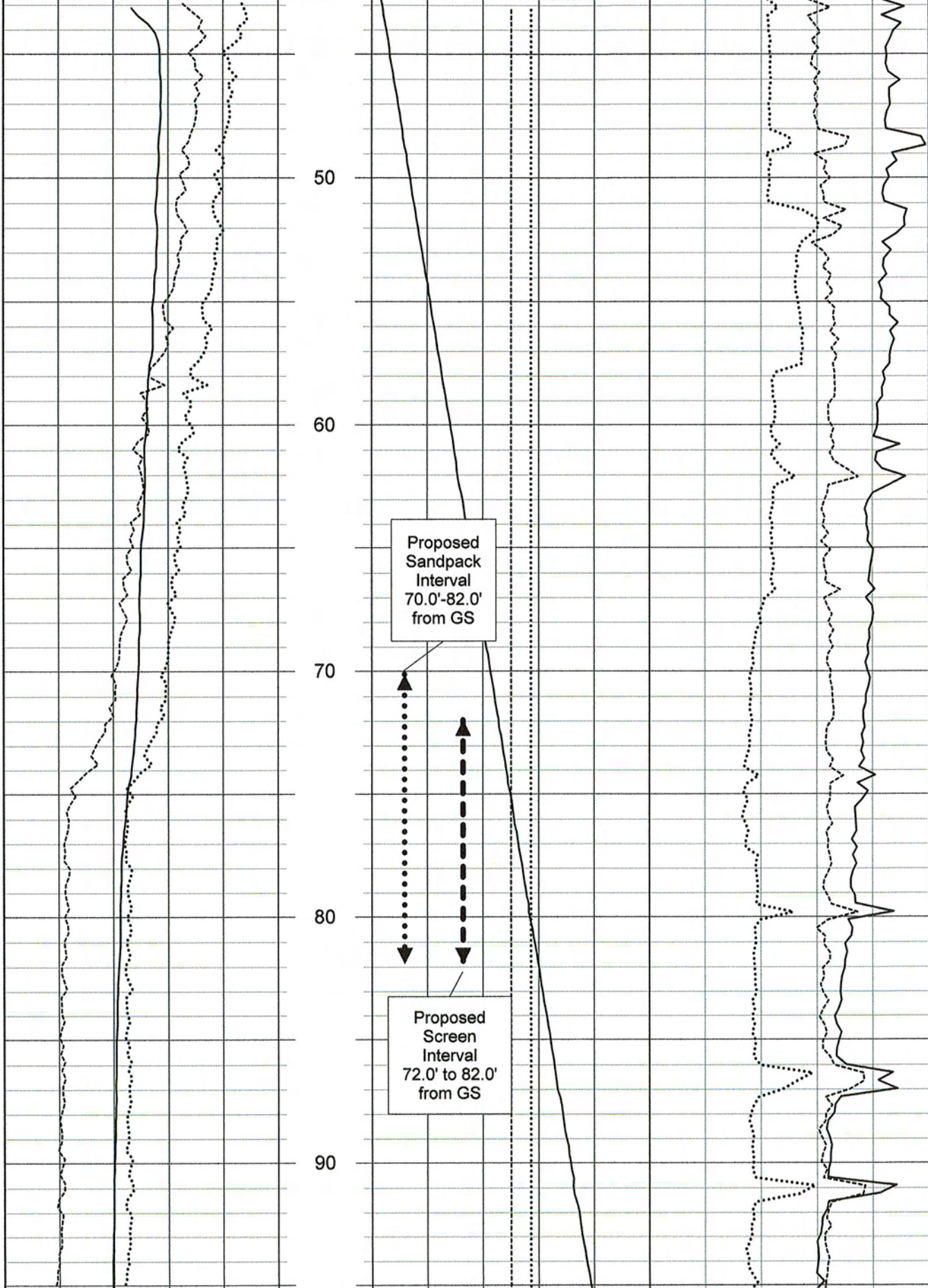


| Temperature | | |
|------------------------|-------|-----|
| 17 | deg C | 19 |
| Fluid Conductivity | | |
| 260 | μS/cm | 275 |
| Fluid Conductivity 20C | | |
| 270 | μS/cm | 285 |

| Depth | Hydraulic Pressure | | |
|------------|--------------------|---------|----|
| | 0 | dBar | 20 |
| | Oxygen-Saturated | | |
| | -1 | percent | 1 |
| Oxygen-ppm | | | |
| -1 | ppm | 0.75 | |

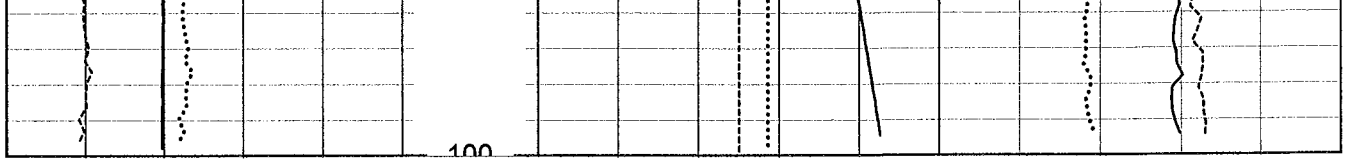
| Redox | | |
|----------|------|-----|
| 170 | mV | 270 |
| Chloride | | |
| 20 | mg/L | 70 |
| Ammonia | | |
| 0 | mg/L | 140 |

1ft:65ft




Proposed Sandpack Interval
70.0'-82.0'
from GS

Proposed Screen Interval
72.0' to 82.0'
from GS



100

| | | |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Well: RIMW13 | | Log: 13 - B |
| Site: PSC | | |
| City/State: Rock Hill, South Carolina | | |
| Date: 12/14/06 | Time: 11:48 | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | |
| Water Level: See notes | Measured From: GS at ~ 12:00 | |
| Outer Casing Height AGL (with cap open/removed): 0.56' Type: Steel | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | Casing Type: N/A | |
| Log Direction: Down | Measured from: GS | Log Speed: 17.7 fpm |
| Log Top: 44.14' | Log Bottom: 101.44' | Reference Point: GS |
| Analysis Software: WellCAD | Smoothing Points: see notes | |
| Operator: JRU | Witness: None | Other Tools Used: 9065, 9041, 2EMA |
| Well Diameter: 6" | Well Depth: 101.44' | Referenced From: GS |
| Casing Material: Steel | Non-Cased Interval: 37.24' to bottom | |
| Screen Interval: None | Screen Type: N/A | |
| Latitude: 34.88914° N | Longitude: -81.07303° W | |
| Notes: | GWL @ 07:30 = 47.89'; 11:30 = 44.15' Smoothing points: conductivities =7; Redox = 1; Nitrate = 5; Chloride = 5. GS references converted from a casing height 0.56' (org. ref. pt.) GPS values; NAD83 | |
|  | | |

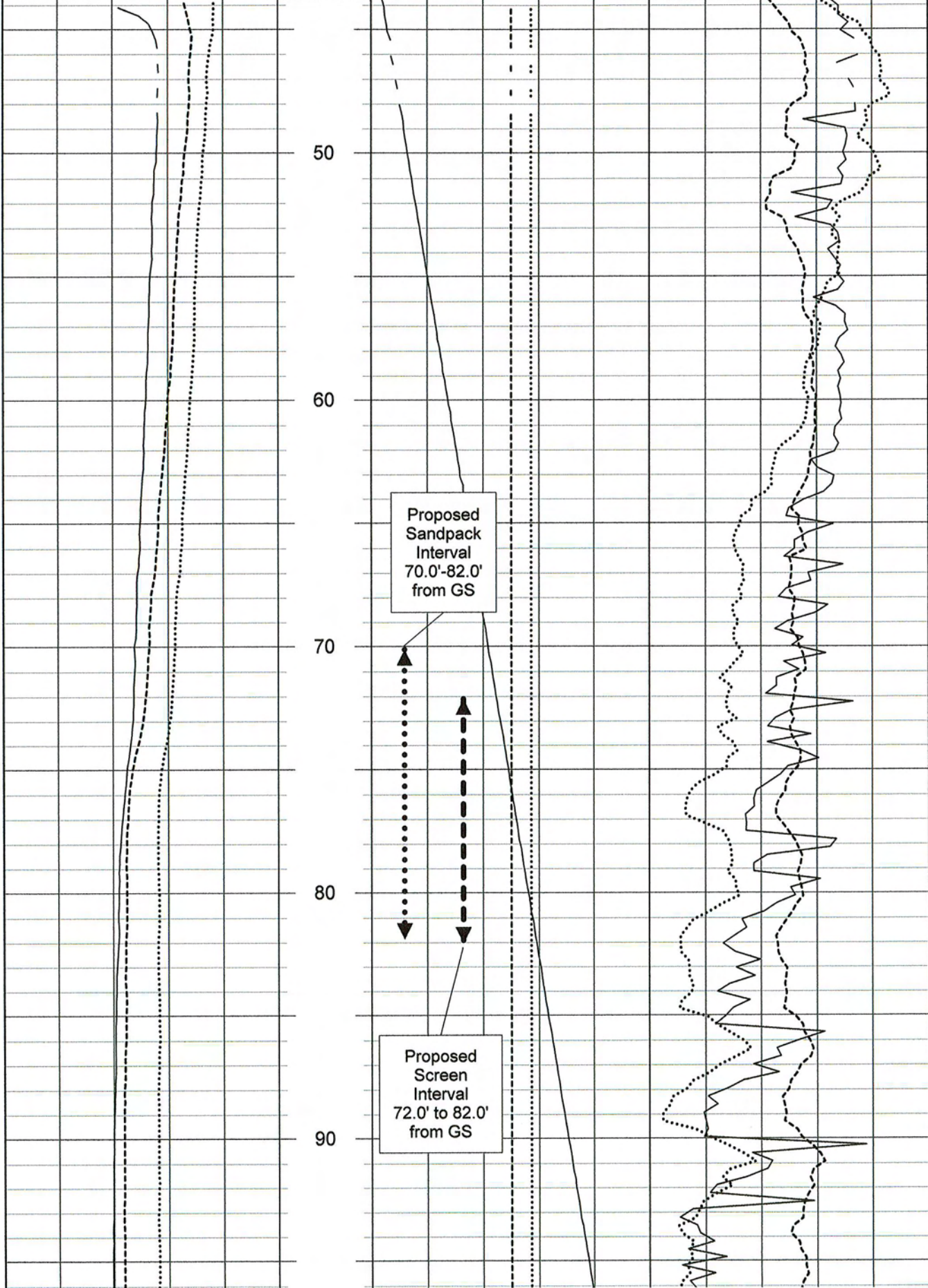


| Temperature | | |
|------------------------|-------|-----|
| 17 | Deg C | 19 |
| Fluid Conductivity | | |
| 250 | uS/cm | 280 |
| Fluid Conductivity 20C | | |
| 260 | uS/cm | 290 |

| Depth | Hydraulic Pressure | | |
|------------|--------------------|---------|----|
| | 0 | dBar | 20 |
| | Oxygen-saturated | | |
| | -1 | percent | 1 |
| Oxygen-ppm | | | |
| -1 | ppm | 0.75 | |

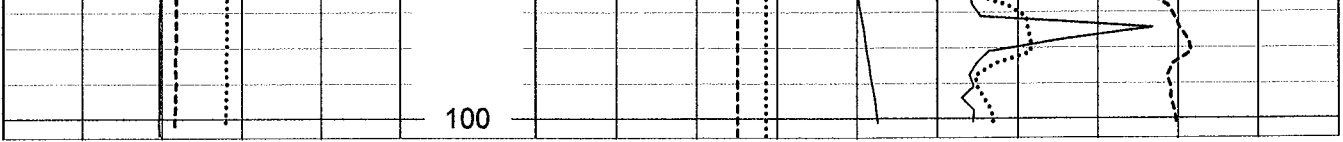
| Redox | | |
|----------|------|-----|
| 25 | mV | 75 |
| Chloride | | |
| 120 | mg/L | 140 |
| Nitrate | | |
| 150 | mg/L | 180 |


1ft:65ft



Proposed Sandpack Interval
70.0'-82.0'
from GS

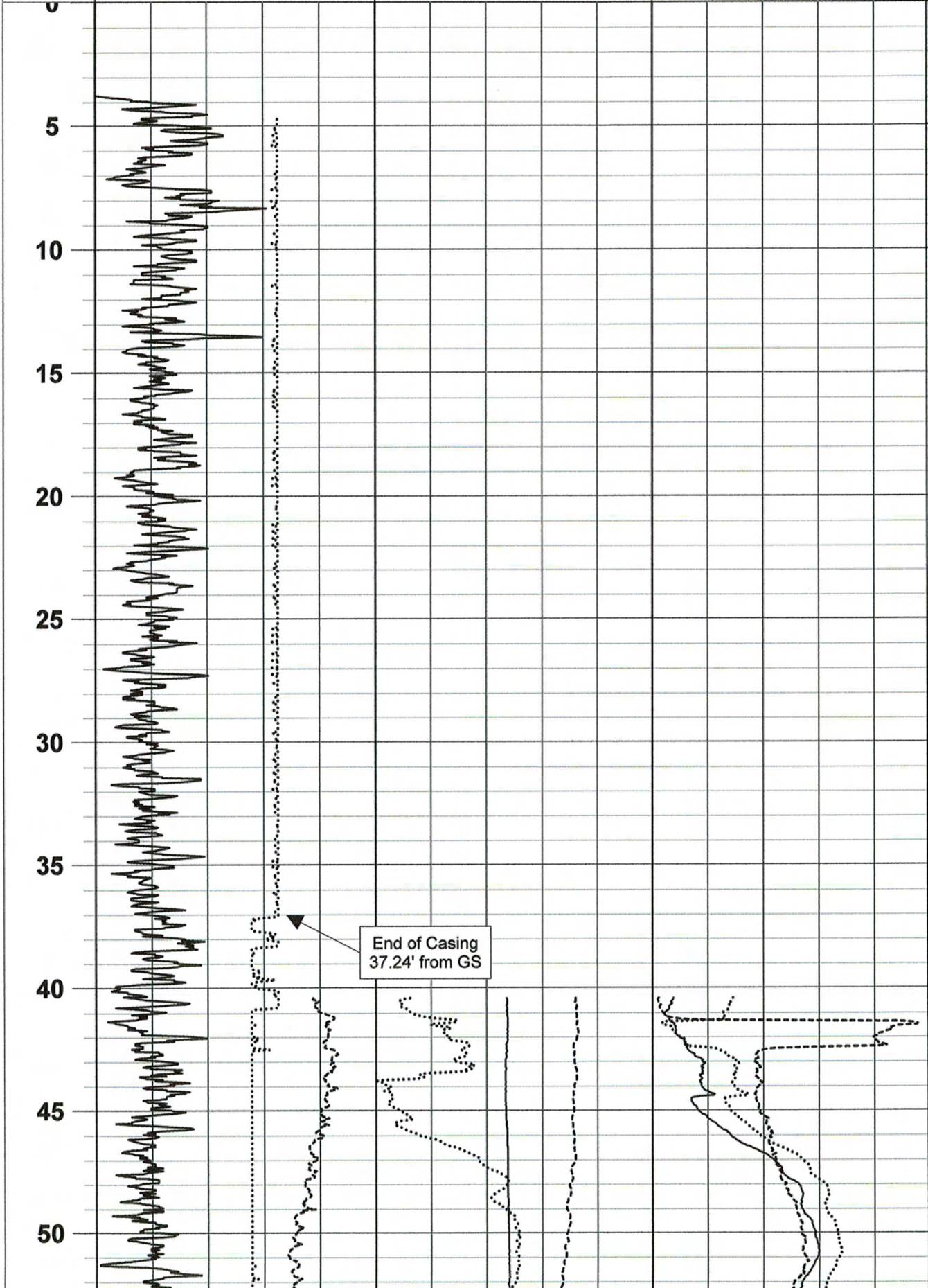
Proposed Screen Interval
72.0' to 82.0'
from GS

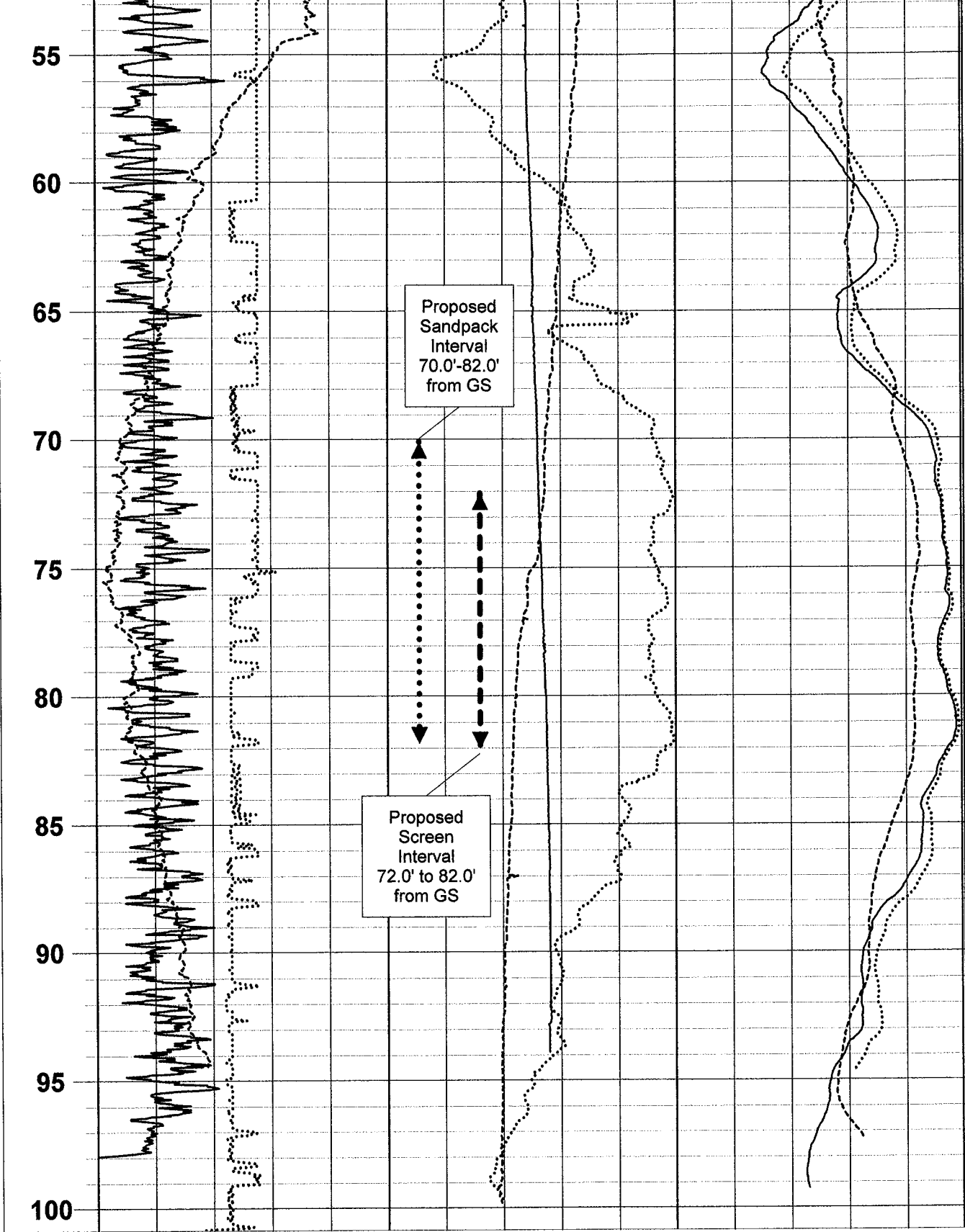



| | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------------------------|------------------------------|--------------------|--|
| Well: | | RIMW13 | | Log: 13 - C | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/14/06 | | | Time: See notes | | |
| System Configuration: Century 9065, 9041 | | | | | |
| Water Level: See notes | | Measured From: GS at ~ 12:00 | | | |
| Outer Casing Height AGL (with cap open/removed): 0.56' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: See notes | | Measured from: GS | | Log Speed: various | |
| Log Top: 4..34' | Log Bottom: 100.84' | | Reference Point: GS | | |
| Analysis Software: WellCAD | | Smoothing Points: natural gamma = 9 | | | |
| Operator: JRJ | Witness: none | | Other Tools Used: 2IDA, 2EMA | | |
| Well Diameter: 6" | Well Depth: 101.44' | | Referenced From: GS | | |
| Casing Material: Steel | | Non-Cased Interval: 37.24' to bottom | | | |
| Screen Interval: None | | Screen Type: N/A | | | |
| Latitude: 34.88914° N | | | Longitude: -81.07303° W | | |
| Notes: Caliper logged up @ 13:20; speed 18 fpm 9041 logged down @ 13:49; speed 17 fpm GWL @ 07:30 = 47.89'; 11:30 = 44.15' GS references converted from a casing height 0.56' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |



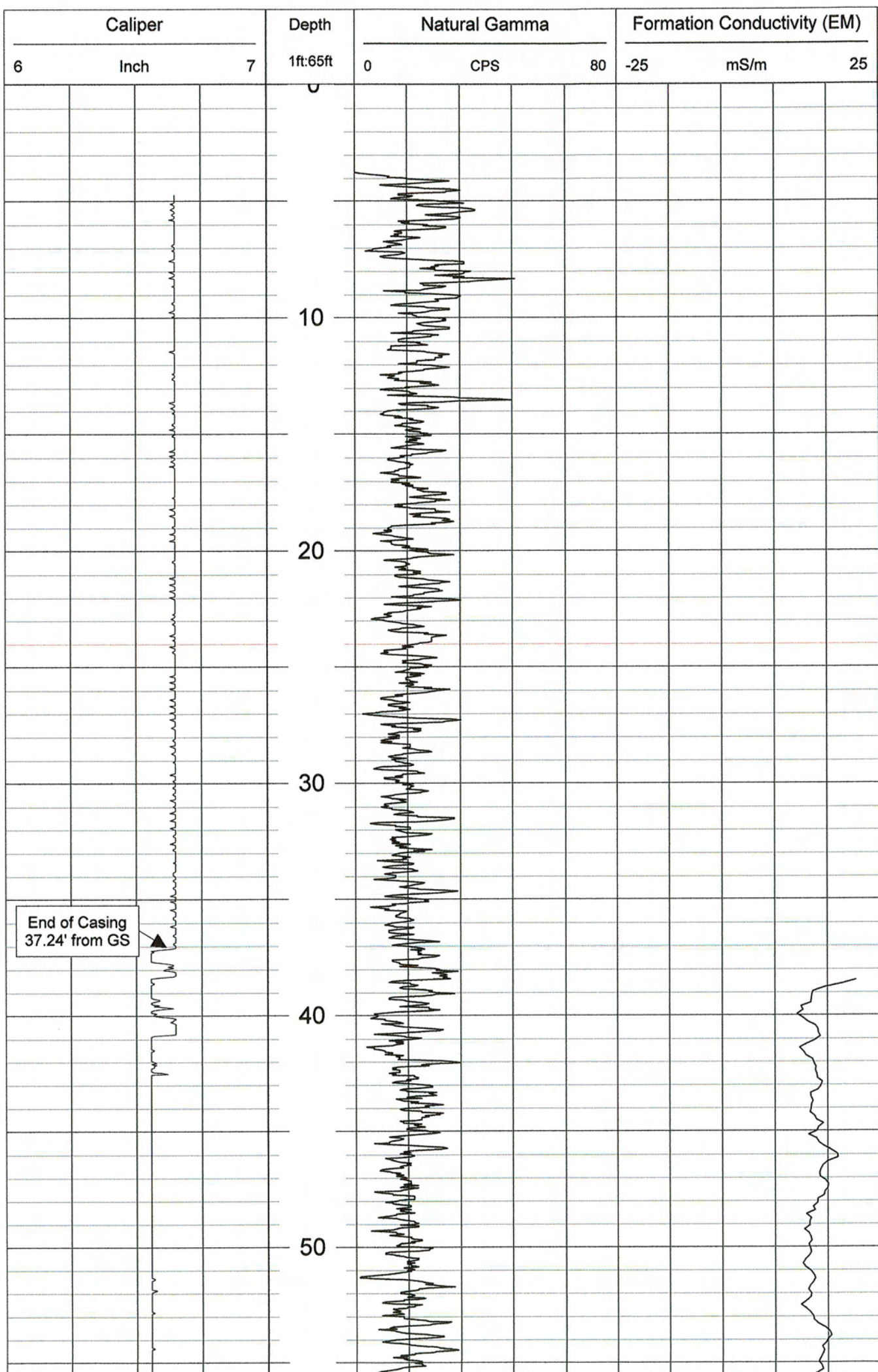
| Depth | Natural Gamma | | Fluid Resistivity | | Normal Resistivity (16"N) | | | | |
|----------|-----------------------|------|-------------------------|------|---------------------------|------|-----|-------|-----|
| | 0 | CPS | 80 | 30 | OHM-M | 40 | 100 | OHM-M | 250 |
| 1ft:65ft | Spontaneous Potential | | Temperature | | Normal Resistivity (64"N) | | | | |
| | 350 | MV | 500 | 64 | Deg F | 66 | 30 | OHM-M | 190 |
| | Caliper | | Single Point Resistance | | Computed Lateral | | | | |
| | 6 | Inch | 7 | 1630 | OHM | 3020 | 80 | OHM-M | 275 |



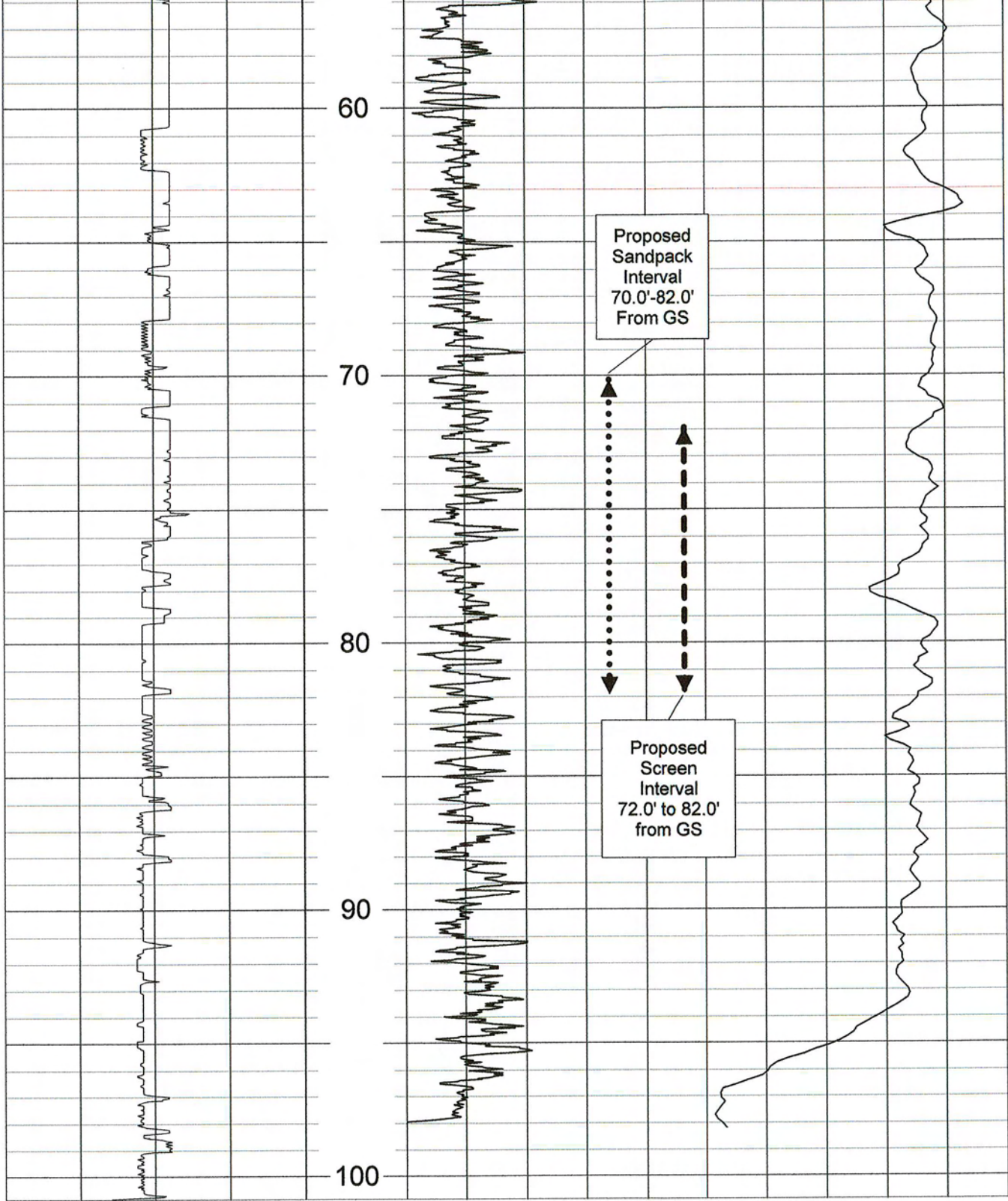


| | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------|--------------------------------------|------------------------|--|
| Well: | | RIMW13 | | Log: 13 - D | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/14/06 | | | Time: See notes | | |
| System Configuration: Century 9065, 9041 (N. gamma only); Mt. Sopris 2EMA | | | | | |
| Water Level: See notes | | Measured From: GS at ~ 12:00 | | | |
| Outer Casing Height AGL (with cap open/removed): 0.56' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: See notes | | Measured from: GS | | Log Speed: see notes | |
| Log Top: 3.84' | | Log Bottom: 100.84' | | Reference Point: GS | |
| Analysis Software: WellCAD | | Smoothing Points: EM = 2 | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2IDA | |
| Well Diameter: 6" | | Well Depth: 101.44' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 37.24' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88914° N | | | Longitude: -81.07303° W | | |
| Notes: Caliper logged up @ 13:20; speed 18 fpm 9041 logged down @ 13:49; speed 17 fpm 2EMA logged up @ 12:26; speed 11.5 fpm GWL @ 07:30 = 47.89'; 11:30 = 44.15' GS references converted from a casing height 0.56' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |





End of Casing
37.24' from GS



PSC Site
December 13 -18, 2006
Rock Hill, South Carolina

Geophysical Logs

Well Logs for RIMW 14

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log 14 – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log 14 – B

Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity - Ohm/M
Computed lateral resistivity – Ohm/M
Caliper – inches

Log 14 - C

Natural gamma – cps
Caliper, 3-arm - inches
Formation conductivity – mS/m

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool (2.5" diameter)
Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity – Ohm/M
Computed lateral resistivity – Ohm/M


Century 9060 tool (1.4" diameter)
Natural gamma – cps

Century 9065 tool
Caliper, 3-arm - inches

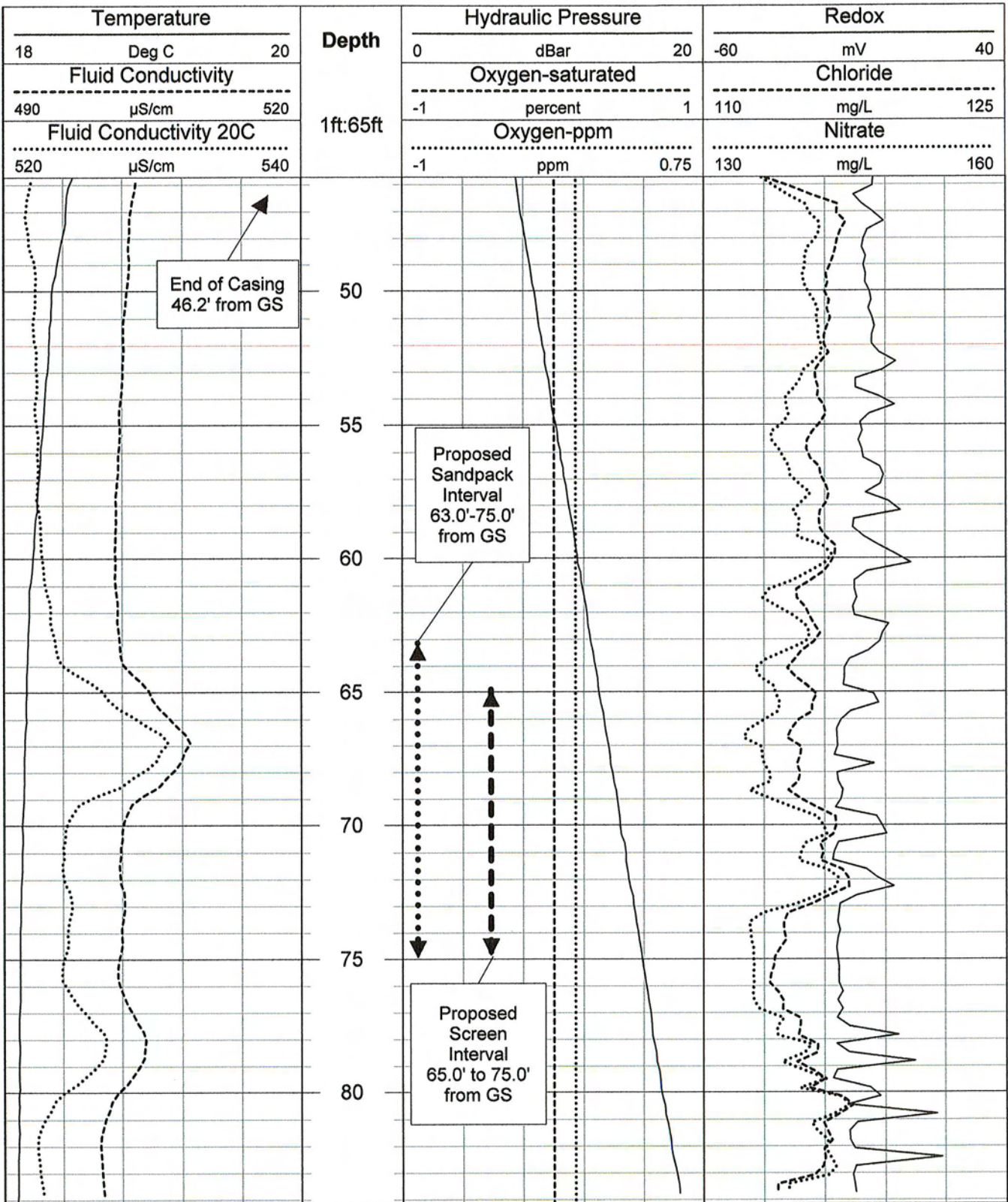
Mount Sopris 2IDA tool – ammonia configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S/cm}$
Fluid conductivity at 20° C – $\mu\text{S/cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L (option sensor)


Mount Sopris 2IDA tool – nitrate configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S/cm}$
Fluid conductivity at 20° C – $\mu\text{S/cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L (option sensor)

Mount Sopris 2EMA-1000 tool
Formation conductivity – mS/m

| | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------------------|------------------------------------|---------------------|--|
| Well: | | RIMW14 | | Log: 14 - A | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/14/06 | | | Time: 09:04 | | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | | | | |
| Water Level: 20.25' | | Measured From: GS ~07:30 on 12/14/06 | | | |
| Outer Casing Height AGL (with cap open/removed): 0.2' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 13.5 fpm | |
| Log Top: 45.9' | Log Bottom: 84.2' | | Reference Point: GS | | |
| Analysis Software: WellCAD | | Smoothing Points: See notes | | | |
| Operator: JRU | Witness: None | | Other Tools Used: 9041, 9065, 2EMA | | |
| Well Diameter: 6" | Well Depth: ~86' | | Referenced From: GS | | |
| Casing Material: Steel | | Non-Cased Interval: 46.2' to bottom | | | |
| Screen Interval: None | | Screen Type: N/A | | | |
| Latitude: 34.88725° N | | | Longitude: 81.07275° W | | |
| Notes: Two traverses with 9041 tool were made prior to this log on 12/14. Conductivity values used 7 smoothing points Chloride and Nitrate used 5 smoothing points; Redox = 1 GS references converted from a casing height of 0.2' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |

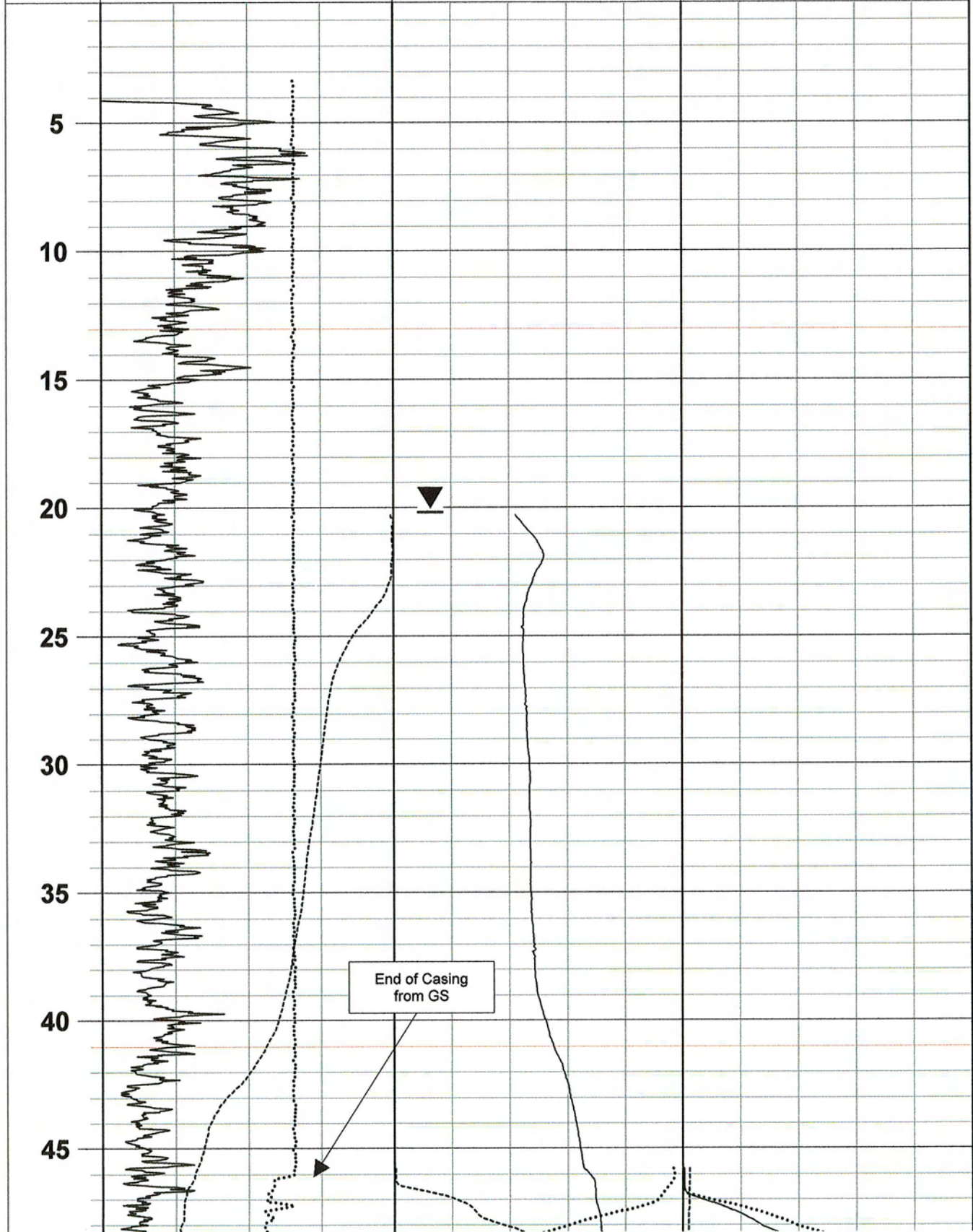


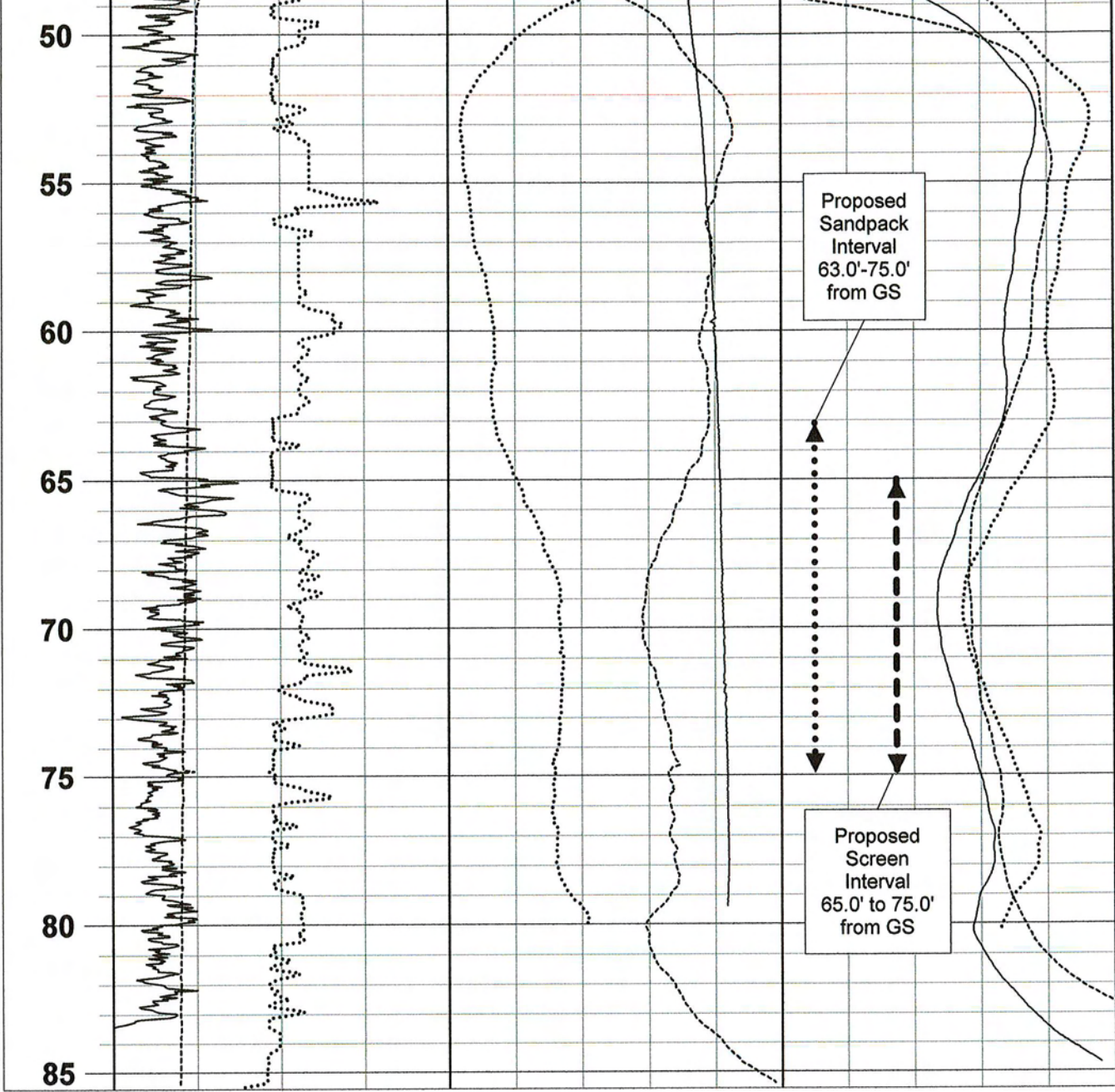


| | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------|----------------------------------------------|------------------------------|--|
| Well: | | RIMW14 | | Log: 14 - B | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/13-14/06 | | | Time: See notes | | |
| System Configuration: Century 9041, 9065 | | | | | |
| Water Level: 20.25' | | Measured From: GS at ~ 07:30 12/14 | | | |
| Outer Casing Height AGL (with cap open/removed): 0.2' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: See notes | | Measured from: GS | | Log Speed: see notes | |
| Log Top: 3.4' | | Log Bottom: 85.6' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: Natural gamma, caliper = 9 | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; 2IDA | |
| Well Diameter: 6" | | Well Depth: ~86' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 46.2' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88725° N | | | Longitude: 81.07275° W | | |
| Notes: Caliper logged up on 12/13/06 @ 10:02; speed 12 fpm 9041 logged down on 12/14/06 @ 07:31; speed 11 fpm GPS values; NAD83 | | | | | |
|  | | | | | |



| Depth | Natural Gamma | | Fluid Resistivity | | | Normal Resistivity (16"N) | | | |
|----------|---------------|-------|-------------------------|-----|-------|---------------------------|---|-------|-----|
| | 0 | CPS | 80 | 15 | OHM-M | 20 | 0 | OHM-M | 220 |
| 1ft:65ft | Temperature | | Single Point Resistance | | | Normal Resistivity (64"N) | | | |
| | 62 | Deg F | 78 | -50 | OHM | 2100 | 0 | OHM-M | 150 |
| | Caliper | | Spontaneous Potential | | | Computed Lateral (48") | | | |
| | 6 | Inch | 7 | 220 | mV | 420 | 0 | OHM-M | 200 |



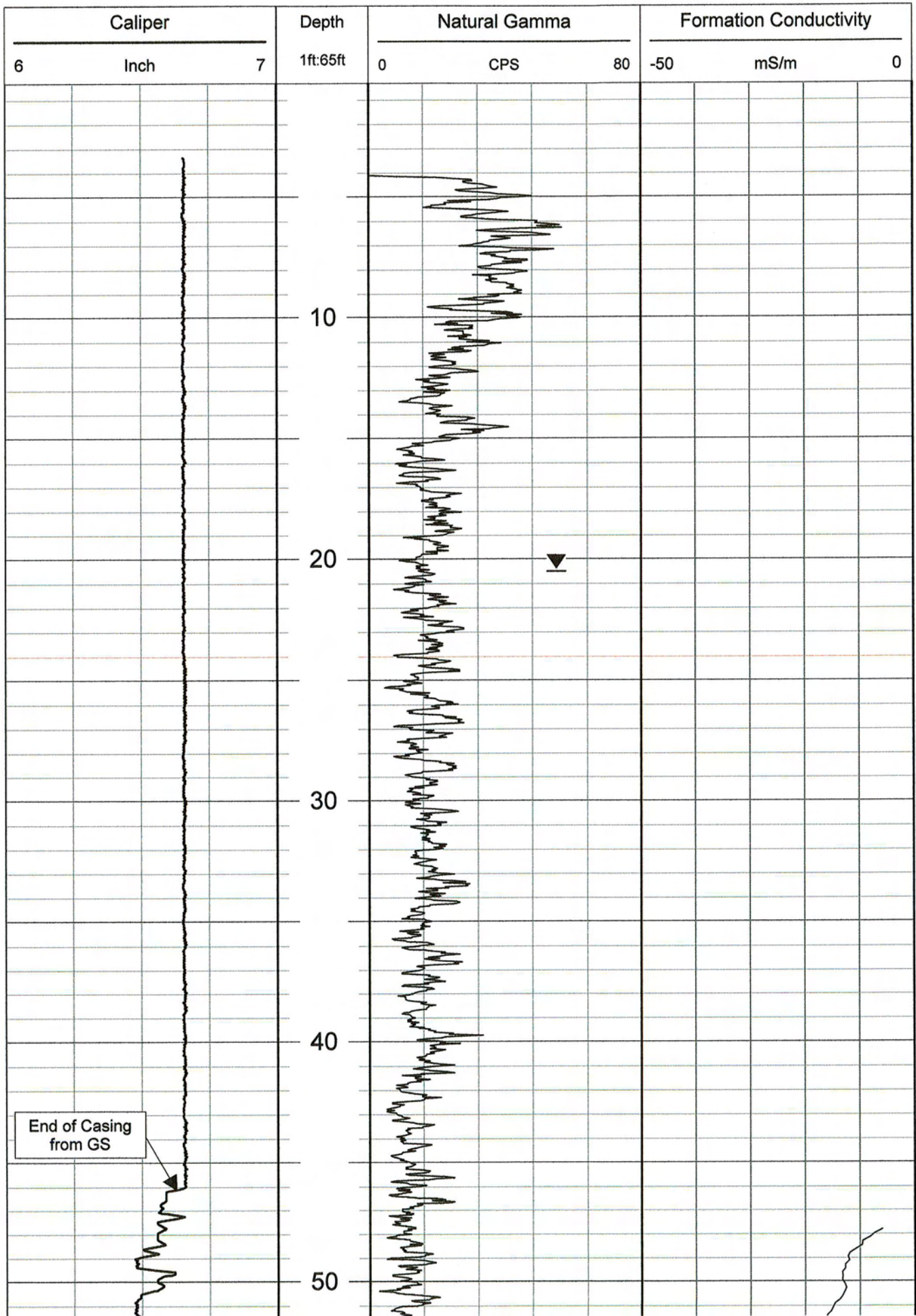


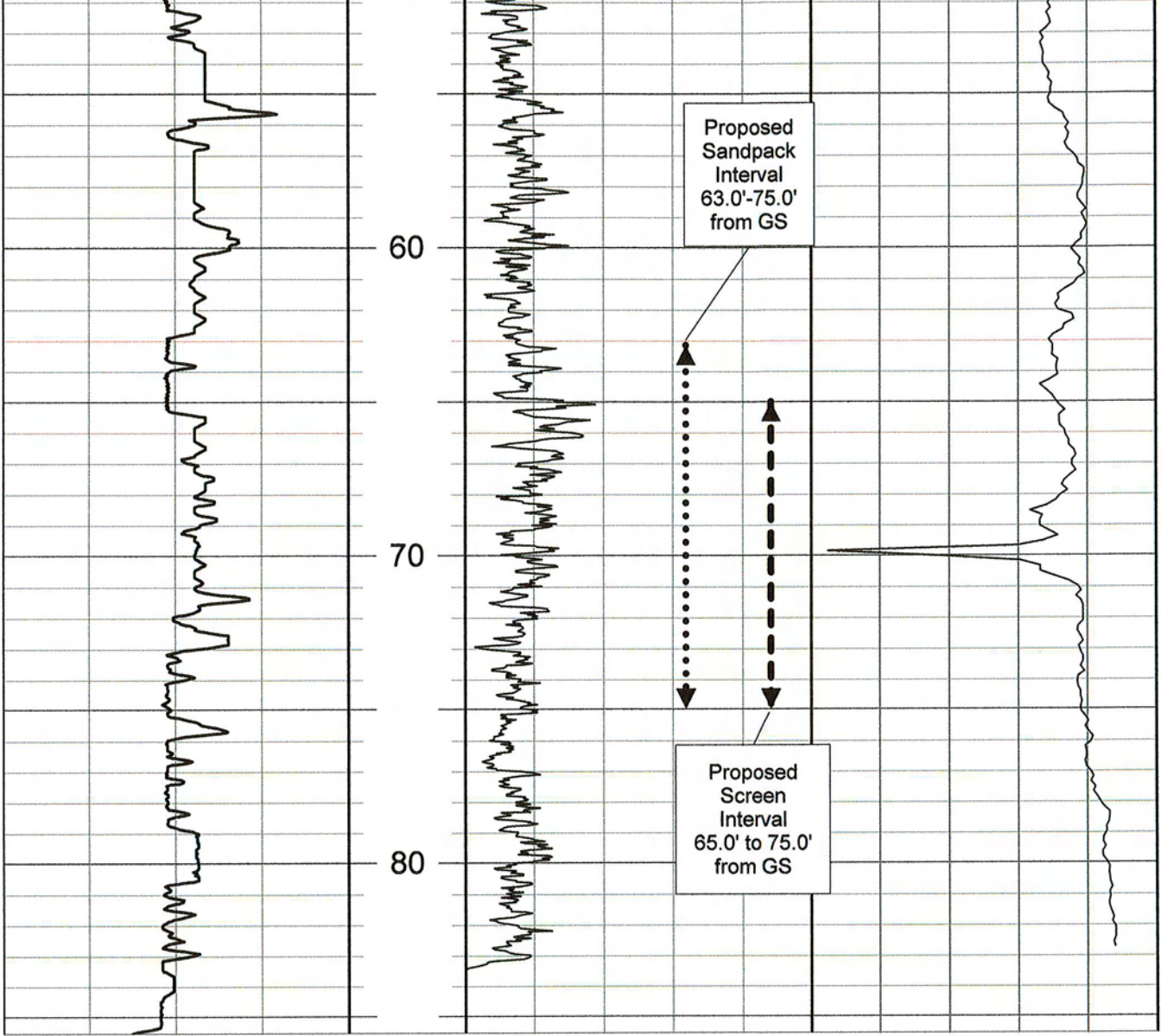
Proposed
Sandpack
Interval
63.0'-75.0'
from GS

Proposed
Screen
Interval
65.0' to 75.0'
from GS

| | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------|-------------------------------------|----------------------------------|--|
| Well: | | RIMW14 | | Log: 14 - C | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/13-14/06 | | | Time: See notes below | | |
| System Configuration: Century 9065; 9041 (N. gamma only); Mt. Sopris 2EMA | | | | | |
| Water Level: See notes | | Measured From: GS | | | |
| Outer Casing Height AGL (with cap open/removed): 0.2' Type: Open steel pipe | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: See Notes | | Measured from: GS | | Log Speed: various | |
| Log Top: 3.4' | | Log Bottom: 85.6' | | Reference Point: GS | |
| Analysis Software: WellCAD | | Smoothing Points: natural gamma, caliper = 9 | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: Idronaut; 9041 | |
| Well Diameter: 6" | | Well Depth: ~86' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 46.2' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88725° N | | | Longitude: 81.07275° W | | |
| Notes: Caliper log: 12/13/06 @ 10:02 logged up; 12 fpm Natural Gamma: 12/14/06 @ 07:42 logged down; 11 fpm Formation Conductivity: 12/13/06 @ 12:50 logged up; 8 fpm Water level taken 12/14/06 @ ~07:30 when stabilized @ 20.25' Water recovery after drilling about 0.1 fpm from 81.81' on 12/13/06 GS references converted from a casing height of 0.2' (org. ref. pt.) | | | | | |







PSC Site
December 13 -18, 2006
Rock Hill, South Carolina

Geophysical Logs

Well Logs for RIMW 18

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log 18 – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log 18 – B

Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity - Ohm/M
Computed lateral resistivity – Ohm/M
Caliper – inches

Log 18 - C

Natural gamma – cps
Caliper, 3-arm - inches
Formation conductivity – mS/m

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool (2.5" diameter)
Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity – Ohm/M
Computed lateral resistivity – Ohm/M


Century 9060 tool (1.4" diameter)
Natural gamma – cps

Century 9065 tool
Caliper, 3-arm - inches

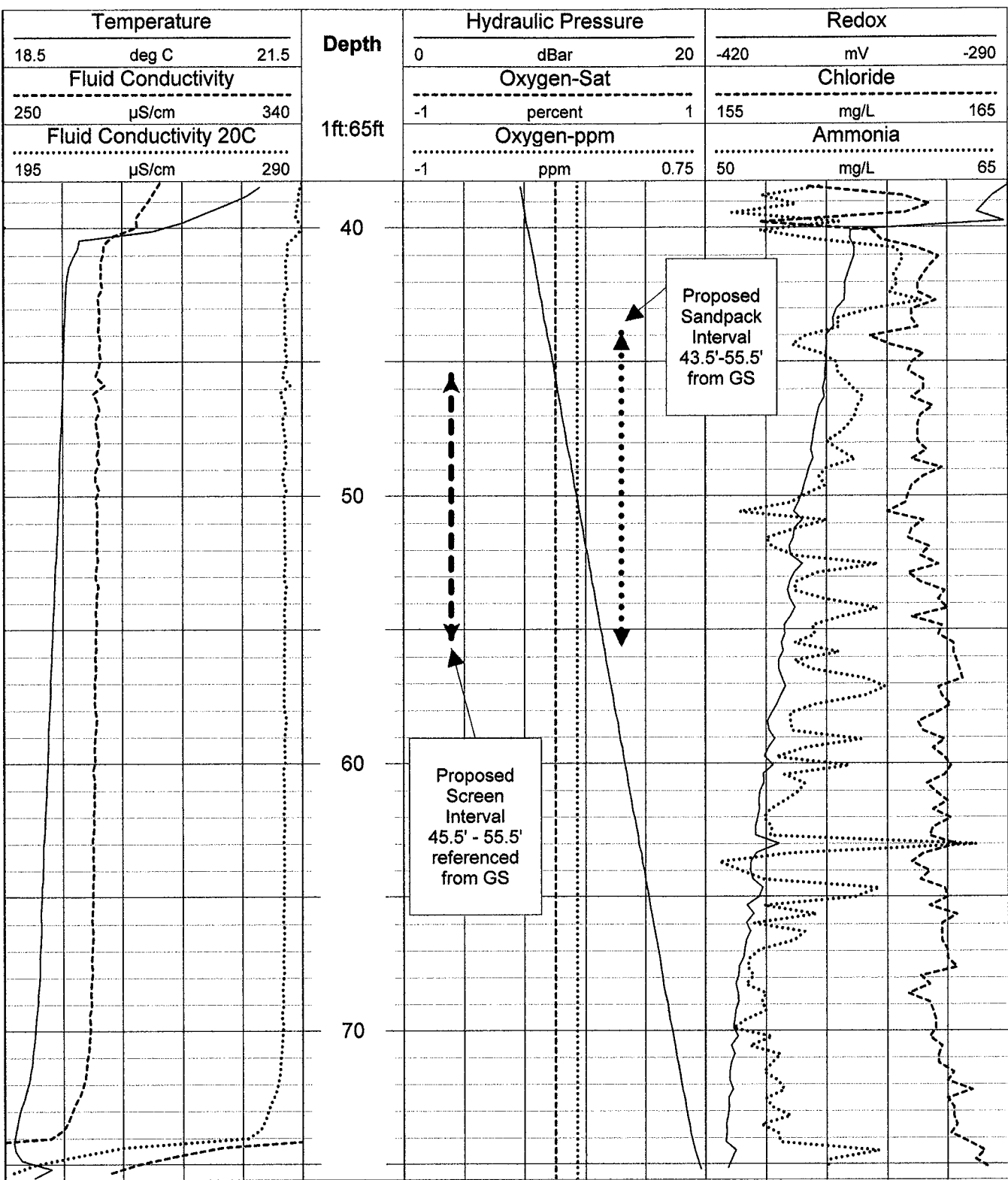
Mount Sopris 2IDA tool – ammonia configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L (option sensor)


Mount Sopris 2IDA tool – nitrate configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L (option sensor)

Mount Sopris 2EMA-1000 tool
Formation conductivity – mS/m

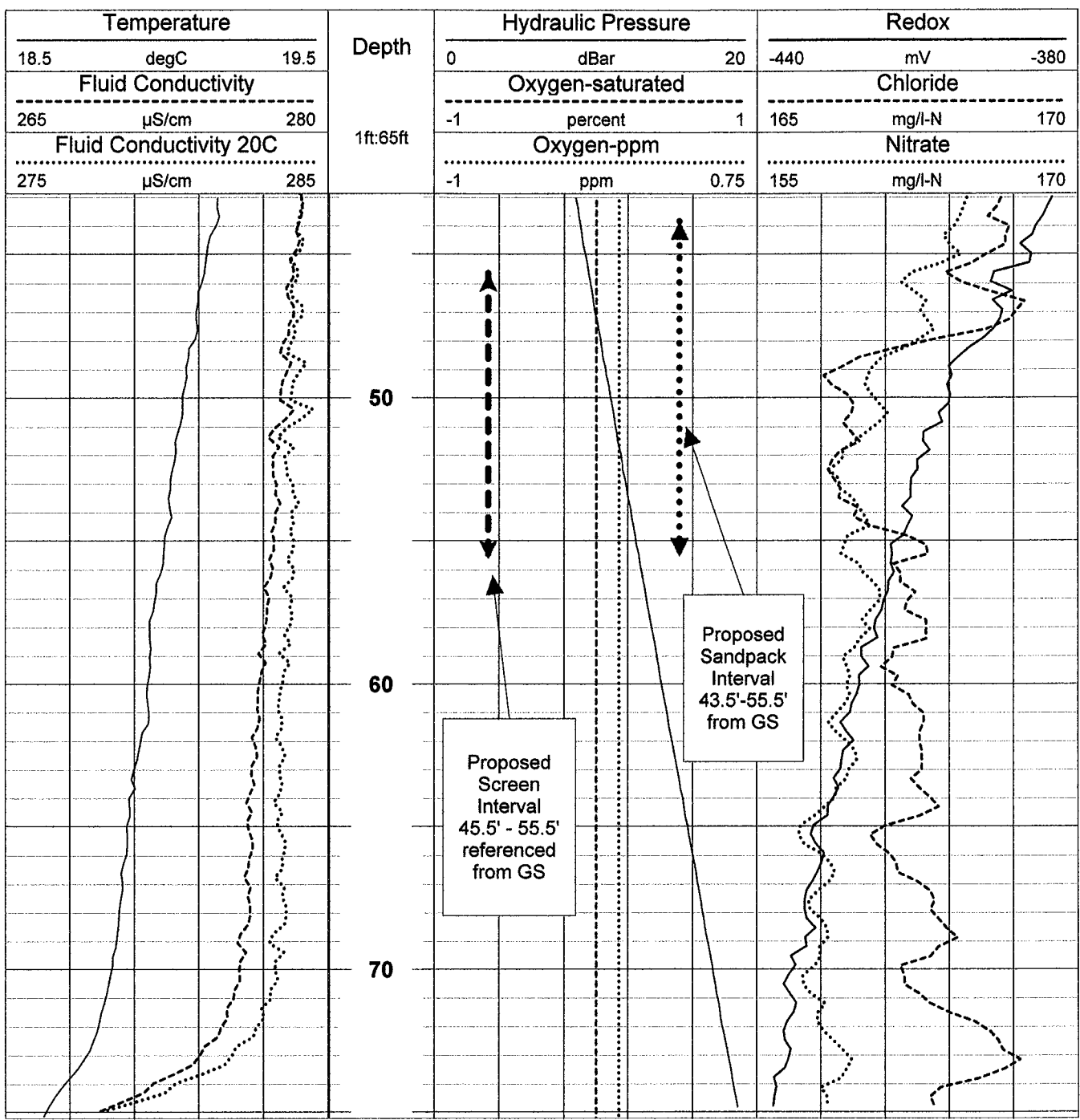
| | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------|------------------------------------|---------------------|--|
| Well: | | RIMW18 | | Log: 18 - A | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/15/06 | | | Time: 10:50 | | |
| System Configuration: Mount Sopris 2IDA with ammonia option | | | | | |
| Water Level: 11.30' | | Measured From: GS @ ~ 08:45 | | | |
| Outer Casing Height AGL (with cap open/removed): 1.6' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 16.4 fpm | |
| Log Top: 38.50' | Log Bottom: 75.5' | | Reference Point: GS | | |
| Analysis Software: WellCAD | | Smoothing Points: See notes | | | |
| Operator: JRU | Witness: None | | Other Tools Used: 9065, 9041, 2EMA | | |
| Well Diameter: 6" | Well Depth: 77.69' | | Referenced From: GS | | |
| Casing Material: Steel | | Non-Cased Interval: 39.9' to bottom | | | |
| Screen Interval: None | | Screen Type: N/A | | | |
| Latitude: 34.88844°N | | | Longitude: -81.07347°W | | |
| Notes: Smoothing points; redox, ammonia, chloride = 1. Six traverses were made before this log was recorded. GS references converted from a casing height of 1.6' (org. ref. pt.) GPS values; NAD83 Probe hanging near 39.9' | | | | | |
|  | | | | | |






| | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------|-------------------------------------|------------------------------------|--|
| Well: | | RIMW18 | | Log: 18 - B | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/15/06 | | | Time: 11:00 | | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | | | | |
| Water Level: 11.30' | | Measured From: GS @ ~ 08:45 | | | |
| Outer Casing Height AGL (with cap open/removed): 1.6' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 15.4 fpm | |
| Log Top: 43' | | Log Bottom: 75.2 | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: see notes | | |
| Operator: JRJ | | Witness: None | | Other Tools Used: 9065, 9041, 2EMA | |
| Well Diameter: 6" | | Well Depth: 77.69' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 39.9' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88844°N | | | Longitude: -81.07347°W | | |
| Notes: Smoothing points; conductivities & redox = 1; Cl & NH4 = 3. Eight traverses were made before this log was recorded. GS references converted from a casing height of 1.6' (org. ref. pt.) GPS values; NAD83 Probe hanging near 39.9' | | | | | |
|  | | | | | |

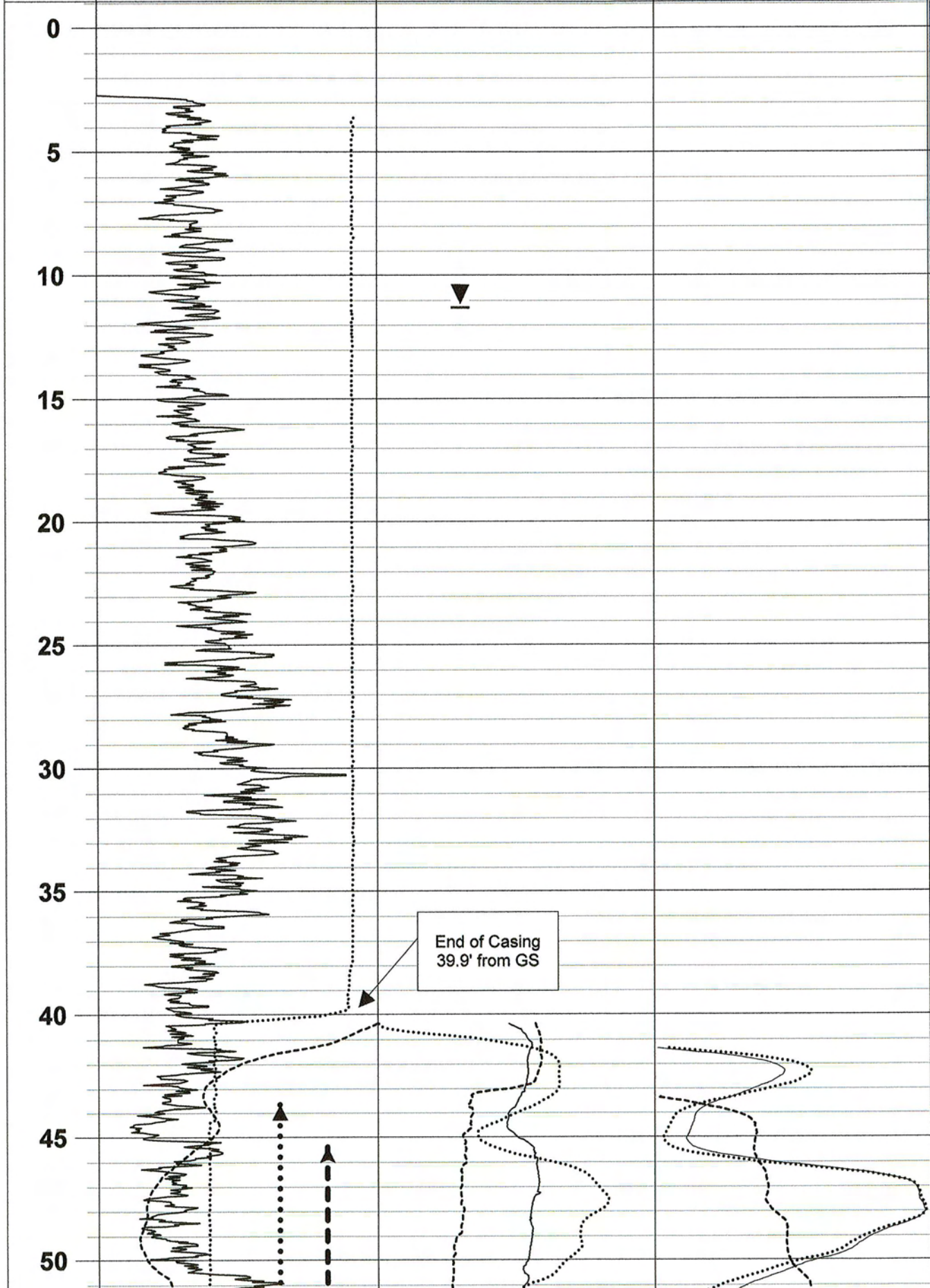


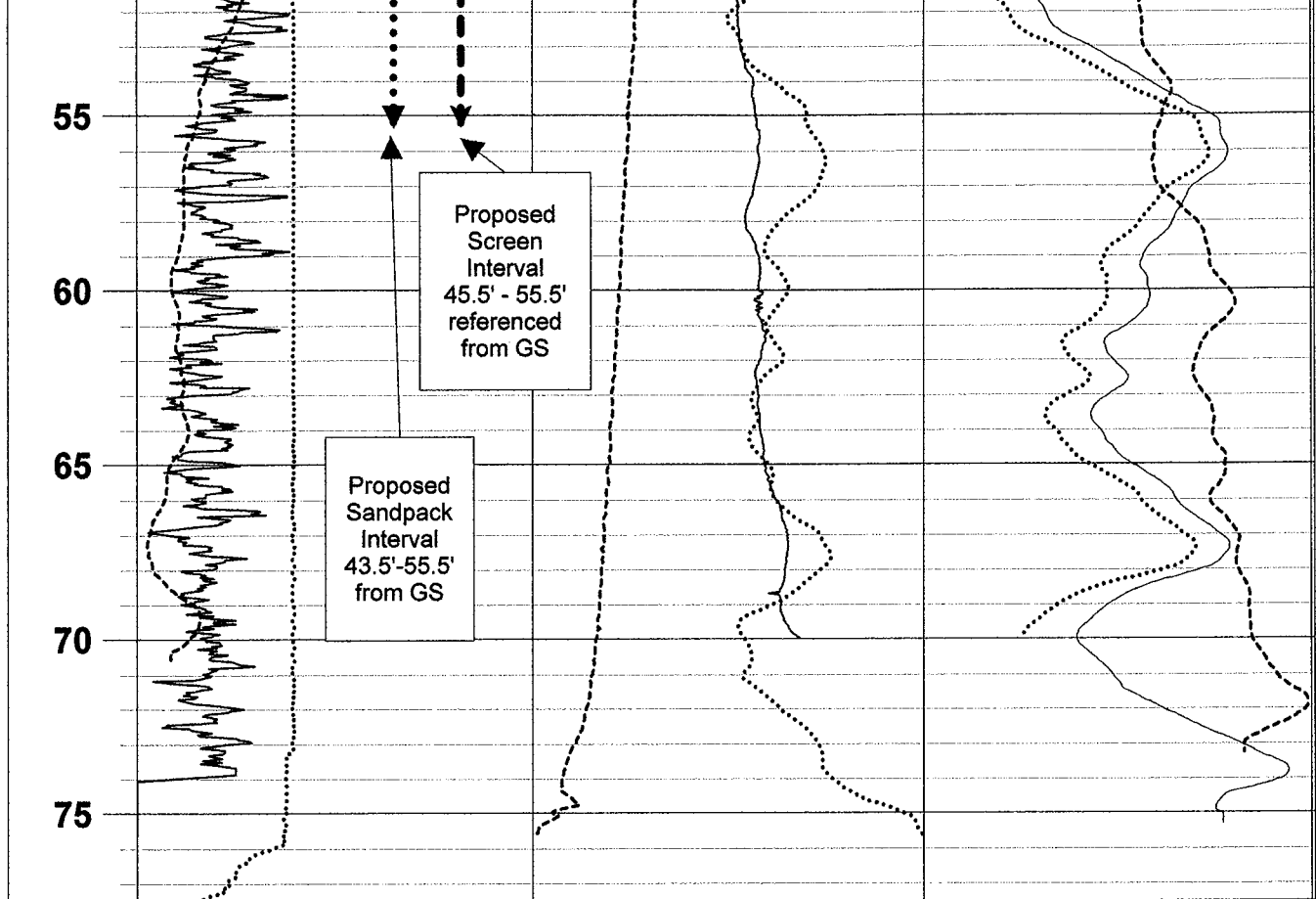


| | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------|----------------------------------------|------------------------------|--|
| Well: | | RIMW18 | | Log: 18 - C | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/15/06 | | | Time: Caliper 09:08; multi func. 09:33 | | |
| System Configuration: Century 9065, 9041 | | | | | |
| Water Level: 11.30' | | Measured From: GS at ~ 08:45 | | | |
| Outer Casing Height AGL (with cap open/removed): 1.6' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: See notes | | Measured from: GS | | Log Speed: see notes | |
| Log Top: 2.6' | | Log Bottom: 77.5' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: Natural gamma = 9 | | |
| Operator: JRJ | | Witness: None | | Other Tools Used: 2IDA; 2EMA | |
| Well Diameter: 6" | | Well Depth: 77.69' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 39.9' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88844°N | | | Longitude: -81.07347°W | | |
| Notes: Caliper logged up @ 09:08; speed 19 fpm. 9041 logged up @ 09:33; speed 16 fpm. GS references converted from a casing height of 1.6' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |



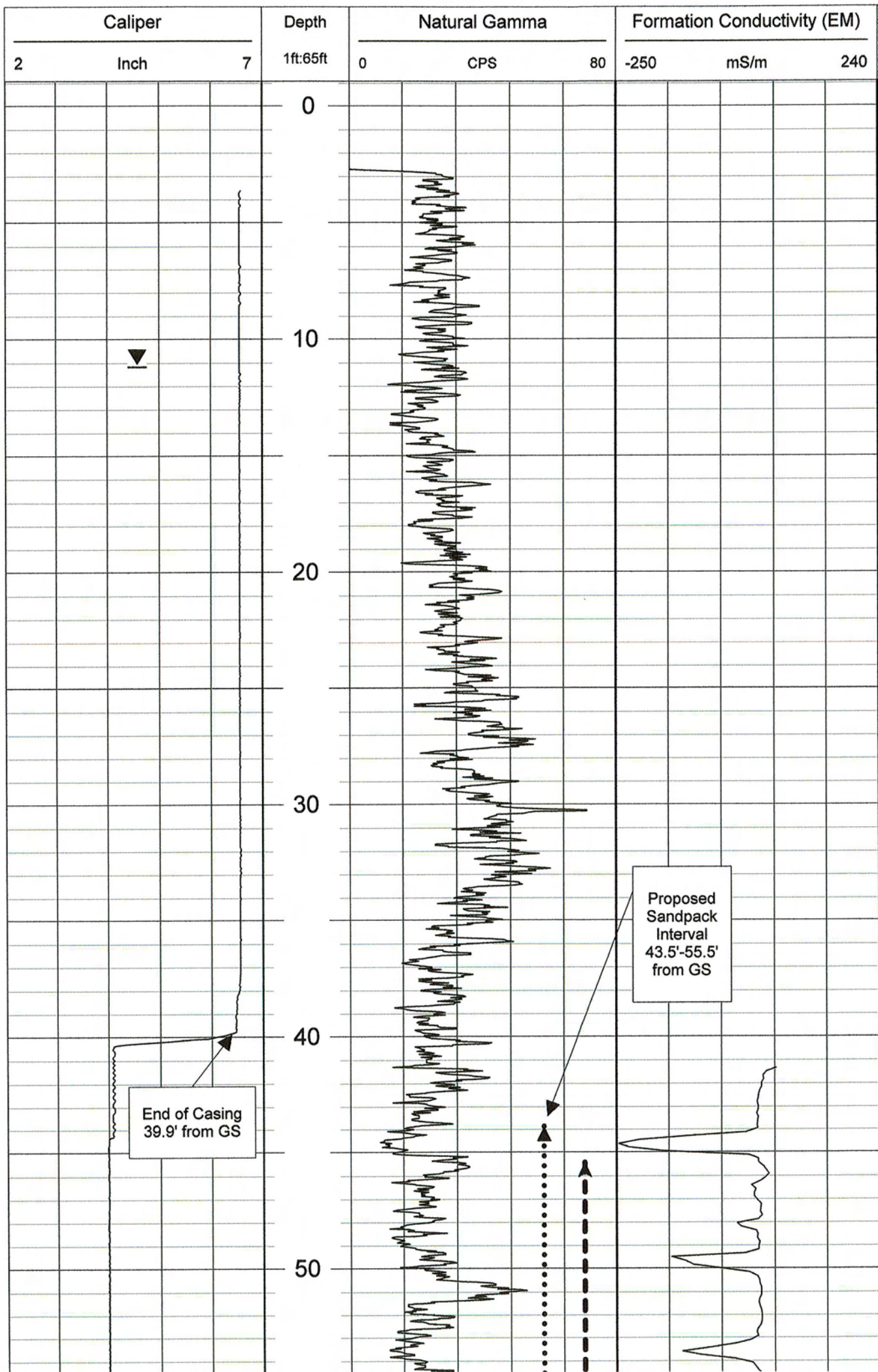
| Depth | Natural Gamma | | Fluid Resistivity | | Normal Resistivity (16") | | | | |
|----------|-----------------------|------|--------------------------|----|--------------------------|------|-----|-------|-----|
| | 0 | CPS | 80 | 32 | Ohm-M | 36 | 95 | Ohm-M | 225 |
| 1ft:65ft | Spontaneous Potential | | Temperature | | Normal Resistivity (64") | | | | |
| | 165 | mV | 310 | 66 | Deg F | 70 | 35 | Ohm-M | 120 |
| | Caliper | | Single Point Resistivity | | Computed Lateral | | | | |
| | 2 | Inch | 7 | 30 | Ohm | 4900 | 120 | Ohm-M | 275 |

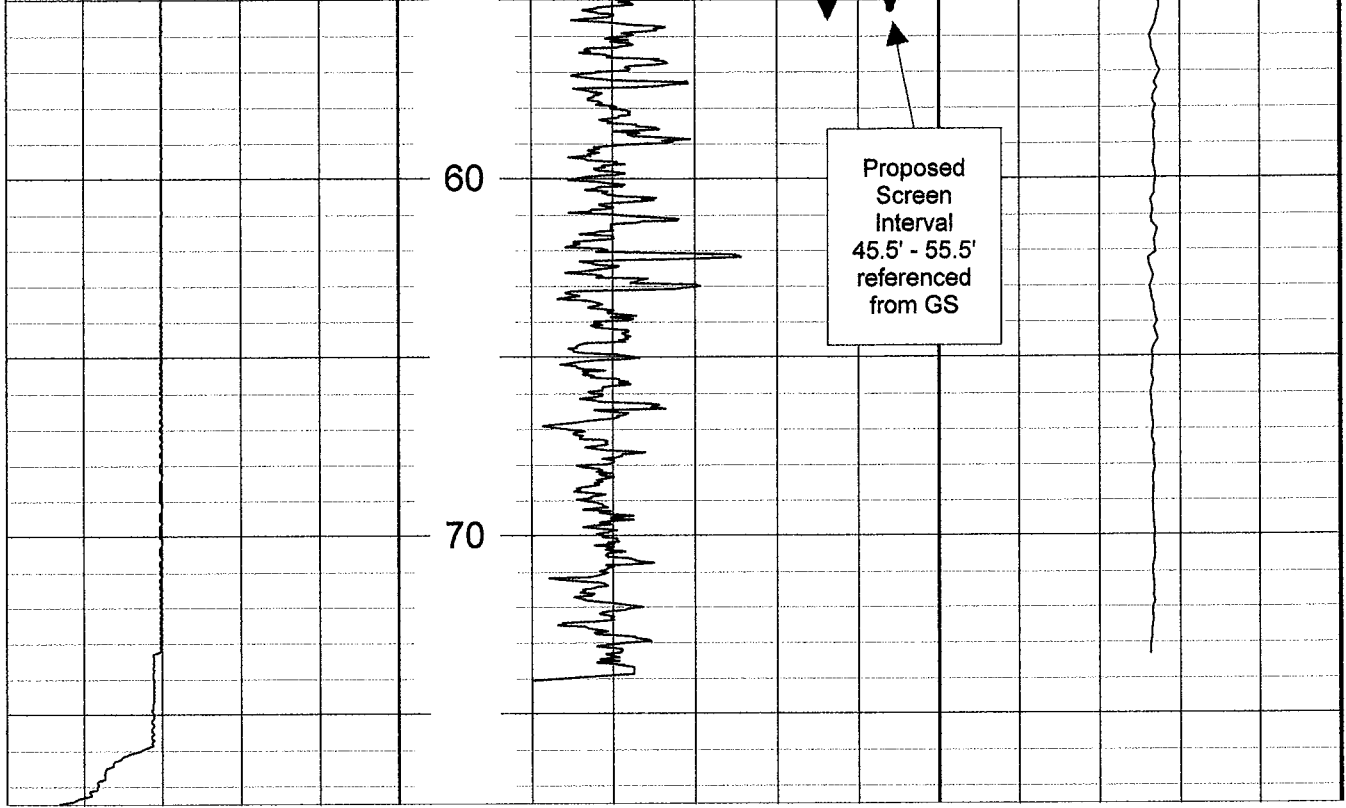




| | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------|-------------------------------------|------------------------|--|
| Well: | | RIMW18 | | Log: 18 - D | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/15/06 | | | Time: See notes | | |
| System Configuration: Century 9065, 9041 (N. gamma only); Mt. Sopris 2EMA | | | | | |
| Water Level: 11.30' | | Measured From: GS at ~ 08:45 | | | |
| Outer Casing Height AGL (with cap open/removed): 1.6' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: See notes | | Measured from: GS | | Log Speed: see notes | |
| Log Top: 2.6' | | Log Bottom: 77.5' | | Reference Point: GS | |
| Analysis Software: WellCAD | | Smoothing Points: Natural gamma = 9 | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2IDA | |
| Well Diameter: 6" | | Well Depth: 77.69' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 39.9' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88844°N | | | Longitude: -81.07347°W | | |
| Notes: Caliper logged up @ 09:08; speed 19 fpm. Natural gamma logged down @ 09:33; speed 16 fpm. Electromagnetic conductivity logged up @ 10:43; speed 13.8 fpm 2EMA stabilized at 19 minutes. GS references converted from a casing height of 1.6' (org. ref. pt.) GPS values; NAD83 | | | | | |







PSC Site
December 13 -18, 2006
Rock Hill, South Carolina

Geophysical Logs

Well Logs for RIMW19

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log 19 – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L

Log 19 – B

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log 19 - C

Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity - Ohm/M
Computed lateral resistivity – Ohm/M
Caliper – inches

Log 19 - D

Natural gamma – cps (9041 Tool)
Caliper, 3-arm - inches
Formation conductivity – mS/m

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool (2.5" diameter)
Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity – Ohm/M
Computed lateral resistivity – Ohm/M


Century 9060 tool (1.4" diameter)
Natural gamma – cps

Century 9065 tool
Caliper, 3-arm - inches

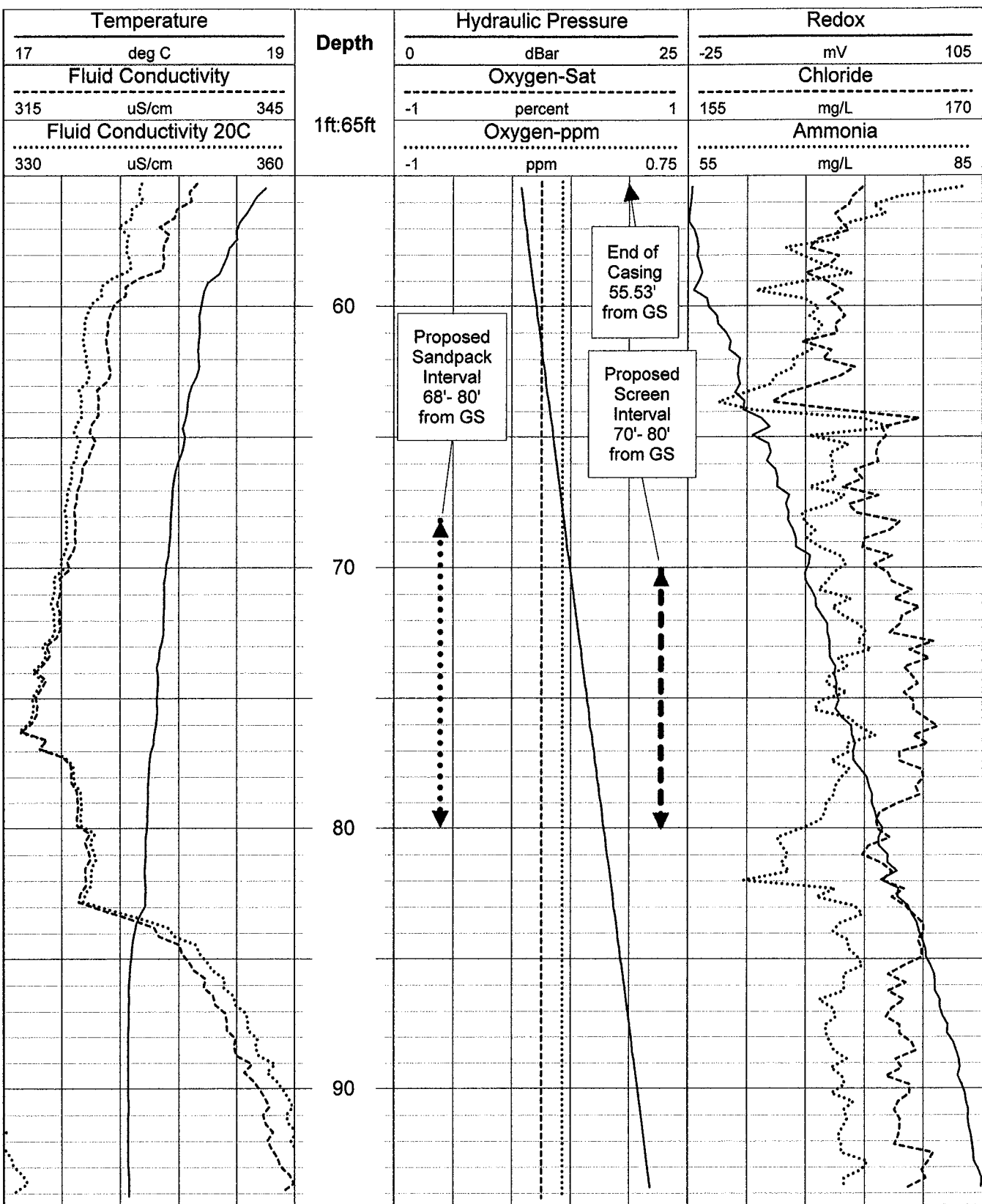
Mount Sopris 2IDA tool – ammonia configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L (option sensor)


Mount Sopris 2IDA tool – nitrate configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L (option sensor)

Mount Sopris 2EMA-1000 tool
Formation conductivity – mS/m

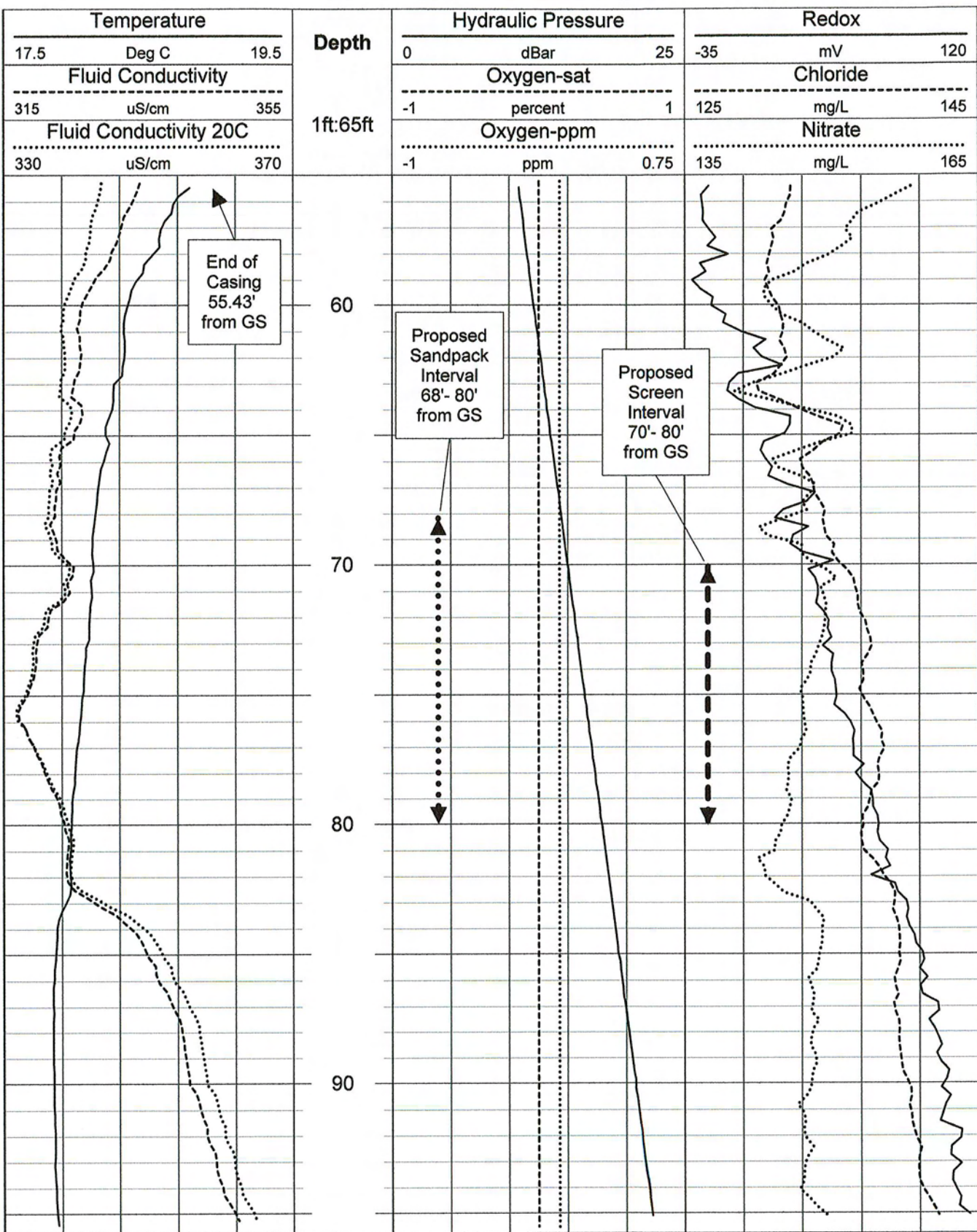
| | | | | | |
|------------------------------------------------------------------------------------------------|--|-----------------------------|------------------------------------------|------------------------------------|--|
| Well: | | RIMW19 | | Log: 19 - A | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/17/06 | | | Time: 17:30 | | |
| System Configuration: Mount Sopris 2IDA with ammonia option | | | | | |
| Water Level: 17.93' | | Measured From: GS @ ~ 15:00 | | | |
| Outer Casing Height AGL (with cap open/removed): 0.67' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 14.8 fpm | |
| Log Top: 55.53' | | Log Bottom: 94.13' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: Redox = 1 | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 9041, 9065, 2EMA | |
| Well Diameter: 6" | | Well Depth: 95.59' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 55.43' to bottom; GS | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88887421°N | | | Longitude: -81.07201329°W | | |
| Notes: GS references converted from a casing height 0.67' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |






| | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------|---------------------------|---------------------|--|
| Well: | | RIMW19 | | Log: 19 - B | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/17/06 | | | Time: See notes | | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | | | | |
| Water Level: 17.93' | | Measured From: GS @ ~ 15:00 | | | |
| Outer Casing Height AGL (with cap open/removed): 0.67' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 15.7 fpm | |
| Log Top: 56' | Log Bottom: 95.43' | | Reference Point: GS | | |
| Analysis Software: WellCAD | | Smoothing Points: see notes | | | |
| Operator: JRJ | Witness: None | | Other Tools Used: | | |
| Well Diameter: 6" | Well Depth: 95.59' | | Referenced From: GS | | |
| Casing Material: Steel | | Non-Cased Interval: 55.43' to bottom; GS | | | |
| Screen Interval: None | | Screen Type: N/A | | | |
| Latitude: 34.88887421°N | | | Longitude: -81.07201329°W | | |
| Notes: Smoothing points: redox = 1; conductivities, nitrate, chloride = 5 2IDA logged down at approximately 17:15. GS references converted from a casing height 0.67' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |

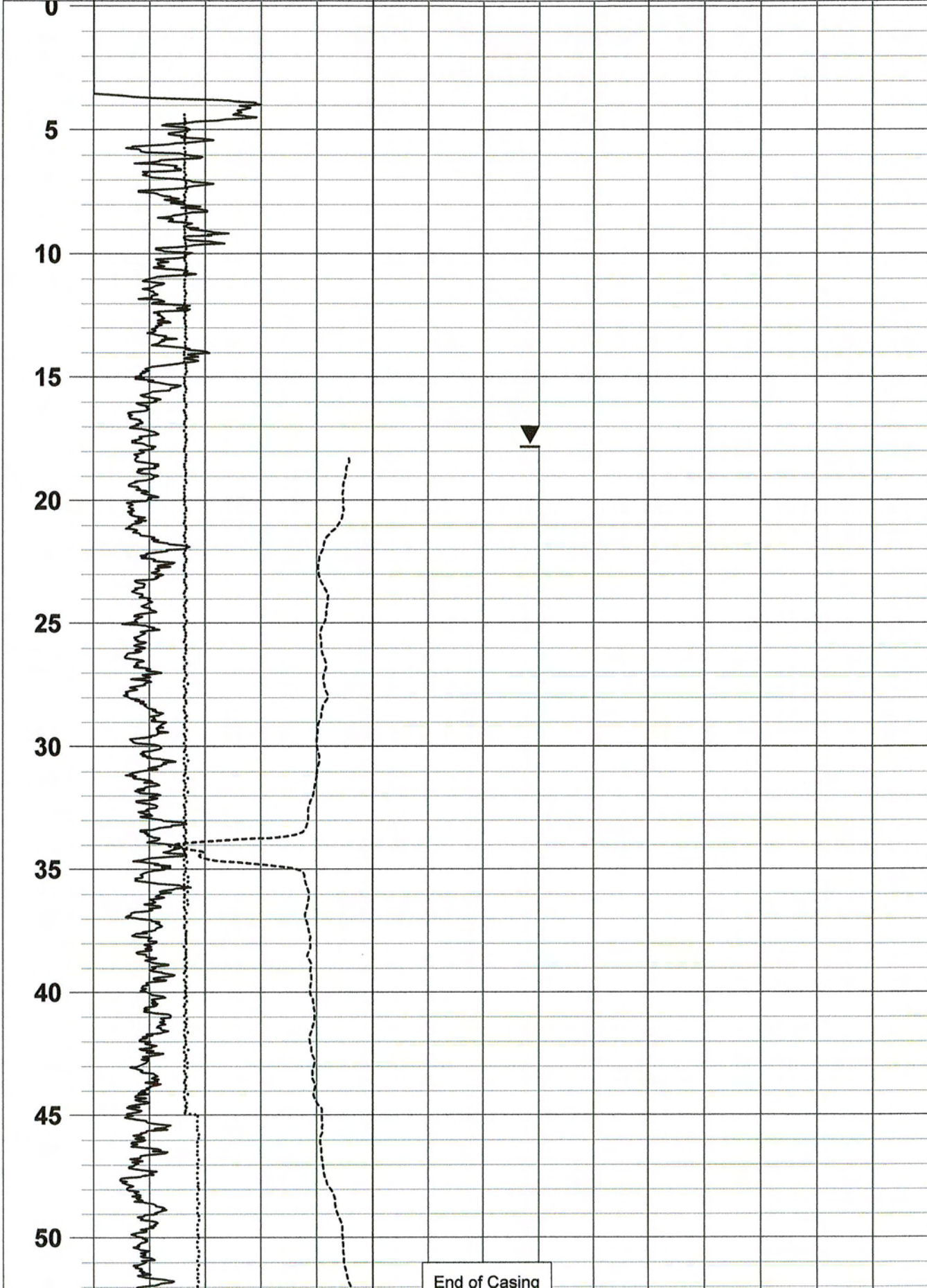




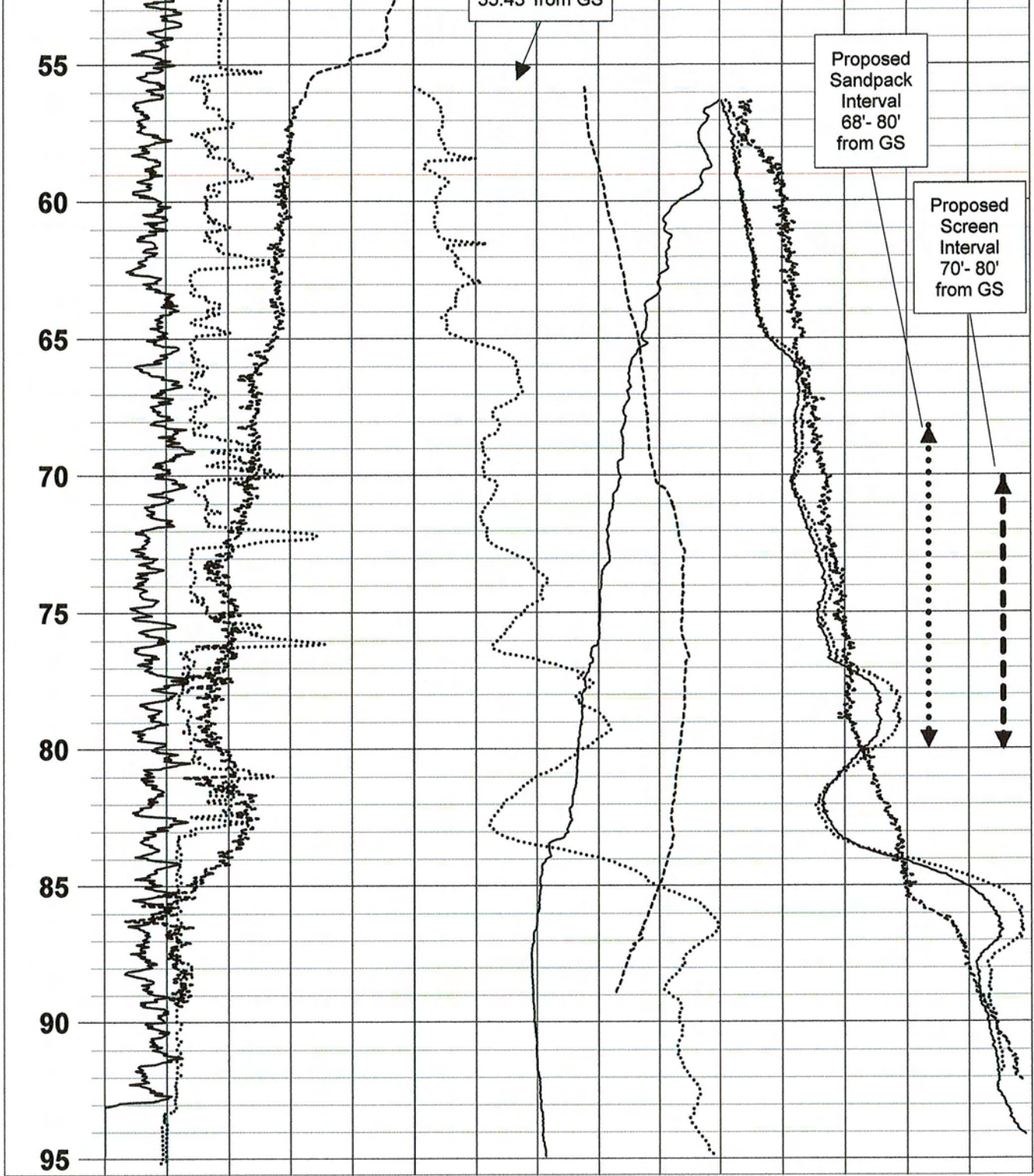
| | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------|------------------------------------------|------------------------------|--|
| Well: | | RIMW19 | | Log: 19 - C | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/17/06 | | | Time: See notes | | |
| System Configuration: Century 9065, 9041 | | | | | |
| Water Level: 17.93' | | Measured From: GS @ ~ 15:00 | | | |
| Outer Casing Height AGL (with cap open/removed): 0.67' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: See notes | | Measured from: GS | | Log Speed: see notes | |
| Log Top: 3.9' | | Log Bottom: 95.23' | | Reference Point: GS | |
| Analysis Software: WellCAD | | Smoothing Points: natural gamma = 13 | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2IDA, 2EMA | |
| Well Diameter: 6" | | Well Depth: 95.59' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 55.43' to bottom; GS | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88887421°N | | | Longitude: -81.07201329°W | | |
| Notes: Caliper (9065) logged up at 15:57; speed 18 fpm. Multi-function tool (9041) logged down at 16:20; speed 17 fpm. GS references converted from a casing height 0.67' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |




| Depth | Natural Gamma | | | Temperature | | | Normal Resistivity (16") | | |
|----------|-----------------------|------|-----|-------------------------|-------|------|--------------------------|-------|-----|
| | 0 | CPS | 100 | 64 | DEG F | 66 | 10 | OHM-M | 170 |
| 1ft:65ft | Spontaneous Potential | | | Fluid Resistance | | | Normal Resistivity (64") | | |
| | 200 | MV | 360 | 25 | OHM-M | 30 | -10 | OHM-M | 125 |
| | Caliper | | | Single Point Resistance | | | Computed Lateral | | |
| | 6 | Inch | 8 | 410 | OHM | 1870 | 10 | OHM-M | 180 |

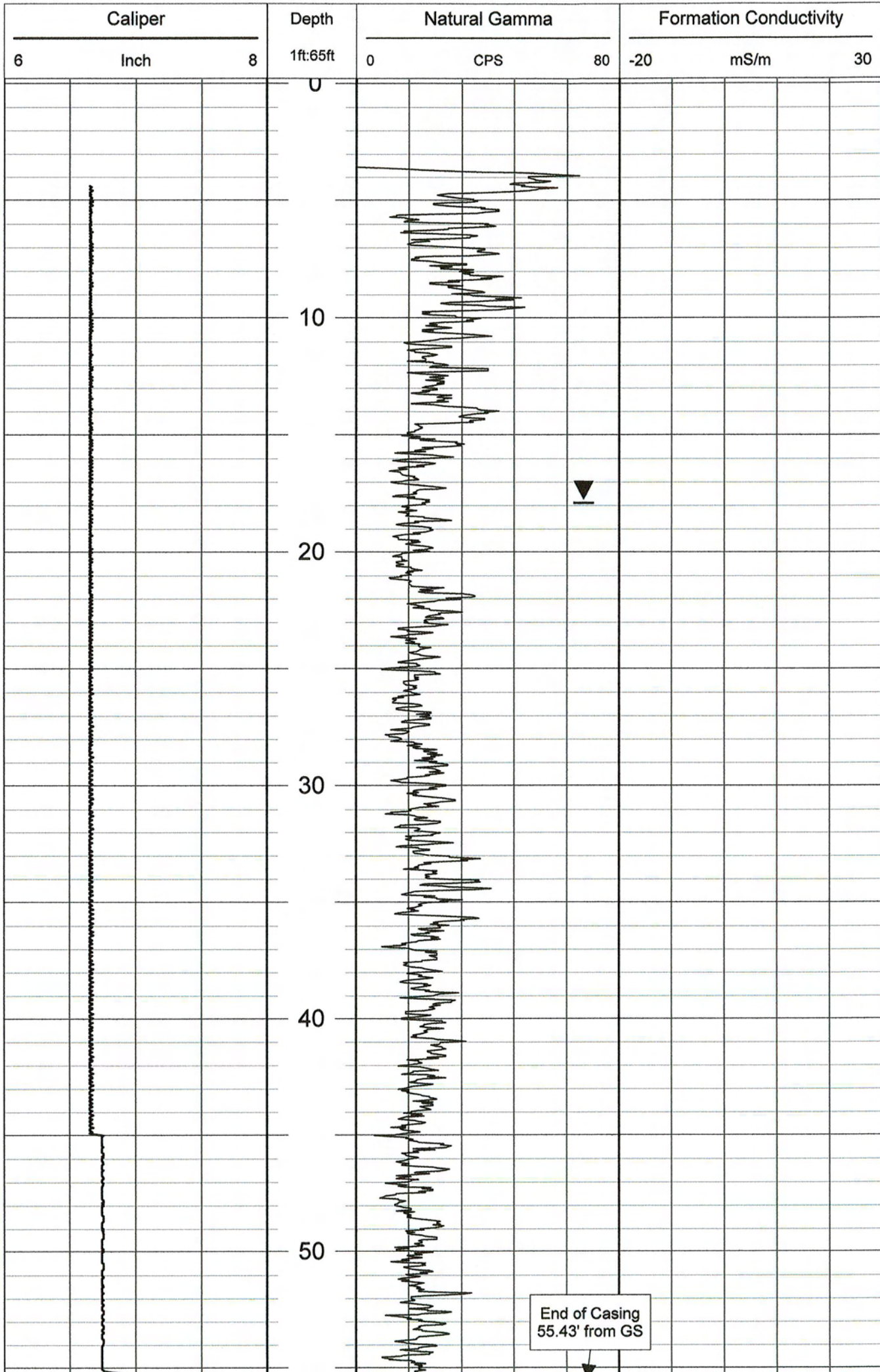


End of Casing



| | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------|------------------------------------------|------------------------|--|
| Well: | | RIMW19 | | Log: 19 - D | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/17/06 | | | Time: See notes | | |
| System Configuration: Century 9065, 9041 (N. gamma only); Mt. Sopris 2EMA | | | | | |
| Water Level: 17.93' | | Measured From: GS @ ~ 15:00 | | | |
| Outer Casing Height AGL (with cap open/removed): 0.67' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: See notes | | Measured from: GS | | Log Speed: see notes | |
| Log Top: 3.8' | | Log Bottom: 95.23' | | Reference Point: GS | |
| Analysis Software: WellCAD | | Smoothing Points: natural gamma = 9 | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2IDA | |
| Well Diameter: 6" | | Well Depth: 95.59' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 55.43' to bottom; GS | | |
| Screen Interval: None | | | Screen Type: None | | |
| Latitude: 34.88887421°N | | | Longitude: -81.07201329°W | | |
| Notes: Caliper (9065) logged up at 15:57; speed 18 fpm. Multi-function tool (9041) logged down at 16:20; speed 17 fpm 2EMA logged up at approximately 16:50; speed 13.5 fpm. 2EMA Stabilized after 8 minutes. GS references converted from a casing height 0.67' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |





Caliper

Depth

Natural Gamma

Formation Conductivity

6 Inch 8

1ft:65ft

0 CPS 80

-20 mS/m 30

0

10

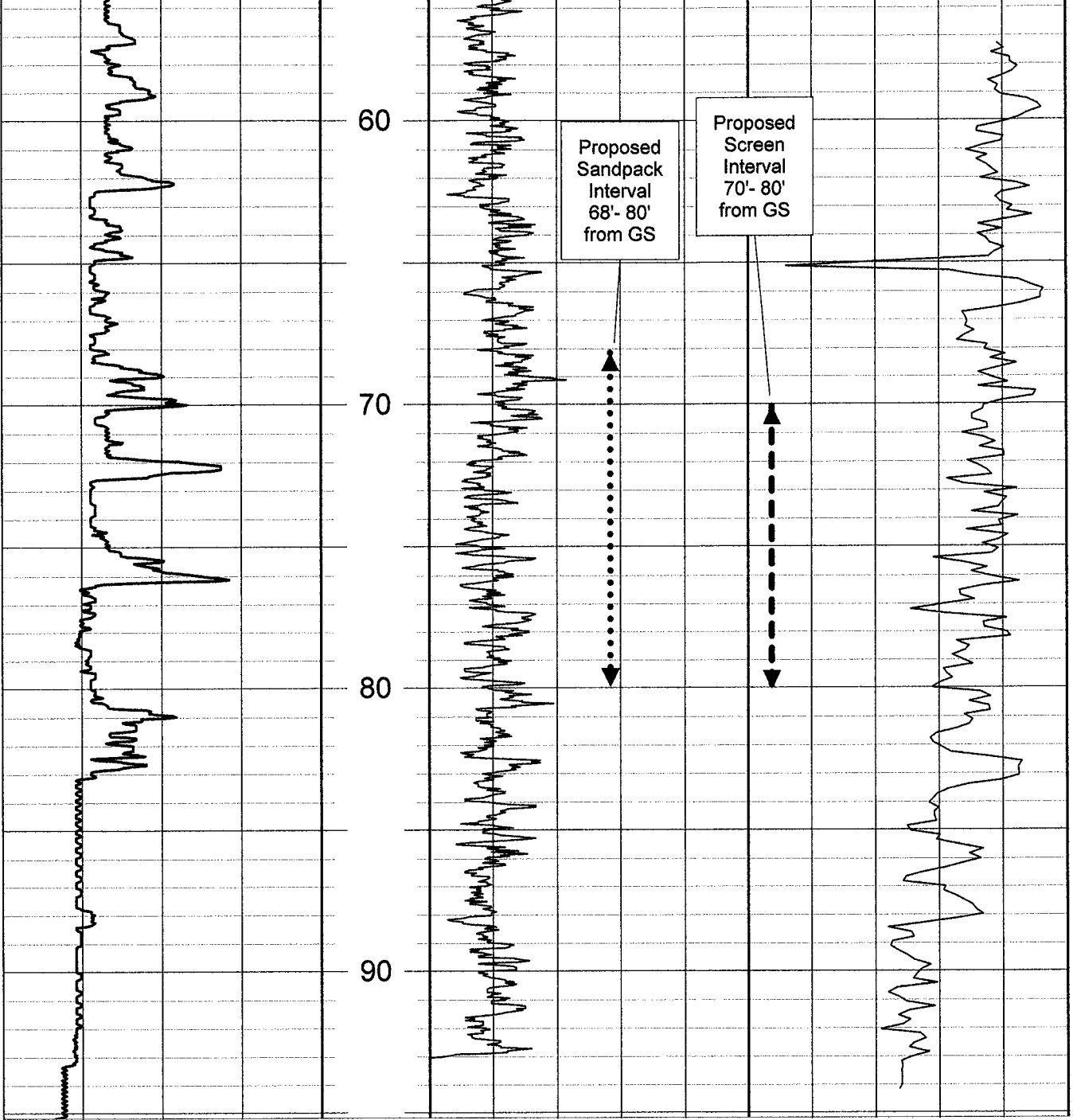
20

30

40

50

End of Casing
55.43' from GS



PSC Site
December 13 -18, 2006
Rock Hill, South Carolina

Geophysical Logs

Well Logs for RIPZ2

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log PZ2 – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L

Log PZ2 – B

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log PZ2 - C

Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity - Ohm/M
Computed lateral resistivity – Ohm/M
Caliper – inches

Log PZ2 - D

Natural gamma – cps (9041 Tool)
Caliper, 3-arm - inches
Formation conductivity – mS/m

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool (2.5" diameter)
Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity – Ohm/M
Computed lateral resistivity – Ohm/M


Century 9060 tool (1.4" diameter)
Natural gamma – cps

Century 9065 tool
Caliper, 3-arm - inches

Mount Sopris 2IDA tool – ammonia configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L (option sensor)

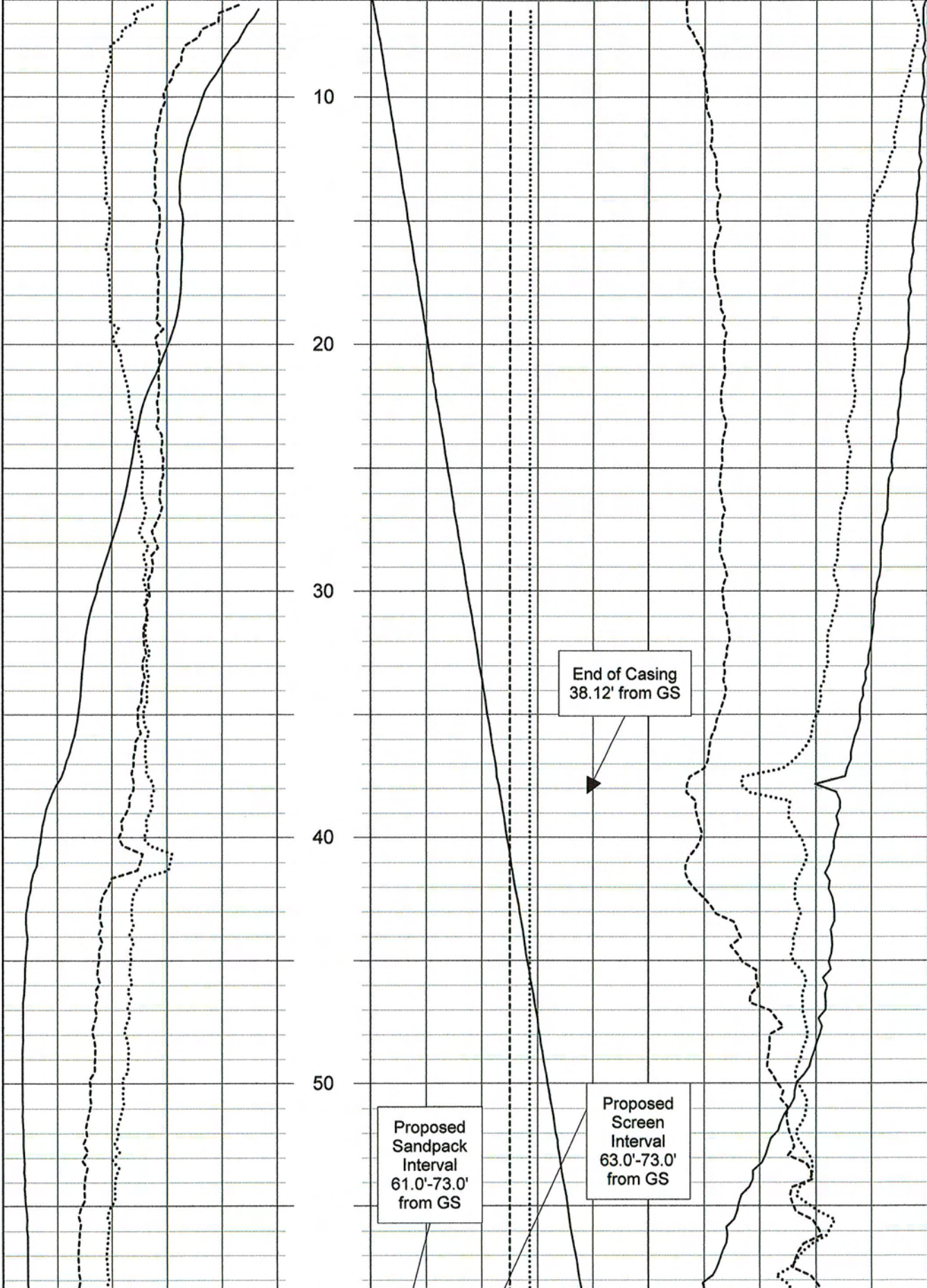
Mount Sopris 2IDA tool – nitrate configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L (option sensor)

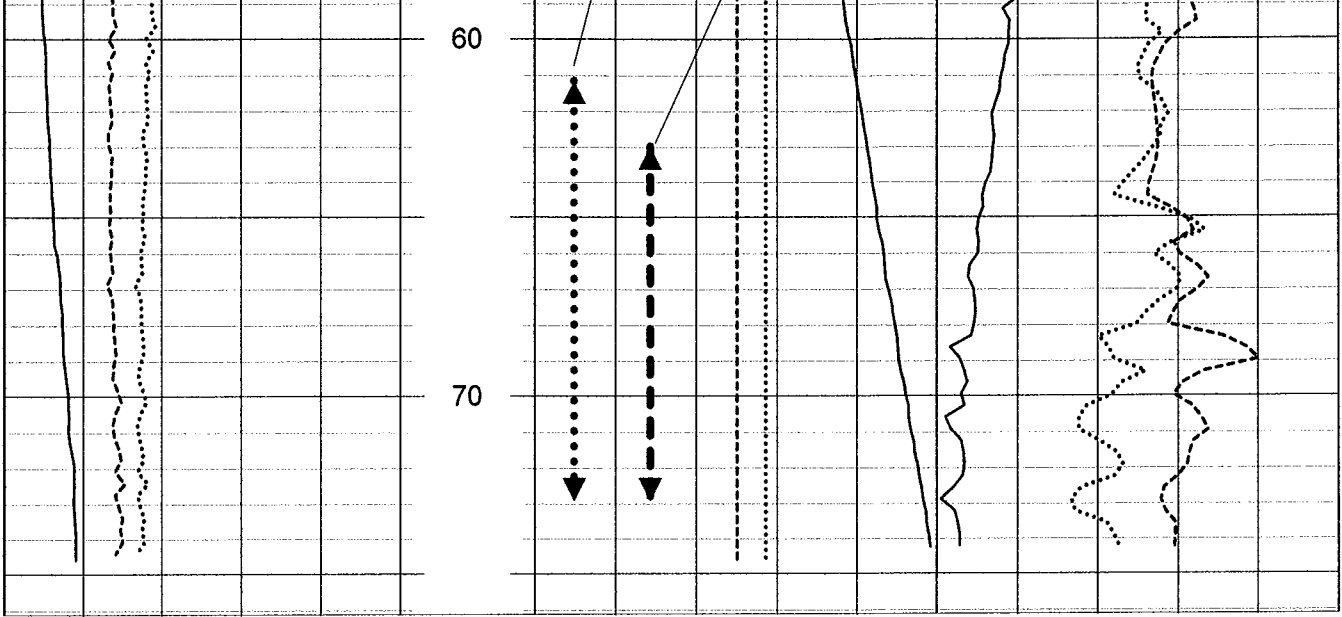
Mount Sopris 2EMA-1000 tool
Formation conductivity – mS/m


| | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------|------------------------------------|---------------------|--|
| Well: | | RIPZ2 | | Log: PZ2-A | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/17/06 | | | Time: 13:33 | | |
| System Configuration: Mount Sopris 2IDA with ammonia option | | | | | |
| Water Level: 6.79' | | Measured From: GS @ ~ 11:50 | | | |
| Outer Casing Height AGL (with cap open/removed): 1.88' Type: PVC | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 14.4 fpm | |
| Log Top: 6.42' | Log Bottom: 74.62' | | Reference Point: GS | | |
| Analysis Software: WellCAD | | Smoothing Points: see notes | | | |
| Operator: JRU | Witness: None | | Other Tools Used: 9041; 9065; 2EMA | | |
| Well Diameter: 4" | Well Depth: 74.97' | | Referenced From: GS | | |
| Casing Material: PVC | | Non-Cased Interval: 38.12' to bottom | | | |
| Screen Interval: None | | Screen Type: N/A | | | |
| Latitude: 34.887718°N | | | Longitude: -81.070799°W | | |
| Notes: Six well traverses were made prior to this log. Smoothing points: redox = 1; Cl & NO3 = 3. GS references converted from a casing height 1.88' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |

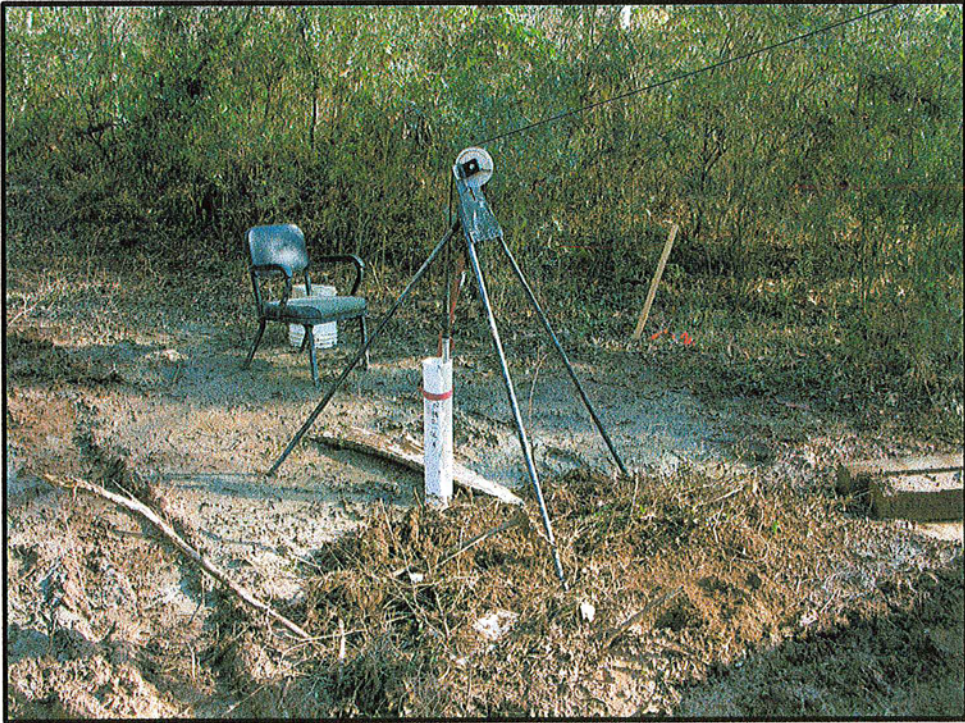


| Temperature | | | Depth | Hydraulic Pressure | | | Redox | | |
|------------------------|-------|------|----------|--------------------|---------|----|----------|------|-----|
| 15.5 | deg C | 17.5 | | 0 | dBar | 20 | -70 | mV | 120 |
| Fluid Conductivity | | | 1ft:65ft | Oxygen-Sat | | | Chloride | | |
| 200 | uS/cm | 220 | | -1 | percent | 1 | 130 | mg/L | 170 |
| Fluid Conductivity 20C | | | | Oxygen-ppm | | | Ammonia | | |
| 220 | uS/cm | 240 | -1 | ppm | 0.75 | 30 | mg/L | 80 | |



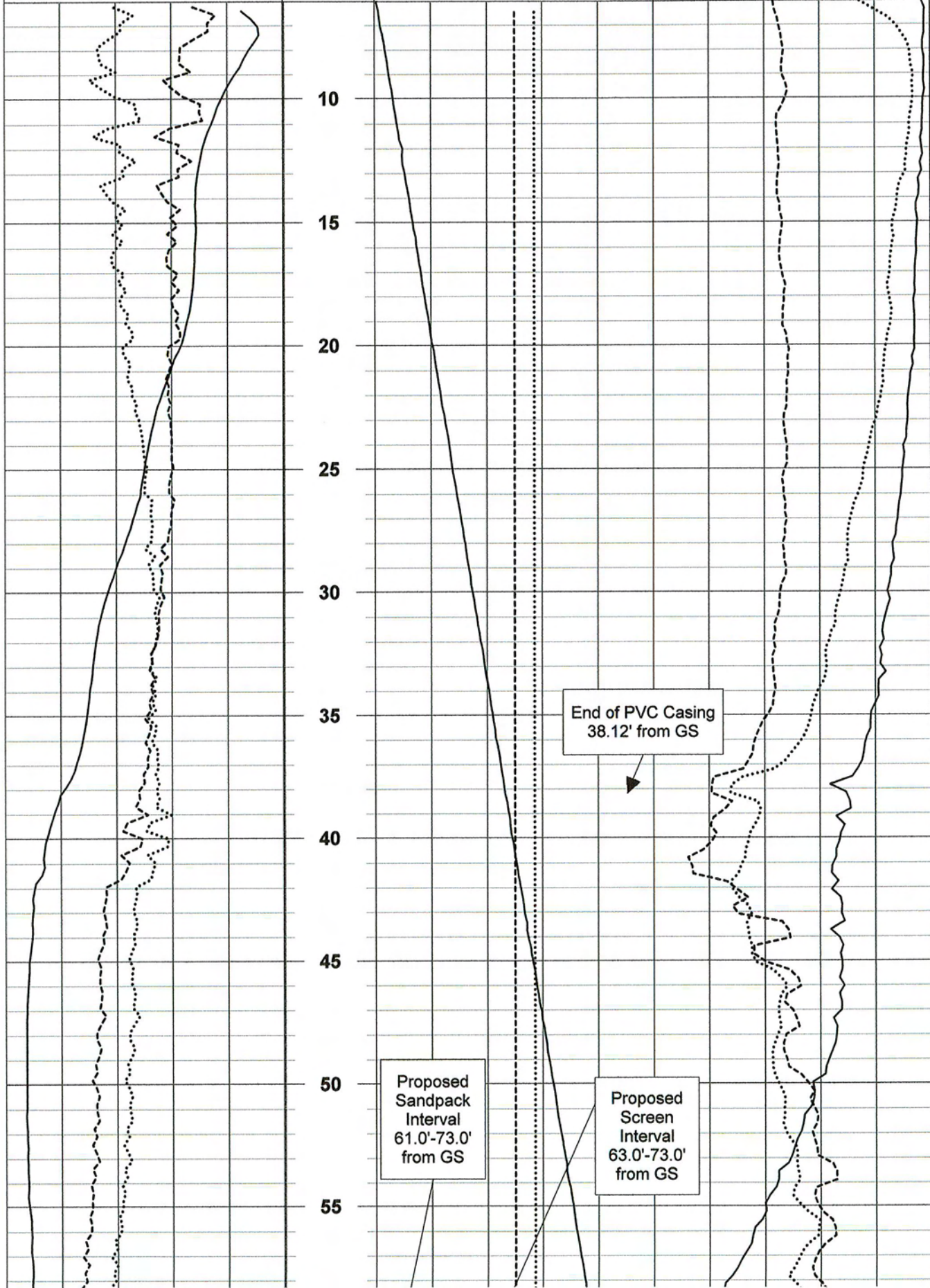


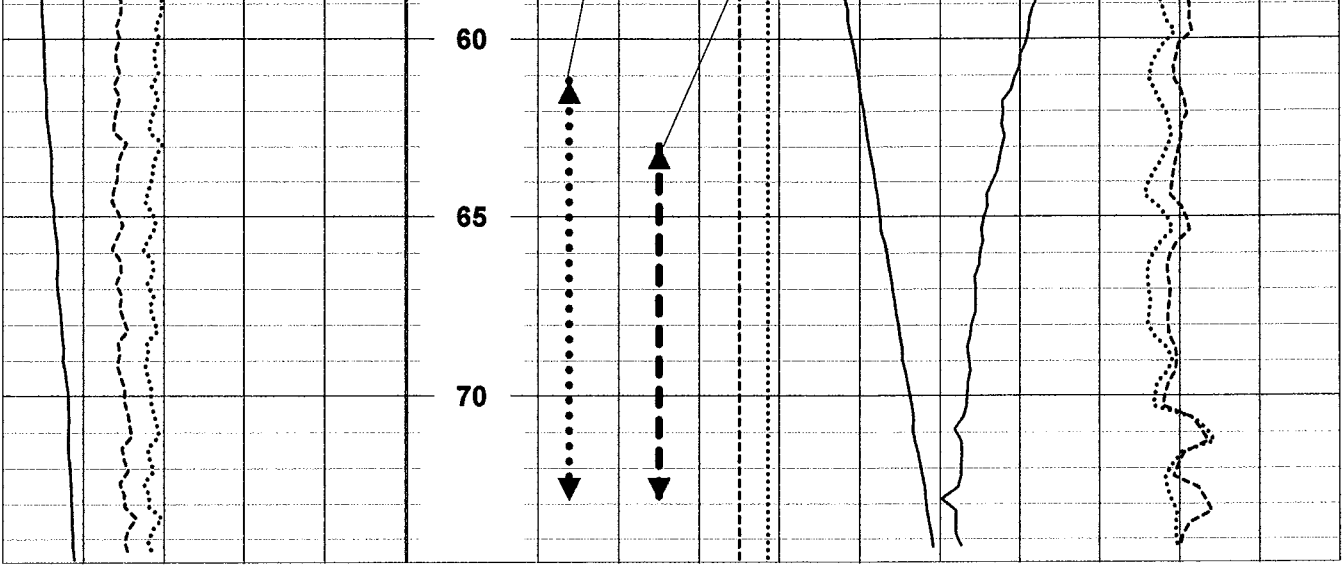
| | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------|------------------------------------|---------------------|--|
| Well: | | RIPZ2 | | Log: PZ2-B | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/17/06 | | | Time: 13:52 | | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | | | | |
| Water Level: 6.79' | | Measured From: GS @ ~ 11:50 | | | |
| Outer Casing Height AGL (with cap open/removed): 1.88' Type: PVC | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 13.8 fpm | |
| Log Top: 6.42' | Log Bottom: 74.62' | | Reference Point: GS | | |
| Analysis Software: WellCAD | | Smoothing Points: see notes | | | |
| Operator: JRU | Witness: None | | Other Tools Used: 9041; 9065; 2EMA | | |
| Well Diameter: 4" | Well Depth: 74.97' | | Referenced From: GS | | |
| Casing Material: PVC | | Non-Cased Interval: 38.12' to bottom | | | |
| Screen Interval: None | | Screen Type: N/A | | | |
| Latitude: 34.887718°N | | | Longitude: -81.070799°W | | |
| Notes: Smoothing points; Cl and NO3 = 3; Redox and conductivities = 1. GS references converted from a casing height 1.88' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |




| Temperature | | |
|--------------------------|-------|------|
| 15.5 | Deg C | 17.5 |
| Fluid Conductivity | | |
| 200 | uS/cm | 220 |
| Fluid Conductivity @ 20C | | |
| 220 | uS/cm | 240 |

| Depth | Hydraulic Pressure | | Redox | |
|-------|--------------------|------|----------|--------|
| | 0 | dBar | 20 | |
| | Oxygen-sat | | Chloride | |
| -1 | percent | 1 | 170 | mg/l-N |
| | Oxygen-ppm | | Nitrate | |
| -1 | ppm | 0.75 | 120 | mg/l-N |
| | | | 180 | |

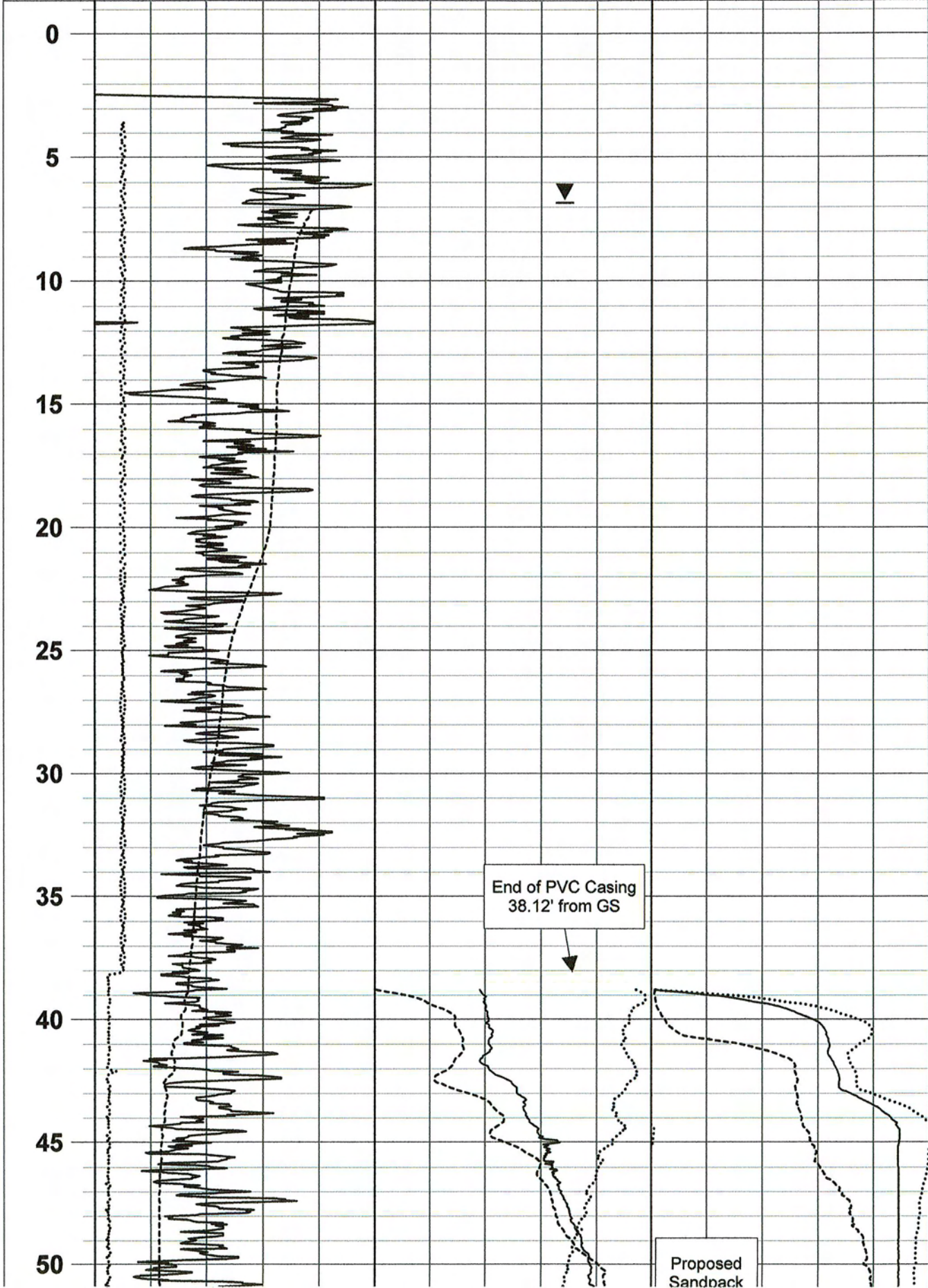


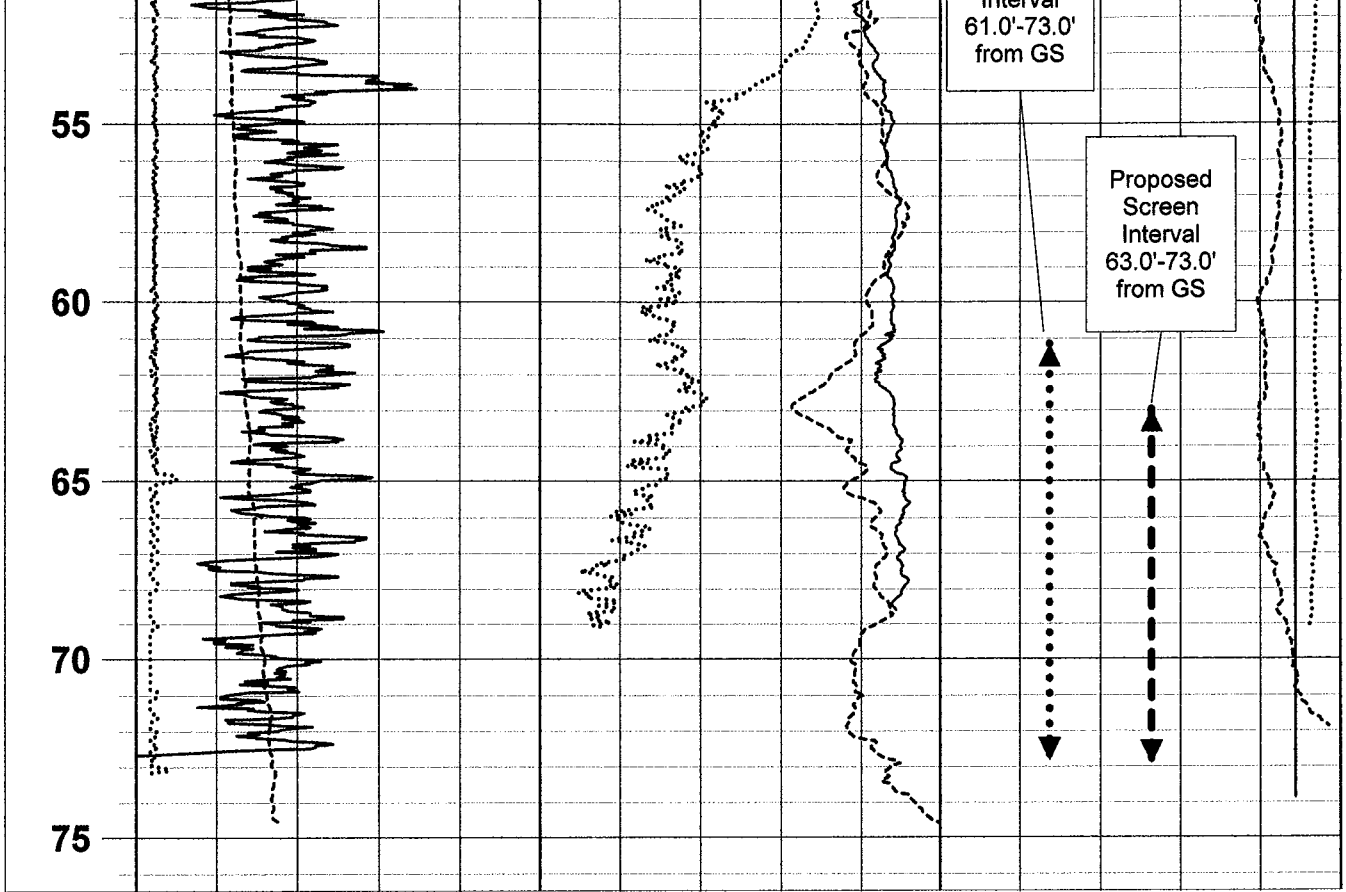


| | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------|--------------------------------------|----------------------------------|--|
| Well: | | RIPZ2 | | Log: PZ2-C | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/17/06 | | | Time: See notes | | |
| System Configuration: Century 9041, 9065 | | | | | |
| Water Level: 6.79' | | Measured From: GS @ ~ 11:50 | | | |
| Outer Casing Height AGL (with cap open/removed): 1.88' Type: PVC | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: see notes | | Measured from: GS | | Log Speed: see notes | |
| Log Top: 2.5' | | Log Bottom: 74.6' | | Reference Point: GS | |
| Analysis Software: WellCAD | | Smoothing Points: natural gamma = 9 | | | |
| Operator: JRJ | | Witness: None | | Other Tools Used: Idronaut, 2EMA | |
| Well Diameter: 4" | | Well Depth: 74.97' | | Referenced From: GS | |
| Casing Material: PVC | | | Non-Cased Interval: 38.12' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.887718°N | | | Longitude: -81.070799°W | | |
| Notes: Caliper logged up @ 12:05; speed 17 fpm. 9041 logged up at 12:36; speed 17 fpm. GS references converted from a casing height 1.88' (org. ref. pt.) GPS values; NAD83 | | | | | |
|  | | | | | |



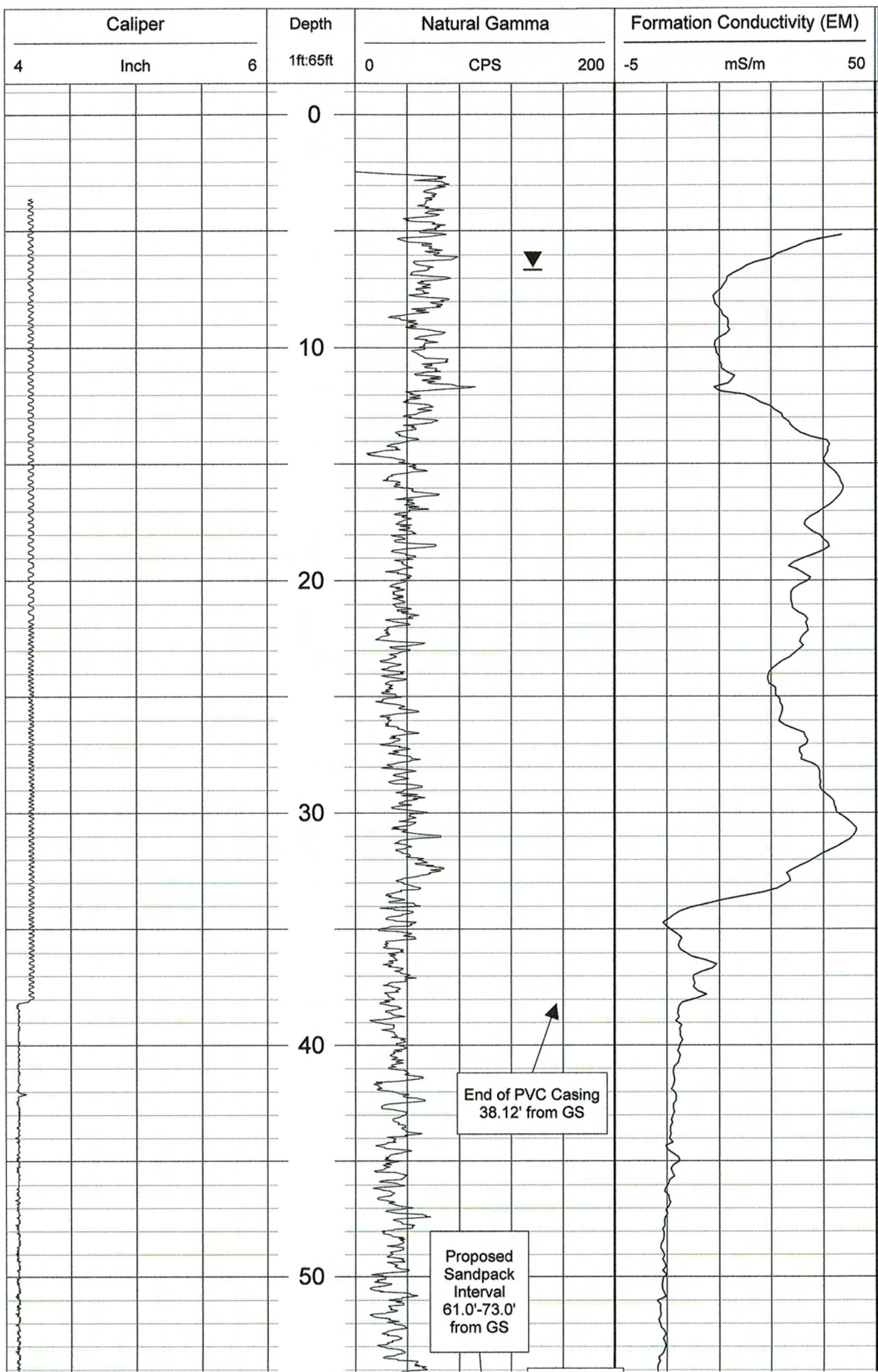
| Depth | Natural Gamma | | Fluid Resistivity | | | Normal Resistivity (16") | | |
|----------|---------------|-------|-------------------------|------|-------|--------------------------|-----|-------|
| | 0 | CPS | 80 | 45 | OHM-M | 47 | 90 | OHM-M |
| 1ft:65ft | Temperature | | Single Point Resistance | | | Normal Resistivity (64") | | |
| | 60 | Deg F | 64 | 3385 | OHM | 8160 | 30 | OHM-M |
| | Caliper | | Spontaneous Potential | | | Computed Lateral | | |
| | 4 | Inch | 6 | 190 | MV | 270 | 110 | OHM-M |

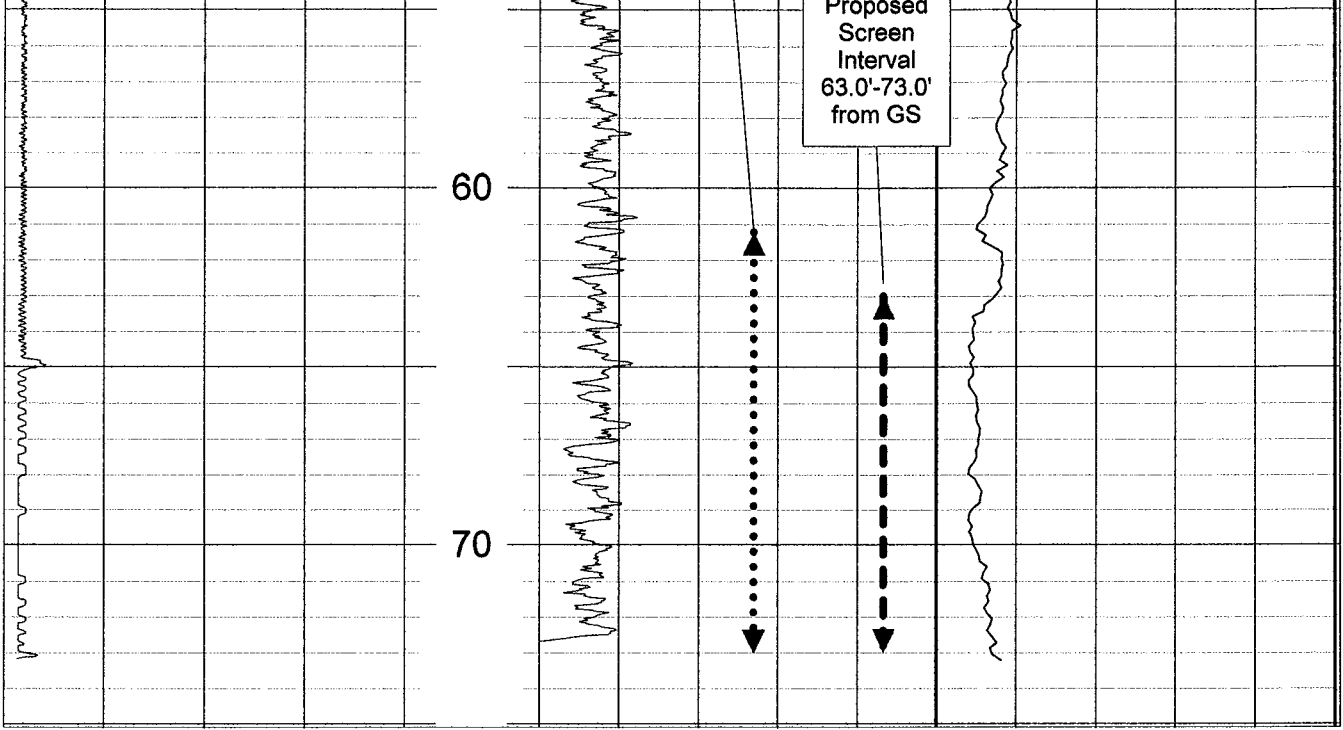




| | | |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| Well: | RIPZ2 | Log: PZ2-D |
| Site: | PSC | |
| City/State: Rock Hill, South Carolina | | |
| Date: 12/17/06 | Time: See notes | |
| System Configuration: Century 9041 (N. gamma only), 9065, Mt. Sopris 2EMA | | |
| Water Level: 6.79' | Measured From: GS @ ~ 11:50 | |
| Outer Casing Height AGL (with cap open/removed): 1.88' Type: PVC | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | Casing Type: N/A | |
| Log Direction: see notes | Measured from: GS | Log Speed: see notes |
| Log Top: 2.5' | Log Bottom: 73.2' | Reference Point: GS |
| Analysis Software: WellCAD | Smoothing Points: See notes | |
| Operator: JRU | Witness: None | Other Tools Used: Idronaut |
| Well Diameter: 4" | Well Depth: 74.97' | Referenced From: GS |
| Casing Material: PVC | Non-Cased Interval: 38.12' to bottom | |
| Screen Interval: None | Screen Type: N/A | |
| Latitude: 34.887718°N | Longitude: -81.070799°W | |
| Notes: | Caliper logged up @ 12:05; speed 17 fpm. 2EMA logged up @ 13:21; speed 13.5 fpm. Natural gamma logged down @ 12:36; speed 17 fpm. 2EMA stabilized after 16 minutes. GS references converted from a casing height 1.88' (org. ref. pt.) GPS values; NAD83 | |







PSC Site
December 13 -18, 2006
Rock Hill, South Carolina

Geophysical Logs

Well Logs for W1

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log W1 – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log W1 – B

Formation conductivity – mS/m

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool (2.5" diameter)
Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity – Ohm/M
Computed lateral resistivity – Ohm/M

Century 9060 tool (1.4" diameter)
Natural gamma – cps

Century 9065 tool
Caliper, 3-arm - inches

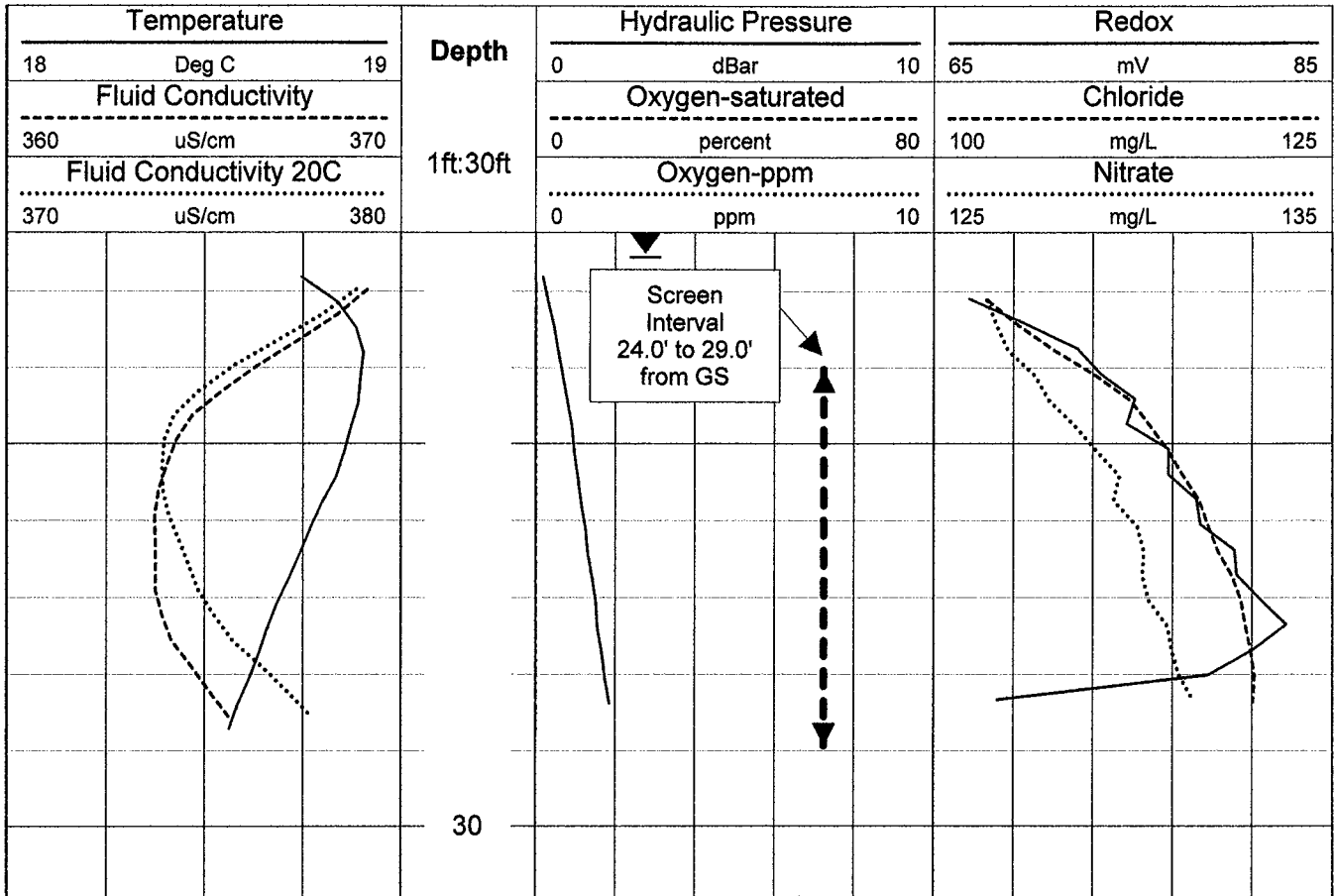
Mount Sopris 2IDA tool – ammonia configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L (option sensor)

Mount Sopris 2IDA tool – nitrate configuration
Temperature – degrees Centigrade
Fluid conductivity – $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L (option sensor)

Mount Sopris 2EMA-1000 tool
Formation conductivity – mS/m

| | | |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Well: | W1 | Log: W1-A |
| Site: | PSC | |
| City/State: Rock Hill, South Carolina | | |
| Date: 12/16/06 | Time: 11:07 | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | |
| Water Level: 22.57' | Measured From: GS @ ~ 11:00 | |
| Outer Casing Height AGL (with cap open/removed): 2.77' Type: Steel | | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.24 | Casing Type: PVC | |
| Log Direction: Down | Measured from: GS | Log Speed: 12.8 fpm |
| Log Top: 22.87' | Log Bottom: 28.77' | Reference Point: GS |
| Analysis Software: WellCAD | Smoothing Points: see notes | |
| Operator: JRU | Witness: None | Other Tools Used: 2EMA |
| Well Diameter: 4" | Well Depth: 29.32' | Referenced From: GS |
| Casing Material: PVC | Non-Cased Interval: N/A | |
| Screen Interval: 24.0' to 29.0'; GS | Screen Type: Unknown | |
| Latitude: 34.88917554° N | Longitude: -81.07304471° W | |
| Notes: | Power lines over head. GPS values; NAD83 This log was the first traverse Screen interval data obtained from previous well construction documents. Smoothing; redox = 1; conductivities, nitrate, chloride = 5. GS references converted from a TIC height of 2.53' (org. ref. pt.) | |





| | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------|----------------------------|------------------------|--|
| Well: | | W1 | | Log: W1-B | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 12/16/06 | | | Time: 11:38 | | |
| System Configuration: Mount Sopris 2EMA | | | | | |
| Water Level: 22.57' | | Measured From: GS @ ~ 11:00 | | | |
| Outer Casing Height AGL (with cap open/removed): 2.77' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: -0.24 | | | Casing Type: PVC | | |
| Log Direction: Down | | Measured from: GS | | Log Speed: 16.7 fpm | |
| Log Top: 7.5' | | Log Bottom: 22.37' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: 2 | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2IDA | |
| Well Diameter: 4" | | Well Depth: 29.32' | | Referenced From: GS | |
| Casing Material: PVC | | | Non-Cased Interval: N/A | | |
| Screen Interval: 24.0' to 29.0'; GS | | | Screen Type: Unknown | | |
| Latitude: 34.88917554° N | | | Longitude: -81.07304471° W | | |
| Notes: Screen interval data obtained from previous well construction documents. Power lines over head. GPS values; NAD83 2EMA stabilized after 18 minutes. 2EMA logged down since up traverse was not started at the bottom. GS references converted from a TIC height of 2.53' (org. ref. pt.) | | | | | |



Well W1

Depth

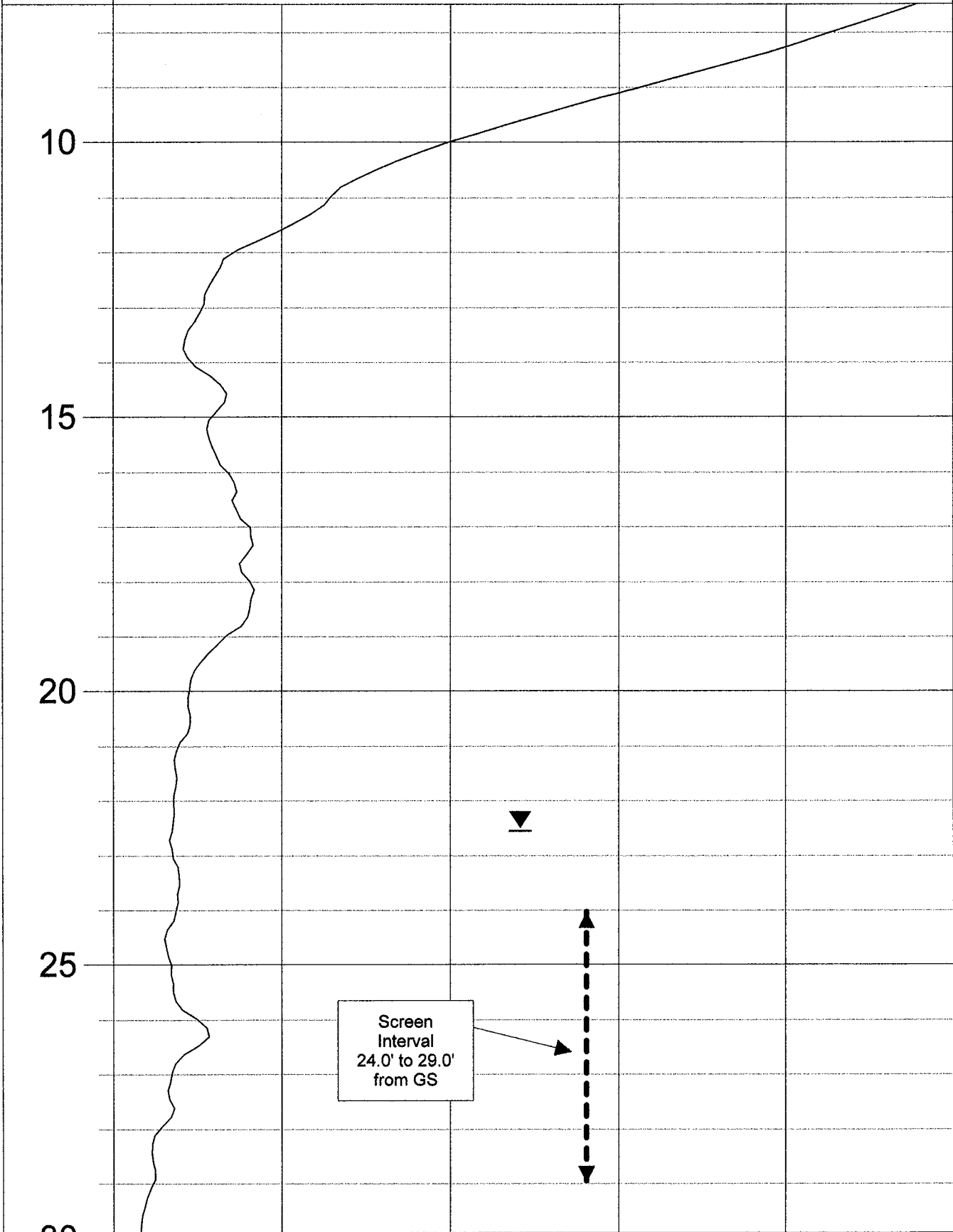
Formation Conductivity - (EM)

1ft:30ft

35

mS/m

90



Screen Interval
24.0' to 29.0'
from GS

PSC Site
August 22 – 28, 2007
Rock Hill, South Carolina

Geophysical Logs

Well Logs for RIMW 20

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log 20 – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L

Log 20 – B

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log 20 - C

Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity - Ohm/M
Computed lateral resistivity – Ohm/M
Caliper – inches

Log 20 - D

Natural gamma – cps
Caliper, 3-arm - inches
Formation conductivity – mS/m
Optical televiewer – color digital image

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool

- Temperature – degrees Fahrenheit
- Natural gamma – cps
- Spontaneous potential - mV
- Fluid resistivity – Ohm/M
- Single point resistivity - Ohm
- 16 inch normal resistivity – Ohm/M
- 24 inch normal resistivity – Ohm/M
- Computed lateral resistivity – Ohm/M

Century 9065 tool

- Caliper, 3-arm - inches

Mount Sopris 2IDA tool – ammonia configuration

- Temperature – degrees Centigrade
- Fluid conductivity – $\mu\text{S}/\text{cm}$
- Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
- Hydraulic pressure - dBar
- Oxygen – saturated - percent
- Oxygen – ppm
- Redox - mV
- Chloride – mg/L
- Ammonia – mg/L (option sensor)

Mount Sopris 2IDA tool – nitrate configuration


- Temperature – degrees Centigrade
- Fluid conductivity – $\mu\text{S}/\text{cm}$
- Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
- Hydraulic pressure - dBar
- Oxygen – saturated - percent
- Oxygen – ppm
- Redox - mV
- Chloride – mg/L
- Nitrate – mg/L (option sensor)

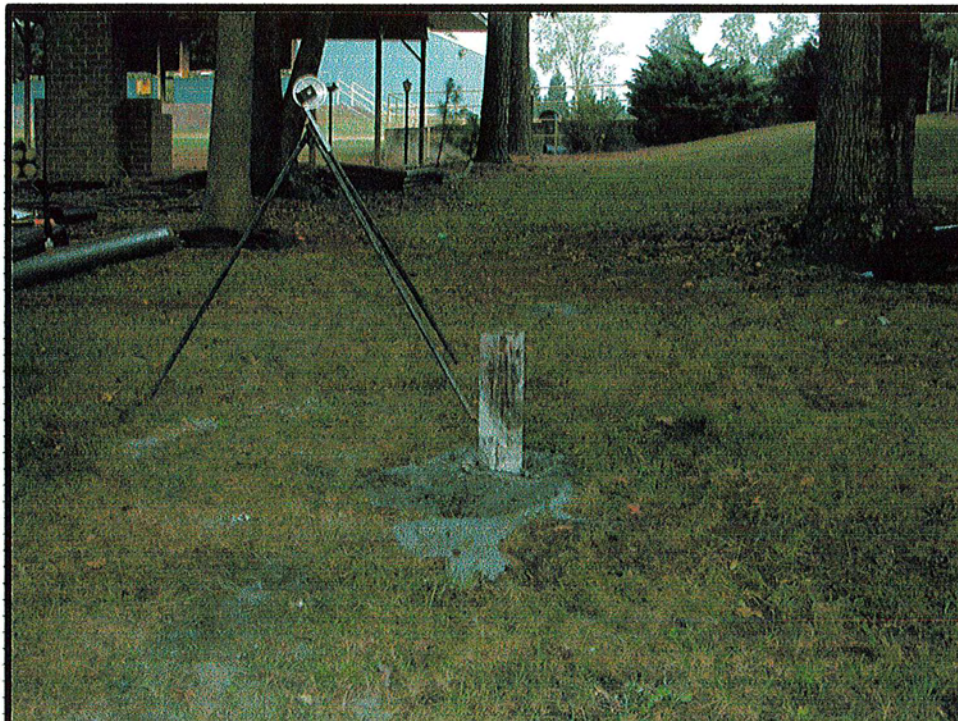
Mount Sopris 2EMA-1000 tool

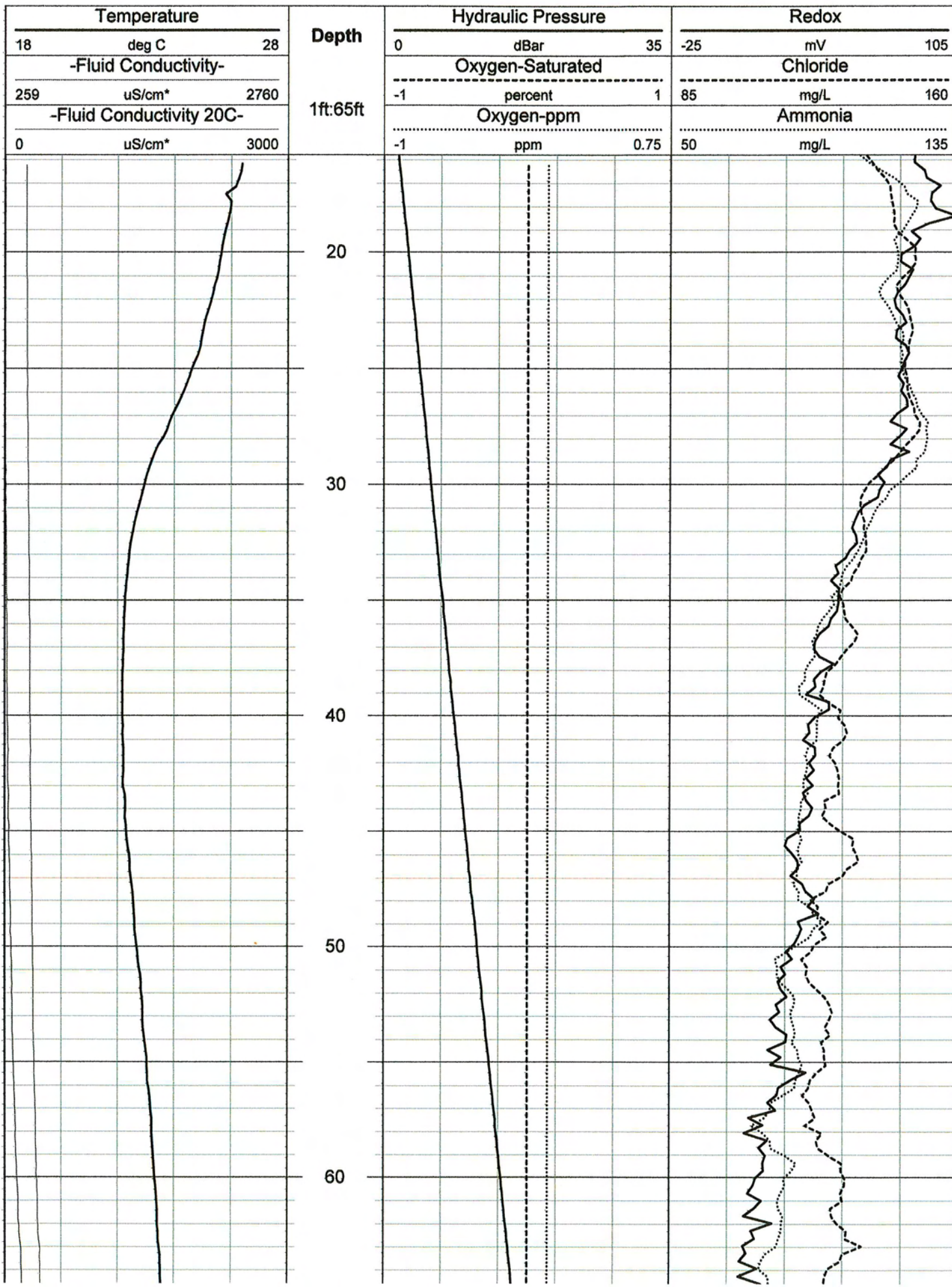
- Formation conductivity – mS/m

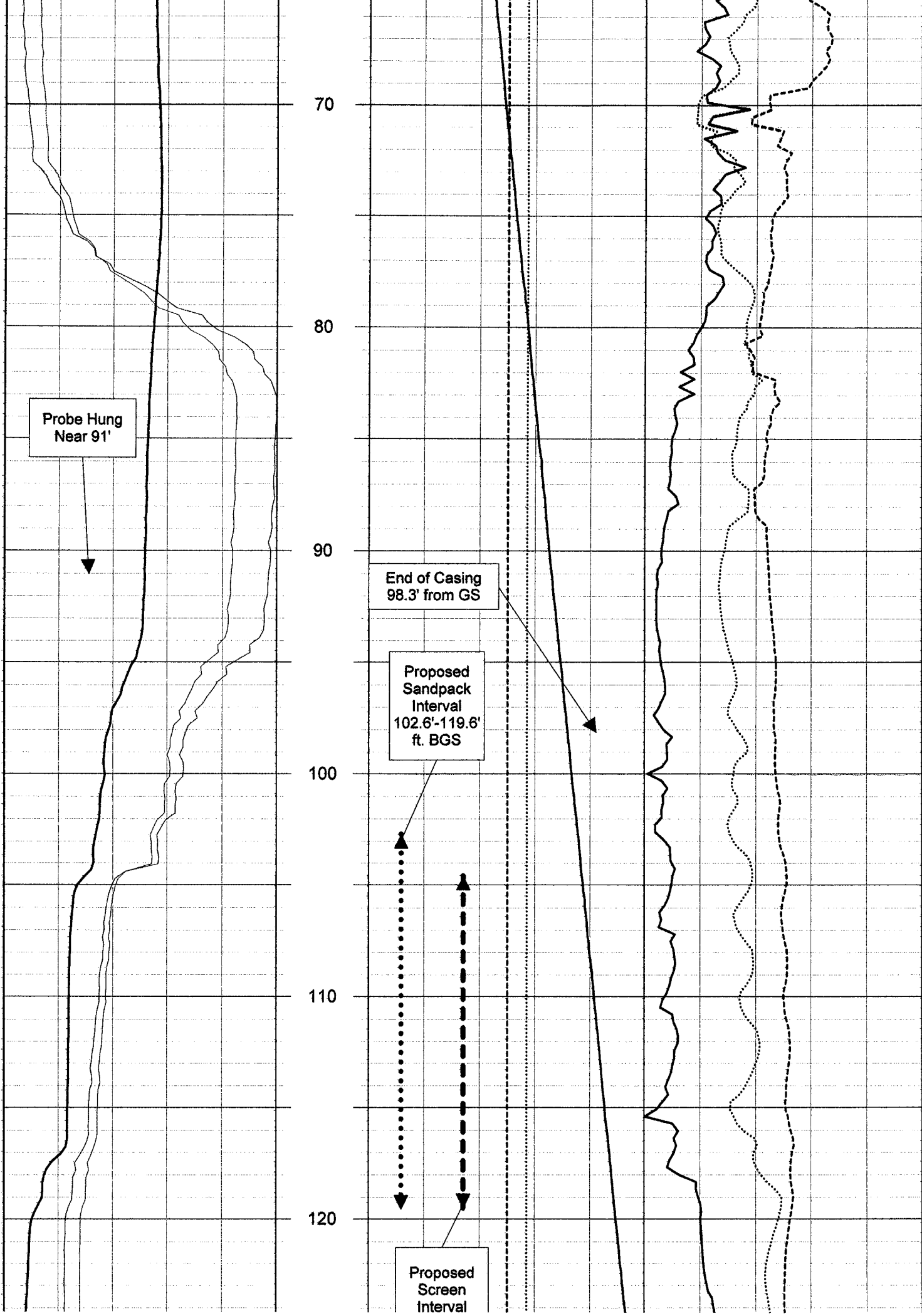
Mount Sopris ALT OBI-40-2 Tool


- Optical televiewer – color digital image

| | | | | | |
|-------------------------------------------------------------------------------------|--|--------------------------------------|-------------------------------------|--------------------------------------|--|
| Well: | | RIMW 20 | | Log: 20-A | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/24/07 | | | Time: 09:30 | | |
| System Configuration: Mount Sopris 2IDA with ammonia option | | | | | |
| Water Level: 9.47' | | Measured From: GS at ~ 07:40 on 8/24 | | | |
| Outer Casing Height AGL (with cap open/removed): 1.62' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: down | | Measured from: Ground Surface | | Log Speed: 16 fpm | |
| Log Top: 15.9' | | Log Bottom: 128.1' | | Reference Point: GS | |
| Analysis Software: WellCAD | | Smoothing Points: Redox = 1 | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; 9041&65; OTV | |
| Well Diameter: 6" | | Well Depth: 128.15' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 98.3' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88959760° N | | | Longitude: -81.07119817° W | | |
| Notes: GPS values; NAD83 | | | | | |
| * fluid conductivity data collected at mS/cm but displayed at uS/cm | | | | | |
|  | | | | | |



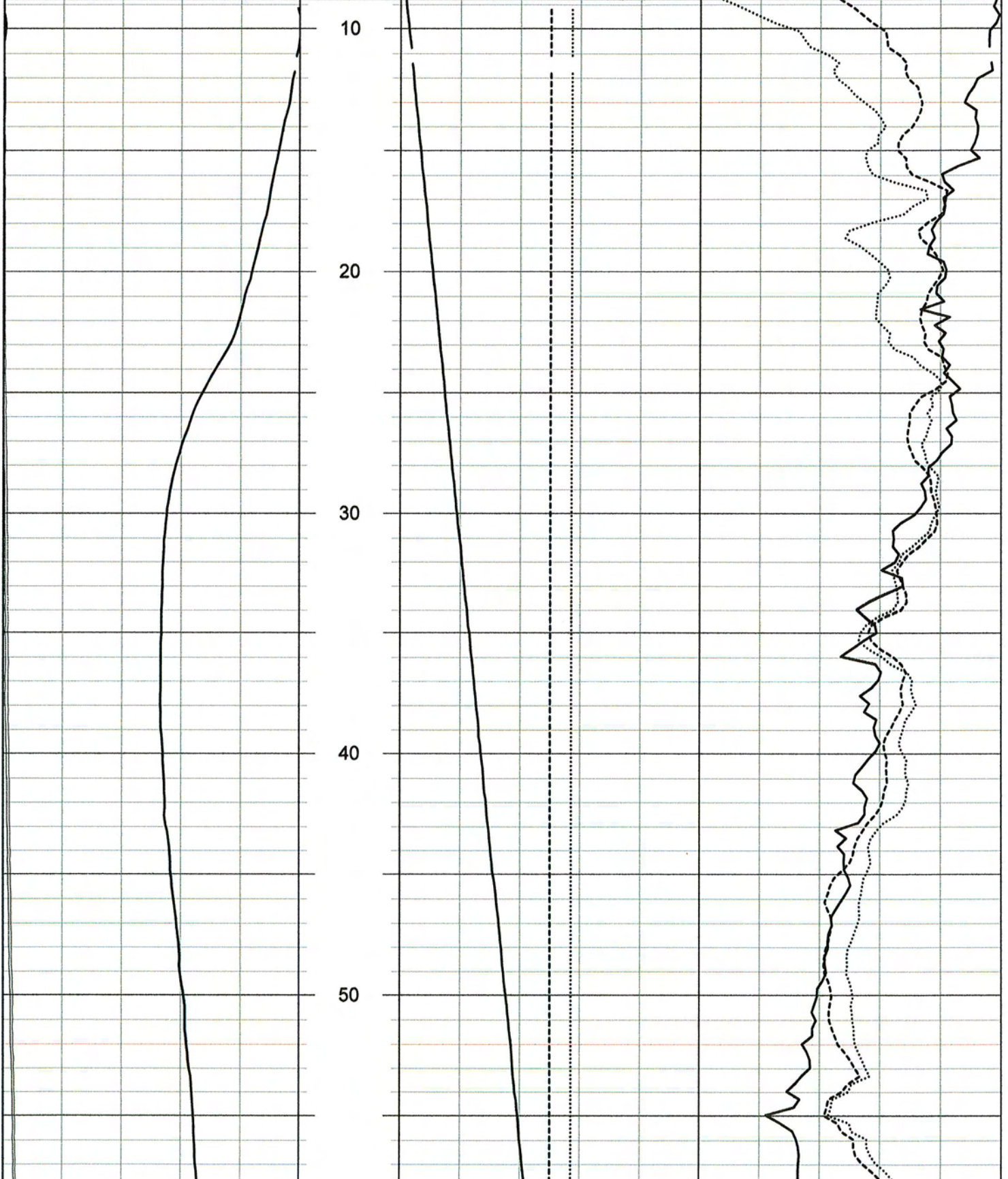


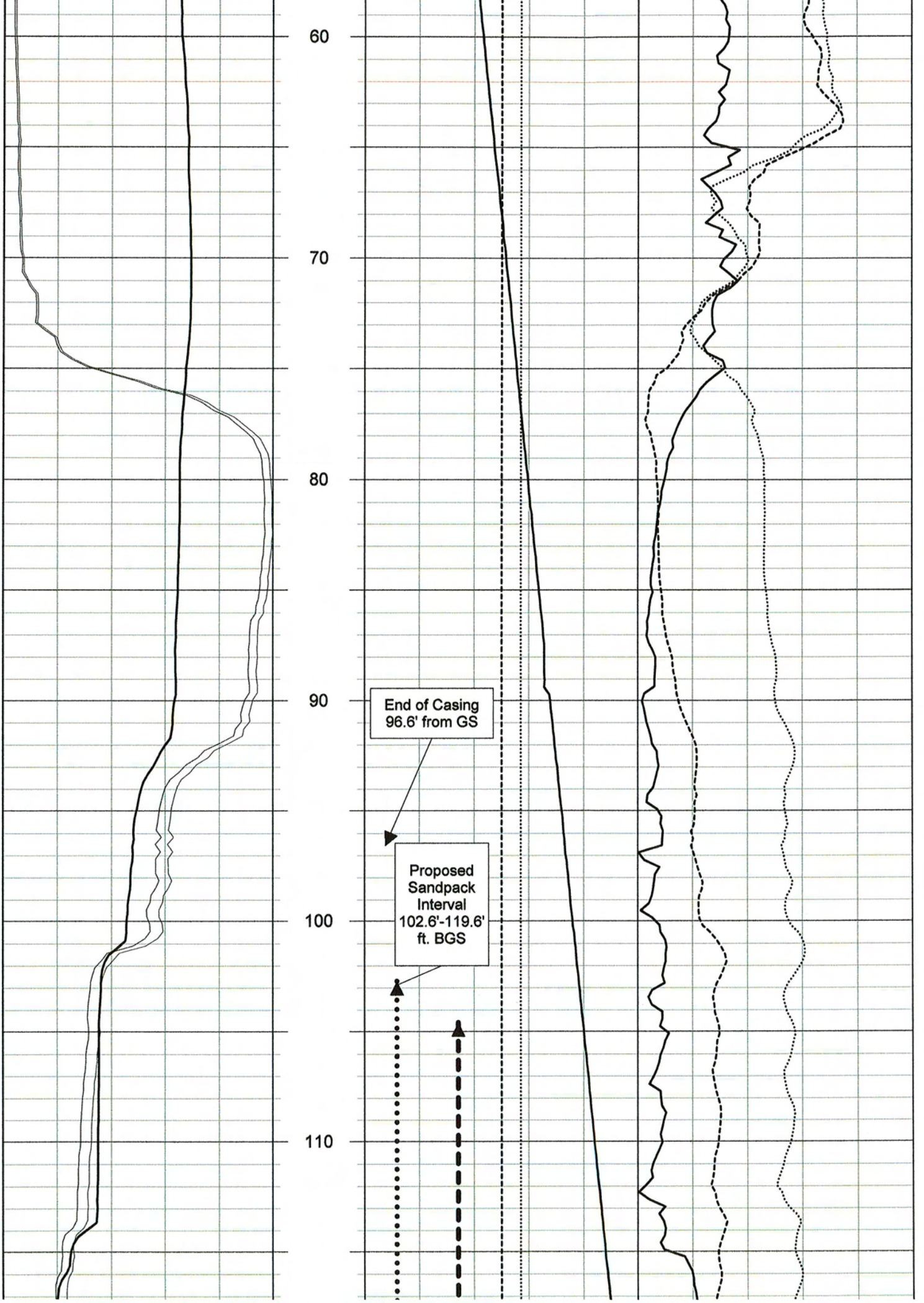


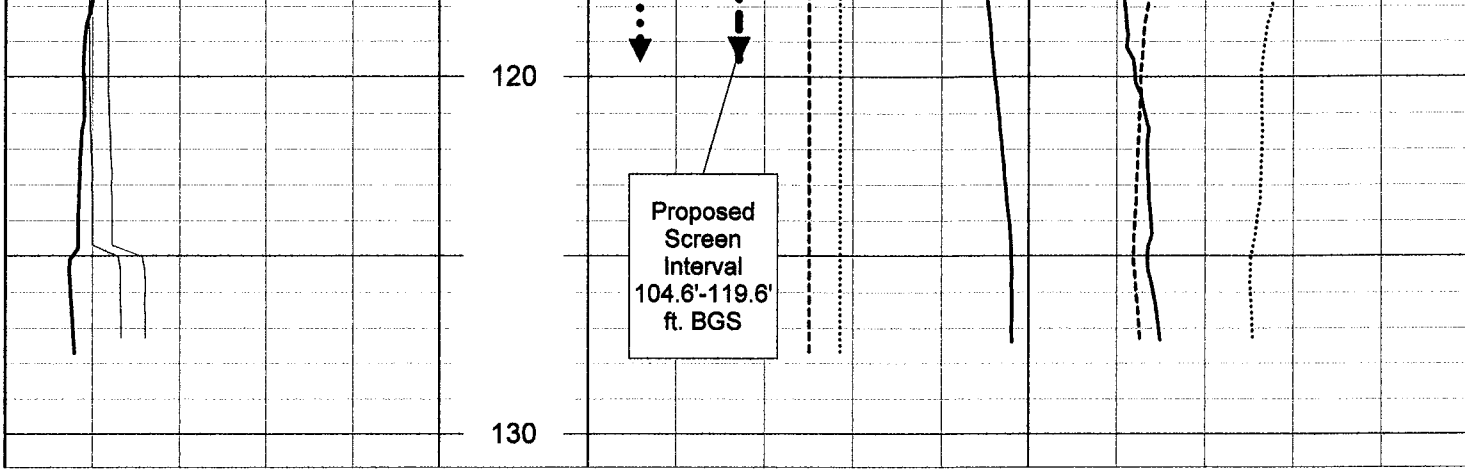
| | | | | | |
|-------------------------------------------------------------------------------------|--|------------------------------------------|-------------------------------------|--------------------------------------|--|
| Well: | | RIMW 20 | | Log: 20-B | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/24/07 | | | Time: 08:20 | | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | | | | |
| Water Level: 9.47' | | Measured From: GS at ~ 07:40 on 8/24 | | | |
| Outer Casing Height AGL (with cap open/removed): 1.62' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: down | | Measured from: Ground Surface | | Log Speed: 15 fpm | |
| Log Top: 8.8' | | Log Bottom: 127.8 | | Reference Point: GS | |
| Analysis Software: WellCAD | | Smoothing Points: Redox = 1; Cl, NO3 = 5 | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; 9041&65; OTV | |
| Well Diameter: 6" | | Well Depth: 128.15' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 98.3' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88959760° N | | | Longitude: -81.07119817° W | | |
| Notes: GPS values; NAD83 | | | | | |
| * fluid conductivity data collected at mS/cm but displayed at uS/cm | | | | | |
|  | | | | | |



| Temperature | | | Depth | Hydraulic Pressure | | | Redox | | |
|--------------------------|--------|------|------------|--------------------|---------|---------|----------|------|-----|
| 17 | Deg C | 27 | | 0 | dBar | 35 | -25 | mV | 100 |
| -Fluid Conductivity- | | | | Oxygen-Saturated | | | Chloride | | |
| 260 | uS/cm* | 3000 | | -1 | percent | 1 | 95 | mg/L | 140 |
| -Fluid Conductivity 20C- | | | Oxygen-ppm | | | Nitrate | | | |
| 225 | uS/cm* | 2700 | -1 | ppm | 0.75 | 130 | mg/L | 200 | |



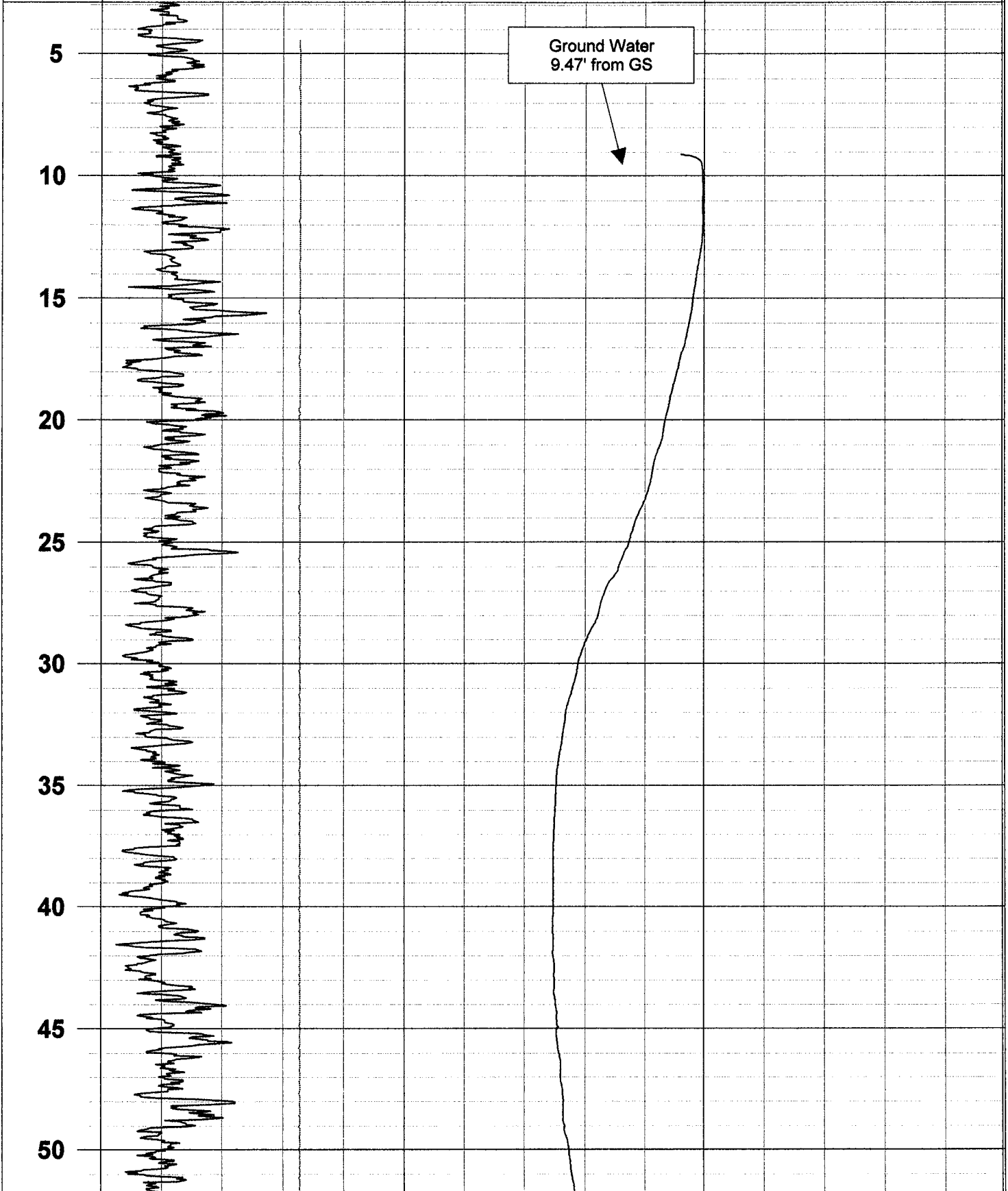




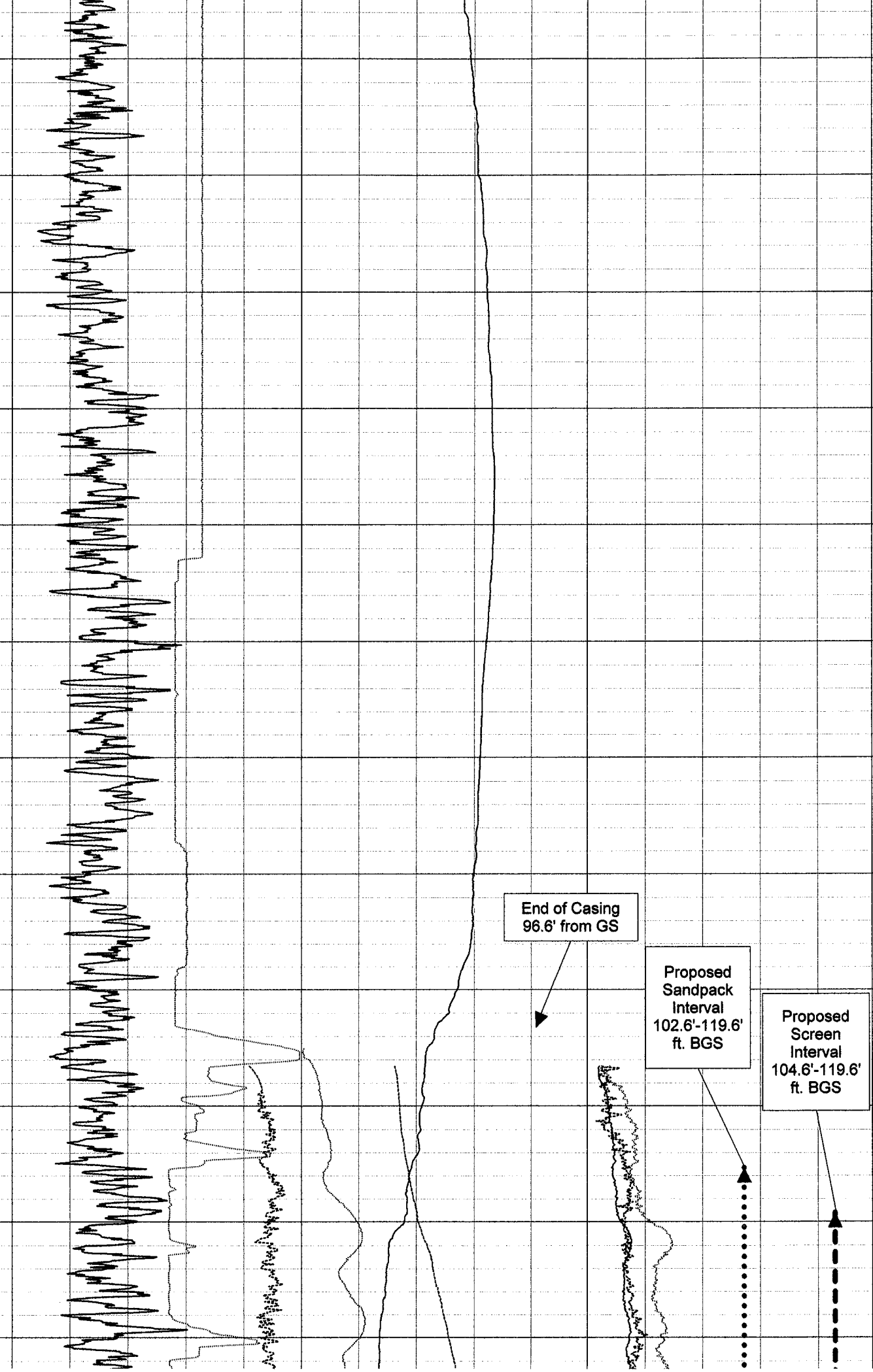
| | | | | | |
|--------------------------------------------------------------------|--|--------------------------------------|--------------------------------------|-----------------------------|--|
| Well: | | RIMW 20 | | Log: 20-C | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/24/07 | | | Time: See Notes | | |
| System Configuration: Century 9041 & 9065 | | | | | |
| Water Level: 9.47' | | Measured From: GS at ~ 07:40 on 8/24 | | | |
| Outer Casing Height AGL (with cap open/removed): 1.62' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: down | | Measured from: Ground Surface | | Log Speed: see notes | |
| Log Top: 2.9' | | Log Bottom: 127.6' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: Natural gamma = 11 | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; OBI | |
| Well Diameter: 6" | | Well Depth: 128.15' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 98.3' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88959760° N | | | Longitude: -81.07119817° W | | |
| Notes: GPS values; NAD83 | | | | | |
| Caliper logged up at 09:45 on 8/24; speed 16 fpm | | | | | |
| 9041 logged down at 10:45 on 8/24; speed 16 fpm | | | | | |



| Depth | Natural Gamma | | Temperature | | 16" Normal Resistivity | |
|----------|-----------------------|-----|--------------------------|------|------------------------|-----|
| | 0 | 90 | 65 | 80 | -10 | 245 |
| 1ft:65ft | Spontaneous Potential | | Fluid Resistivity | | 64" Normal Resistivity | |
| | 0 | 410 | 0 | 15 | -10 | 150 |
| | Caliper | | Single Point Resistivity | | Computed Lateral | |
| | 0 | 10 | -415 | 2120 | -10 | 140 |
| | | | | | | |



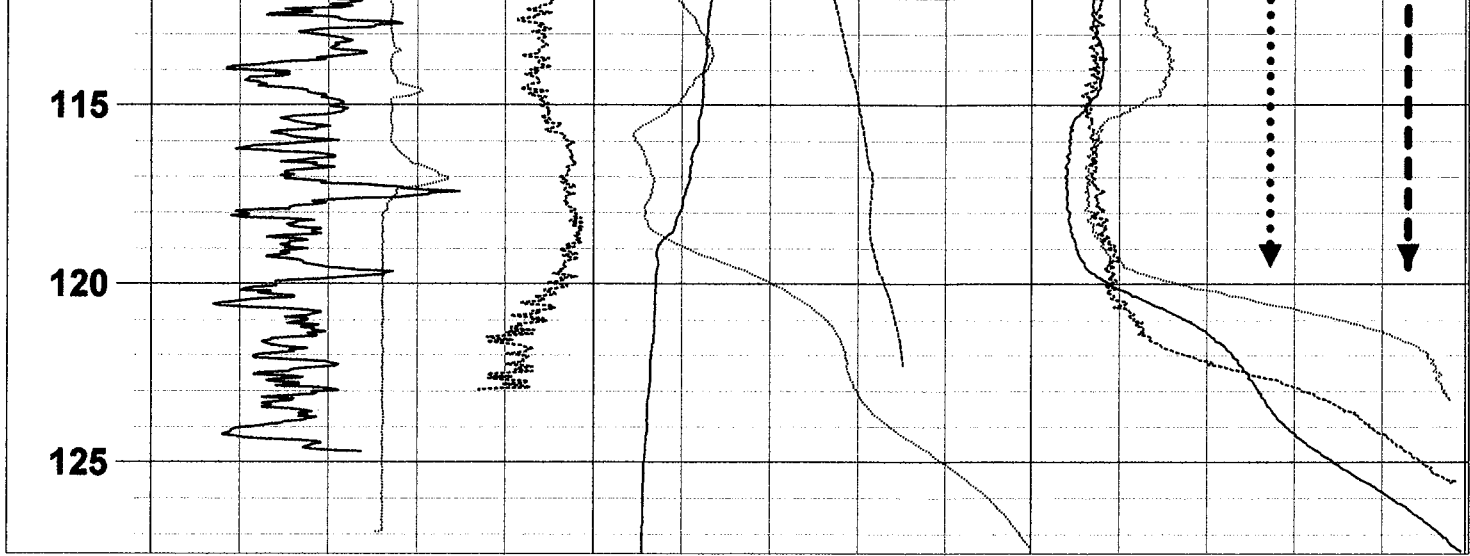
55
60
65
70
75
80
85
90
95
100
105
110



End of Casing
96.6' from GS

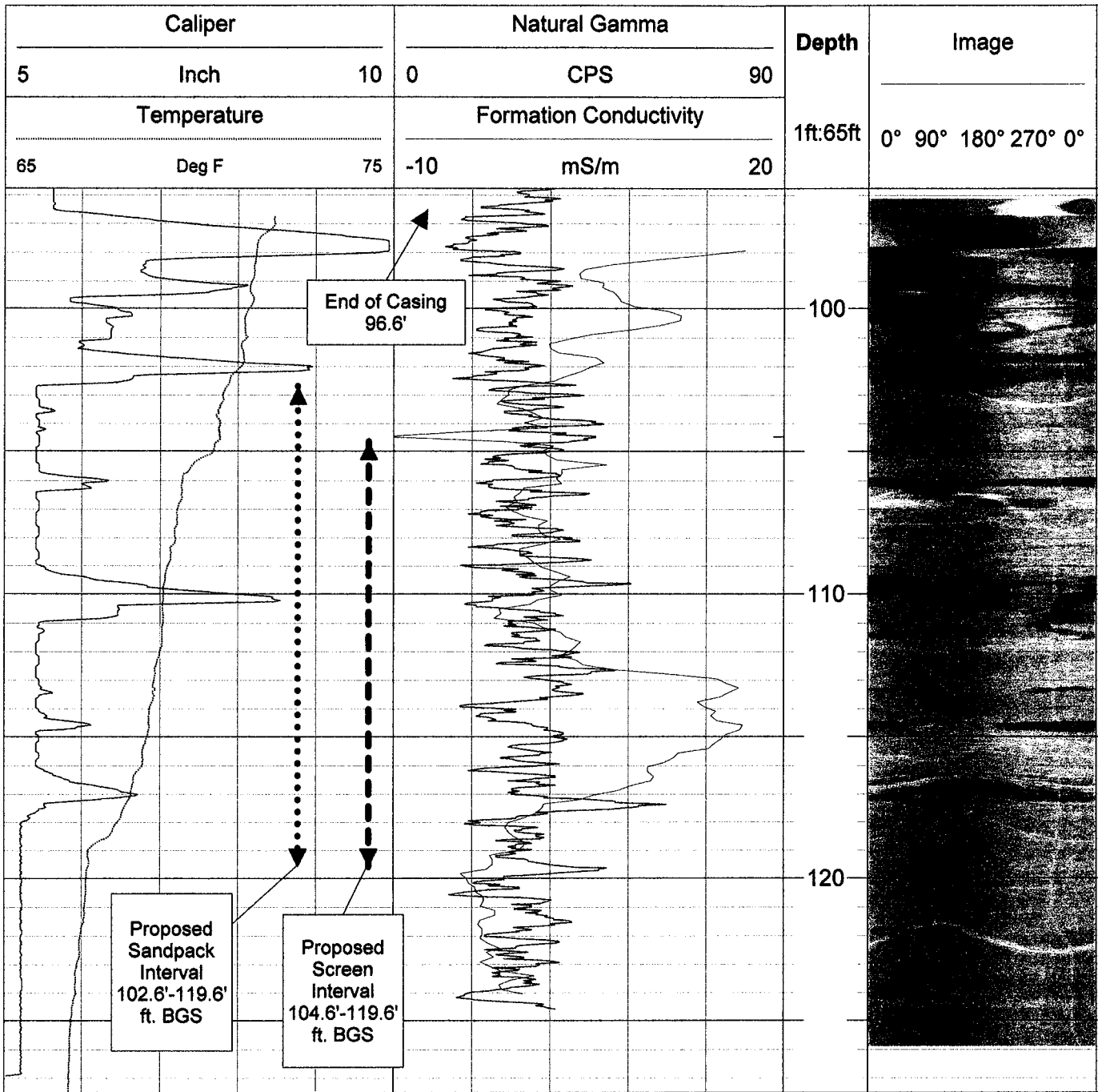
Proposed
Sandpack
Interval
102.6'-119.6'
ft. BGS

Proposed
Screen
Interval
104.6'-119.6'
ft. BGS



| | | | | | |
|--------------------------------------------------------------------|--|--------------------------------------|-------------------------------------|------------------------|--|
| Well: | | RIMW 20 | | Log: 20-D | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/24 & 28/07 | | | Time: See notes | | |
| System Configuration: Century & Mount Sopris | | | | | |
| Water Level: 9.47' | | Measured From: GS at ~ 07:40 on 8/24 | | | |
| Outer Casing Height AGL (with cap open/removed): 1.62' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: down | | Measured from: Ground Surface | | Log Speed: see notes | |
| Log Top: 95.8' | | Log Bottom: 127.0 | | Reference Point: GS | |
| Analysis Software: WellCAD | | Smoothing Points: Natural gamma = 11 | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2IDA | |
| Well Diameter: 6" | | Well Depth: 128.15' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 98.3' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88959760° N | | | Longitude: -81.07119817° W | | |
| Notes: GPS values; NAD83 | | | | | |
| Formation conductivity logged up at 08:45 on 8/24; speed 15 fpm | | | | | |
| Caliper logged up at 09:45 on 8/24; speed 16 fpm | | | | | |
| 9041 logged down at 10:45 on 8/24; speed 16 fpm | | | | | |
| Optical televiewer logged down at 12:30 on 8/28; speed 2.1 fpm | | | | | |





PSC Site
August 22 – 28, 2007
Rock Hill, South Carolina

Geophysical Logs

Well Logs for RIMW 21

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log 21 – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L

Log 21 – B

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log 21 - C

Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity - Ohm/M
Computed lateral resistivity – Ohm/M
Caliper – inches

Log 21 - D

Natural gamma – cps
Caliper, 3-arm - inches
Formation conductivity – mS/m
Optical televiewer – color digital image

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool

- Temperature – degrees Fahrenheit
- Natural gamma – cps
- Spontaneous potential - mV
- Fluid resistivity – Ohm/M
- Single point resistivity - Ohm
- 16 inch normal resistivity – Ohm/M
- 24 inch normal resistivity – Ohm/M
- Computed lateral resistivity – Ohm/M

Century 9065 tool

- Caliper, 3-arm - inches

Mount Sopris 2IDA tool – ammonia configuration

- Temperature – degrees Centigrade
- Fluid conductivity – $\mu\text{S}/\text{cm}$
- Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
- Hydraulic pressure - dBar
- Oxygen – saturated - percent
- Oxygen – ppm
- Redox - mV
- Chloride – mg/L
- Ammonia – mg/L (option sensor)

Mount Sopris 2IDA tool – nitrate configuration


- Temperature – degrees Centigrade
- Fluid conductivity – $\mu\text{S}/\text{cm}$
- Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
- Hydraulic pressure - dBar
- Oxygen – saturated - percent
- Oxygen – ppm
- Redox - mV
- Chloride – mg/L
- Nitrate – mg/L (option sensor)

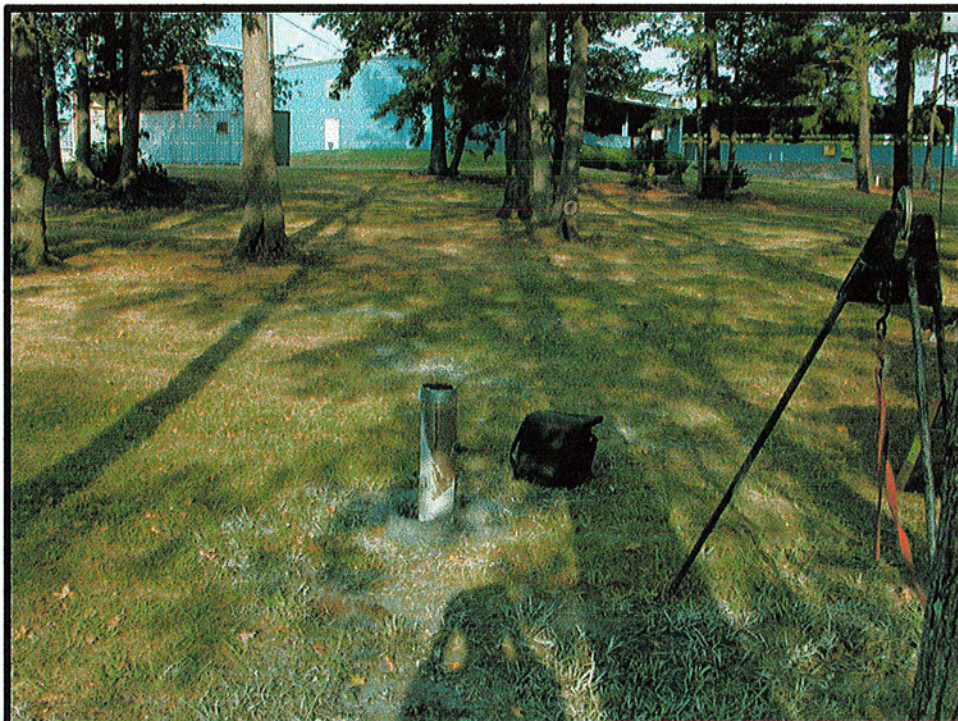
Mount Sopris 2EMA-1000 tool

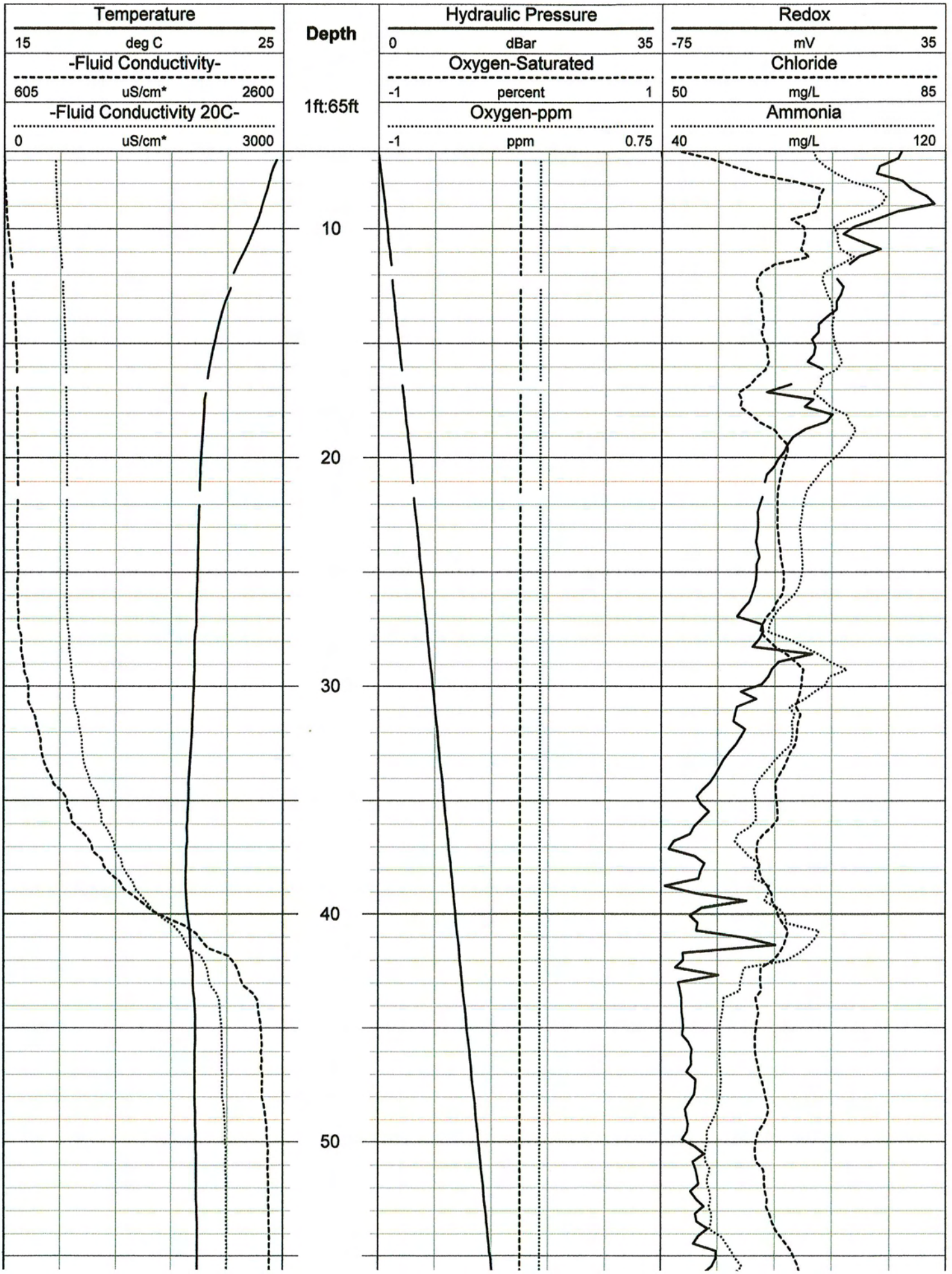
- Formation conductivity – mS/m

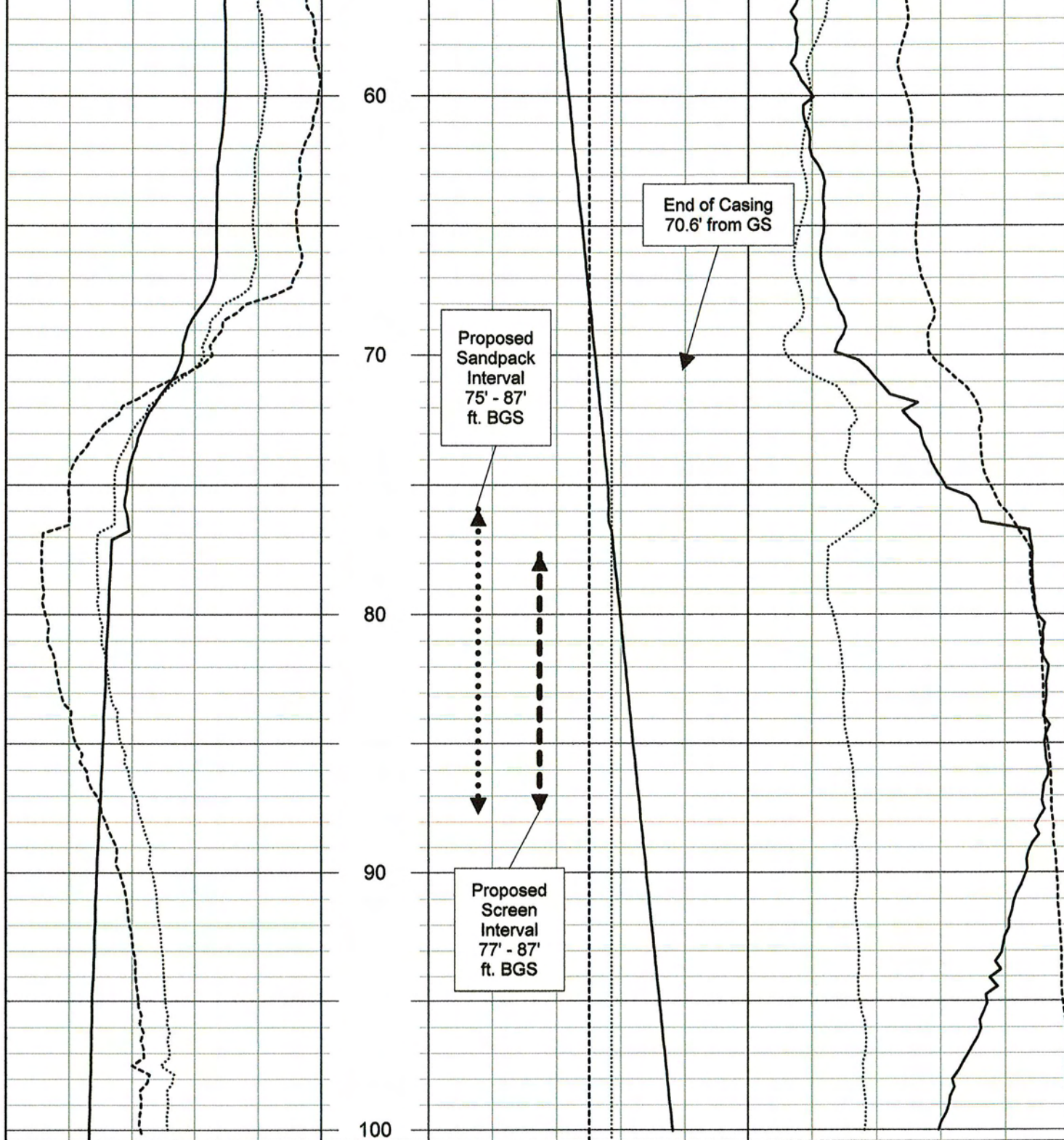
Mount Sopris ALT OBI-40-2 Tool


- Optical televiewer – color digital image

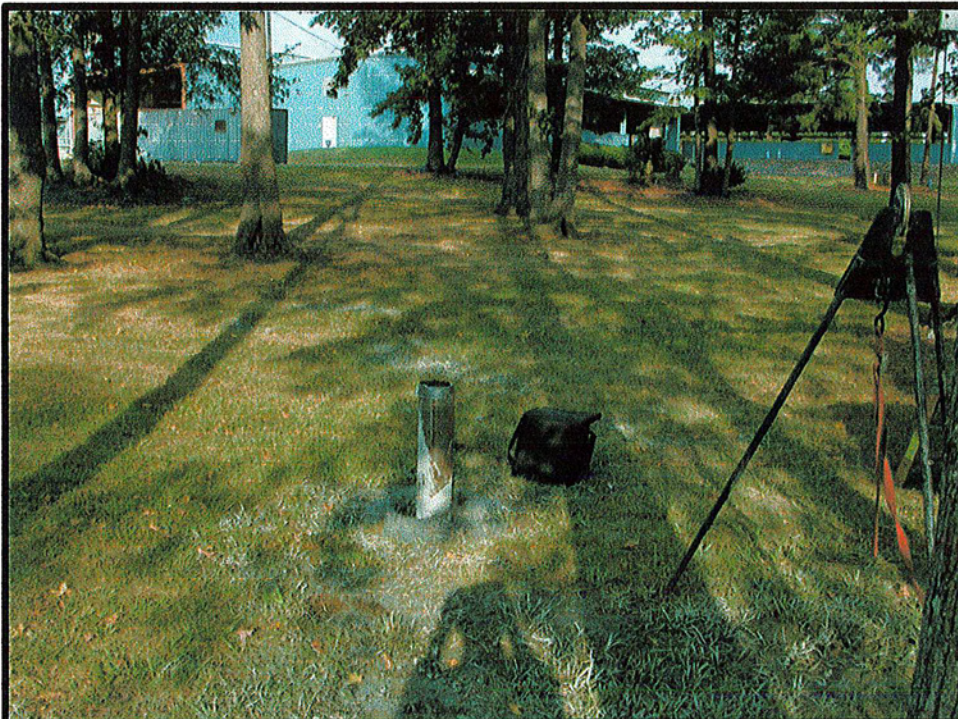
| | | | | | | | |
|-------------------------------------------------------------------------------------|--|------------------------------------------|--|--------------------------------------|--|---------------|--|
| Well: | | RIMW 21 | | Log: | | 21 - A | |
| Site: | | PSC | | | | | |
| City/State: Rock Hill, South Carolina | | | | | | | |
| Date: 8/25/07 | | | | Time: 09:40 | | | |
| System Configuration: Mount Sopris 2IDA with ammonia option | | | | | | | |
| Water Level: 6.35' | | Measured From: GS at ~ 09:40 8/25 | | | | | |
| Outer Casing Height AGL (with cap open/removed): 8.15' Type: Steel | | | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | | Casing Type: N/A | | | |
| Log Direction: down | | Measured from: Ground Surface | | Log Speed: 15.4 fpm | | | |
| Log Top: 7' | | Log Bottom: 100.5' | | Reference Point: GS | | | |
| Analysis Software: WellCAD | | Smoothing Points: Redox = 1; Cl, NH4 = 5 | | | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; 9041&65; OTV | | | |
| Well Diameter: 6" | | Well Depth: 101.14' | | Referenced From: GS | | | |
| Casing Material: Steel | | | | Non-Cased Interval: 70.6' to bottom | | | |
| Screen Interval: None | | | | Screen Type: N/A | | | |
| Latitude: 34.88930735° N | | | | Longitude: -81.07101464° W | | | |
| Notes: GPS values; NAD83 | | | | | | | |
| * fluid conductivity data collected at mS/cm but displayed as uScm | | | | | | | |
|  | | | | | | | |

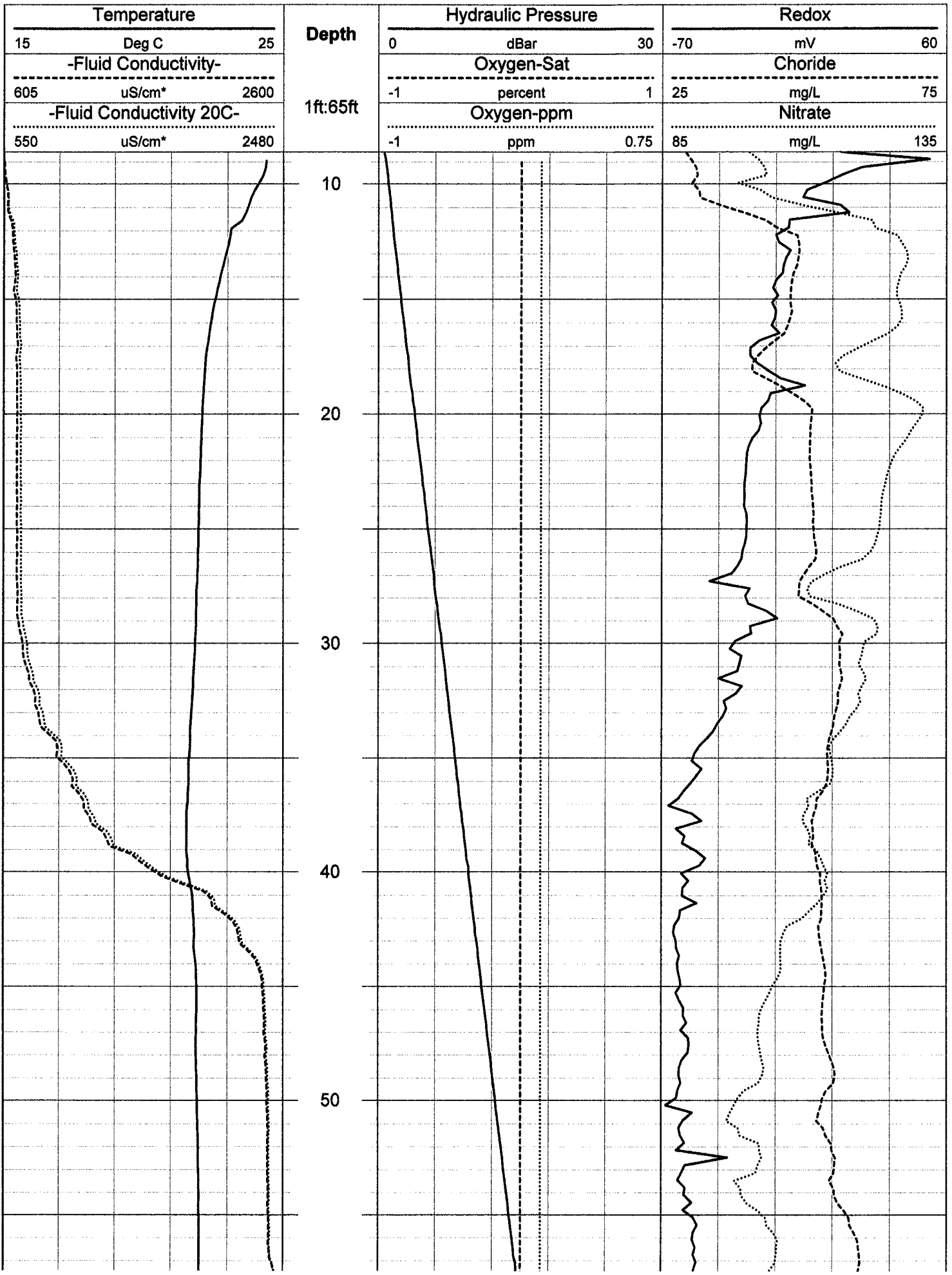


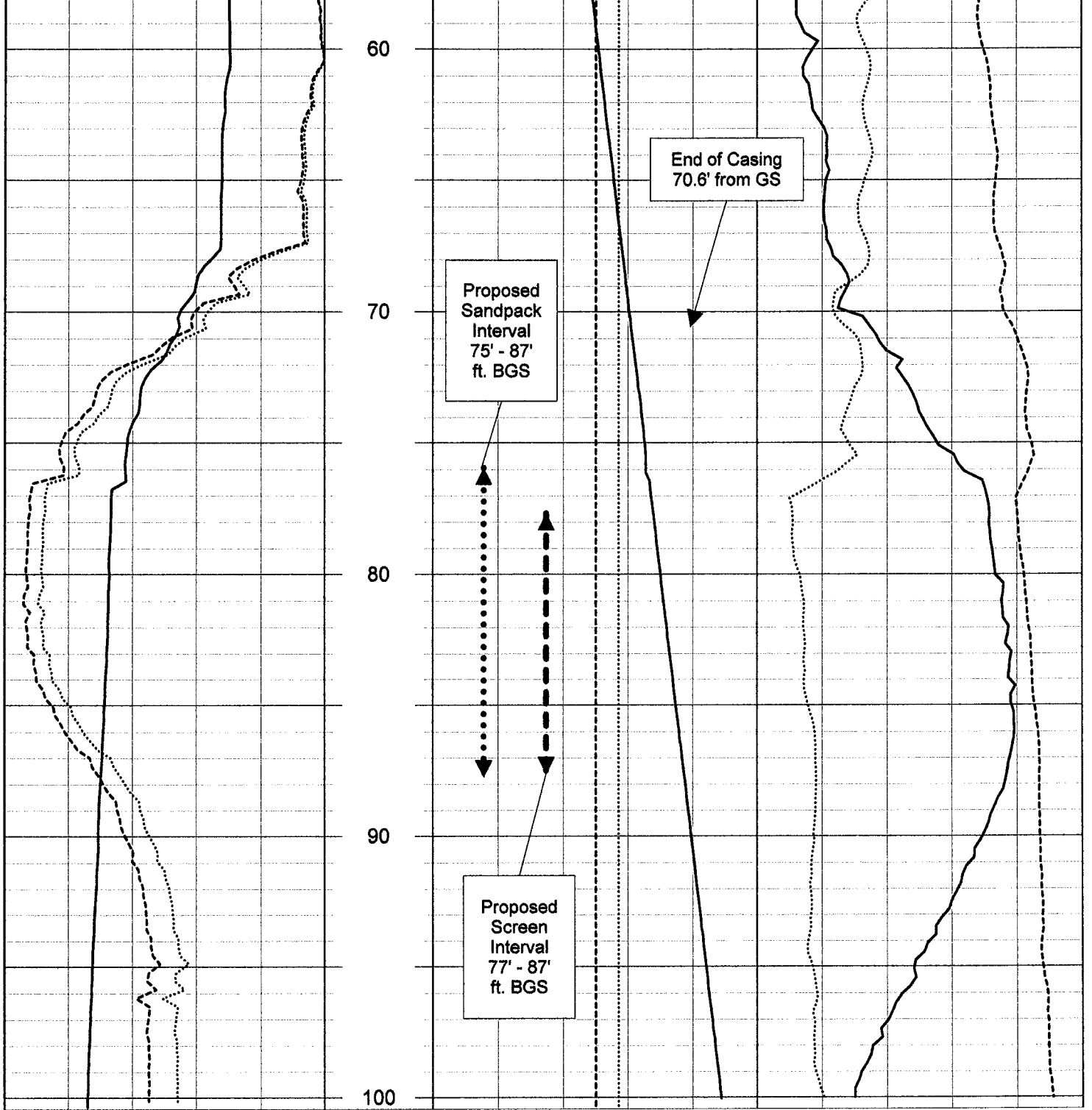




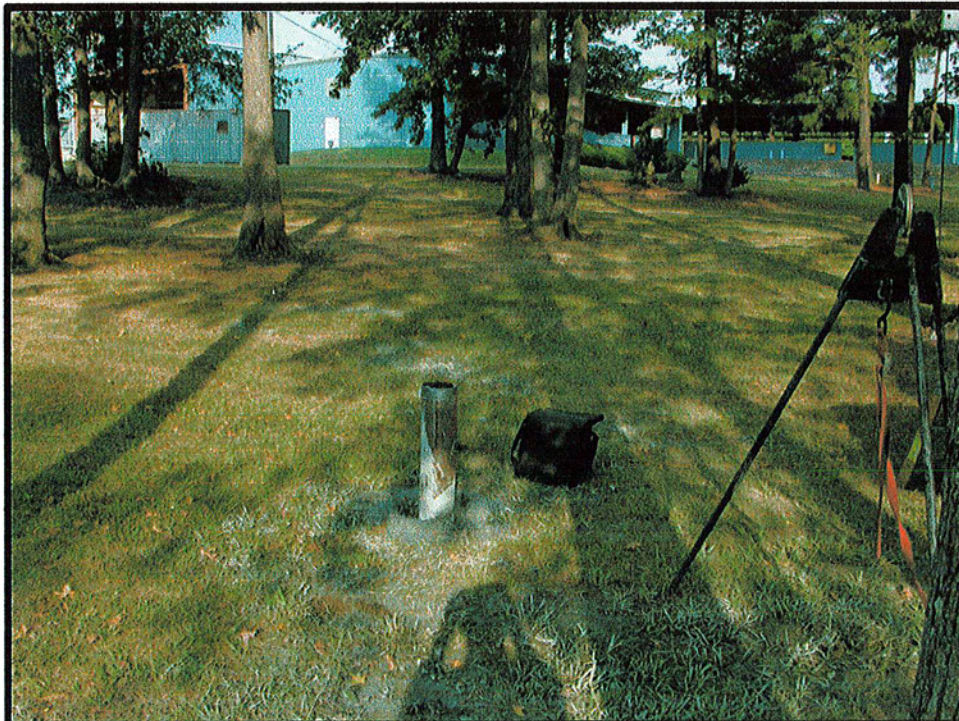
| | | | | | | | |
|--------------------------------------------------------------------------------------------------------|--|---------------------|------------------------------------------|--------------------------------------|---------------------|---------------|--|
| Well: | | RIMW 21 | | Log: | | 21 - B | |
| Site: | | | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | | | |
| Date: 8/25/07 | | | | Time: 09:40 | | | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | | | | | | |
| Water Level: 6.35' | | | Measured From: GS at ~ 09:05 8/25 | | | | |
| Outer Casing Height AGL (with cap open/removed): 8.15' Type: Steel | | | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | | Casing Type: N/A | | | |
| Log Direction: down | | | Measured from: Ground Surface | | Log Speed: 11.5 fpm | | |
| Log Top: 8.6' | | Log Bottom: 100.5' | | Reference Point: GS | | | |
| Analysis Software: WellCAD | | | Smoothing Points: Redox = 1; Cl, NO3 = 5 | | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; 9041&65; OTV | | | |
| Well Diameter: 6" | | Well Depth: 101.14' | | Referenced From: GS | | | |
| Casing Material: Steel | | | | Non-Cased Interval: 70.6' to bottom | | | |
| Screen Interval: None | | | | Screen Type: N/A | | | |
| Latitude: 34.88930735° N | | | | Longitude: -81.07101464° W | | | |
| Notes: GPS values; NAD83 * fluid conductivity data collected at mS/cm but displayed as uS/cm | | | | | | | |
|  | | | | | | | |



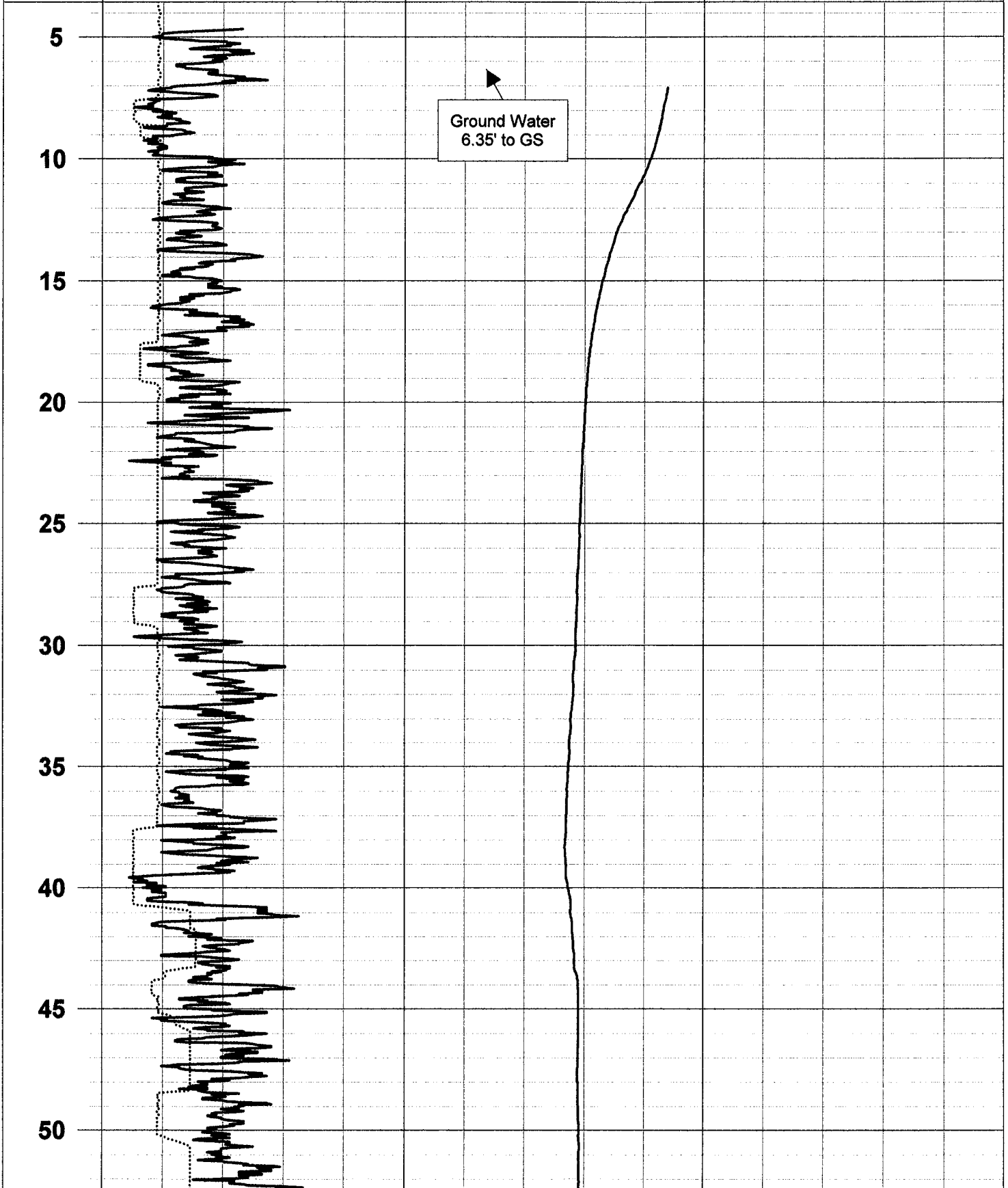




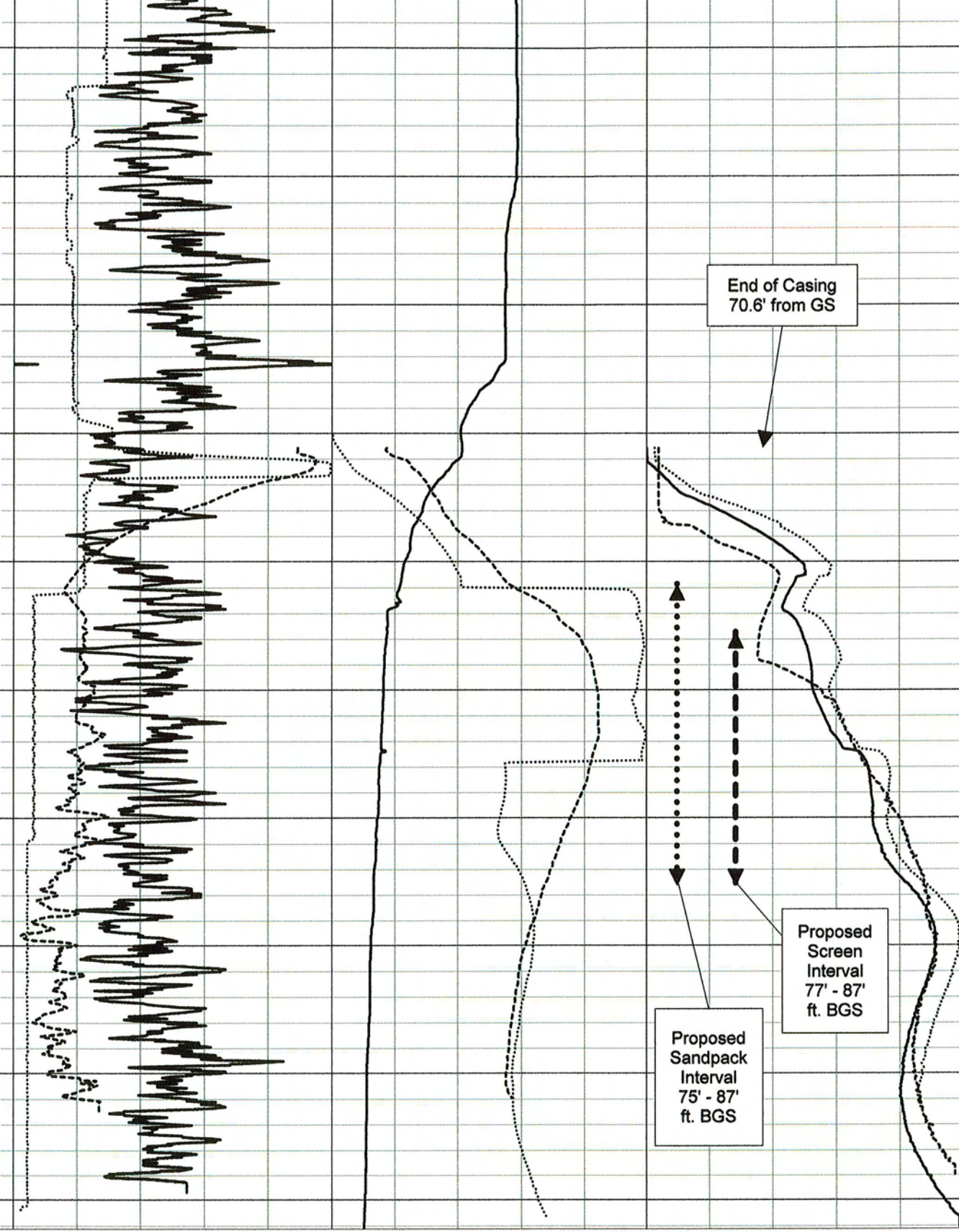
| | | | | | | | |
|--------------------------------------------------------------------|--|--------------------------------------|--|--------------------------------------|--|-------------|--|
| Well: | | RIMW 21 | | Log: | | 21-C | |
| Site: | | PSC | | | | | |
| City/State: Rock Hill, South Carolina | | | | | | | |
| Date: 8/25/07 | | | | Time: See notes | | | |
| System Configuration: Century | | | | | | | |
| Water Level: 6.35' | | Measured From: GS at ~ 09:40 on 8/25 | | | | | |
| Outer Casing Height AGL (with cap open/removed): 8.15' Type: Steel | | | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | | Casing Type: N/A | | | |
| Log Direction: See notes | | Measured from: Ground Surface | | Log Speed: see notes | | | |
| Log Top: 3.6' | | Log Bottom: 100.5' | | Reference Point: GS | | | |
| Analysis Software: WellCAD | | | | Smoothing Points: Natural gamma = 11 | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; OTV | | | |
| Well Diameter: 6" | | Well Depth: 101.14' | | Referenced From: GS | | | |
| Casing Material: Steel | | | | Non-Cased Interval: 70.6' to bottom | | | |
| Screen Interval: None | | | | Screen Type: N/A | | | |
| Latitude: 34.88930735° N | | | | Longitude: -81.07101464° W | | | |
| Notes: GPS values; NAD83 | | | | | | | |
| Caliper logged up at 10:30 on 8/25; speed 16 fpm | | | | | | | |
| 9041 logged down at 11:30 on 8/25; speed 17 fpm | | | | | | | |




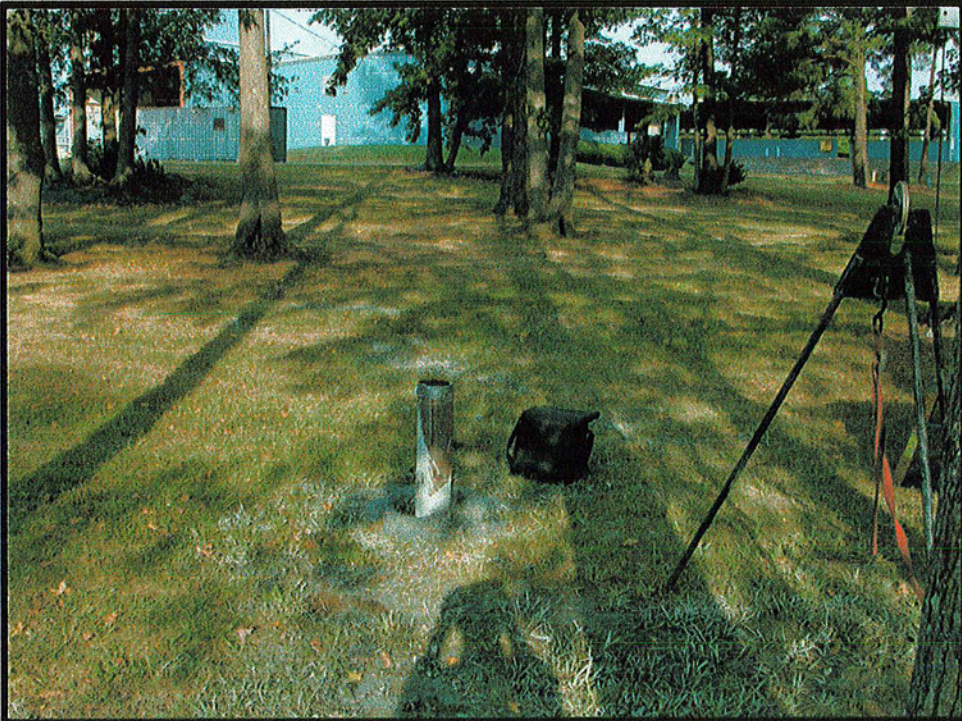
| Depth | Natural Gamma | | Temperature | | 16" Normal Resistivity | | | | |
|----------|-----------------------|------|--------------------------|------|------------------------|------|----|-------|-----|
| | 0 | CPS | 60 | 63 | Deg F | 78 | 0 | OHM-M | 185 |
| 1ft:65ft | Spontaneous Potential | | Fluid Resistivity | | 64" Normal Resistivity | | | | |
| | 360 | mV | 510 | 5 | OHM-M | 10 | -5 | OHM-M | 140 |
| | Caliper | | Single Point Resistivity | | Computed Lateral | | | | |
| | 5 | Inch | 10 | -420 | OHM | 2230 | -5 | OHM-M | 185 |

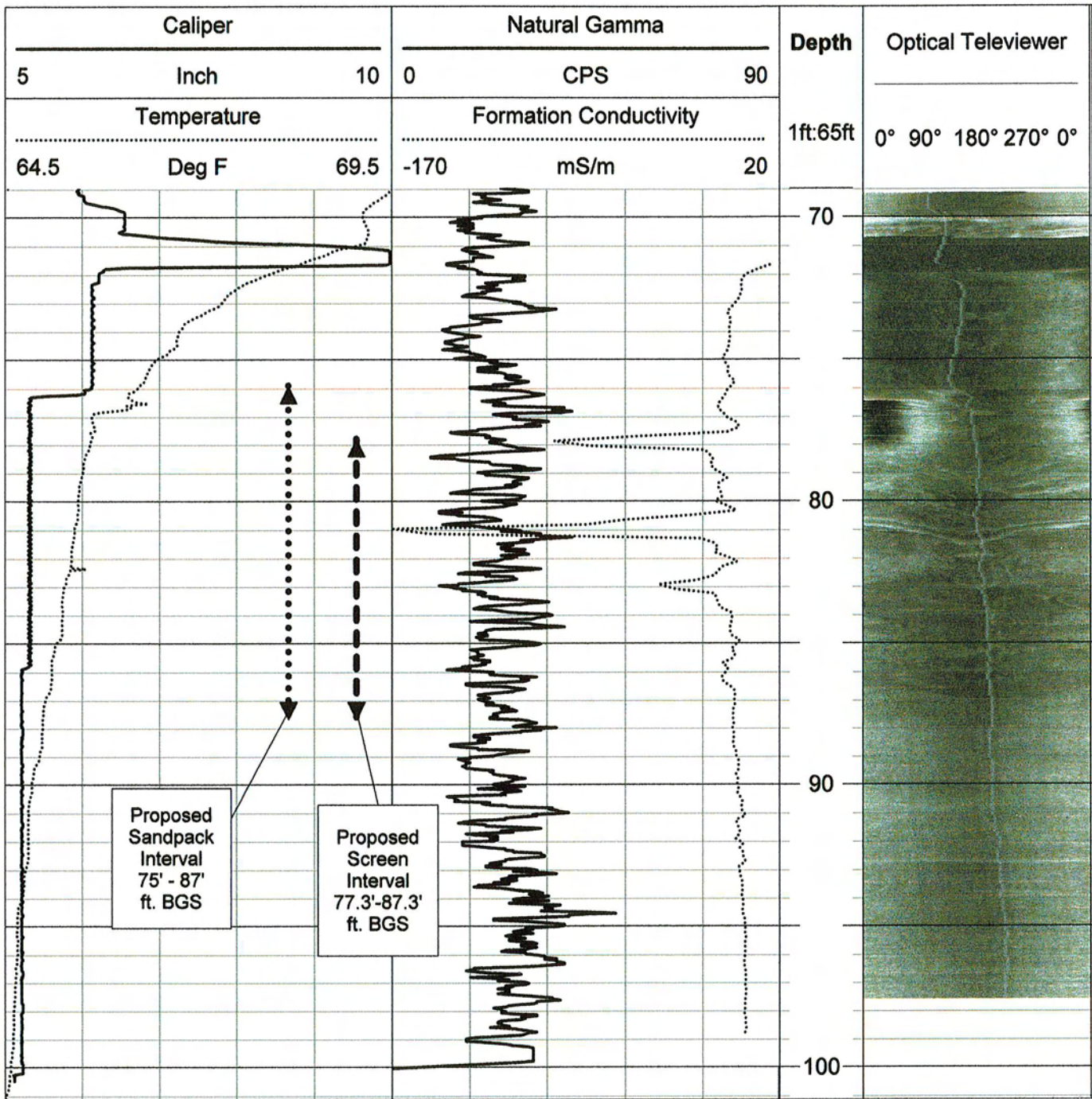


55
60
65
70
75
80
85
90
95
100



| | | | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------|--|--------------------------------------|--|-------------|--|
| Well: | | RIMW 21 | | Log: | | 21-D | |
| Site: | | PSC | | | | | |
| City/State: Rock Hill, South Carolina | | | | | | | |
| Date: 8/25 & 27/07 | | | | Time: See notes | | | |
| System Configuration: Mount Sopris & Century | | | | | | | |
| Water Level: 6.35' | | Measured From: GS at ~ 09:40 on 8/25 | | | | | |
| Outer Casing Height AGL (with cap open/removed): 8.15' Type: Steel | | | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | | Casing Type: N/A | | | |
| Log Direction: See notes | | Measured from: Ground Surface | | Log Speed: see notes | | | |
| Log Top: 69' | | Log Bottom: 100.5' | | Reference Point: GS | | | |
| Analysis Software: WellCAD | | | | Smoothing Points: Natural Gamma = 11 | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2IDA | | | |
| Well Diameter: 6" | | Well Depth: 101.14' | | Referenced From: GS | | | |
| Casing Material: Steel | | | | Non-Cased Interval: 70.6' to bottom | | | |
| Screen Interval: None | | | | Screen Type: N/A | | | |
| Latitude: 34.88930735° N | | | | Longitude: -81.07101464° W | | | |
| Notes: GPS values; NAD83 Formation conductivity logged up at 10:20 on 8/25; speed 13.5 fpm Caliper logged up at 10:30 on 8/25; speed 16 fpm 9041 logged down at 11:30 on 8/25; speed 17 fpm Optical televiewer logged down at 14:35on 8/27; speed 2.2 fpm | | | | | | | |
|  | | | | | | | |





PSC Site
August 22 – 28, 2007
Rock Hill, South Carolina

Well Logs for RIMW 22

Geophysical Logs

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log 22 - A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L

Log 22 - B

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log 22 - C

Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity - Ohm/M
Computed lateral resistivity – Ohm/M
Caliper – inches

Log 22 - D

Natural gamma – cps
Caliper, 3-arm - inches
Formation conductivity – mS/m
Optical televiewer – color digital image

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool

- Temperature – degrees Fahrenheit
- Natural gamma – cps
- Spontaneous potential - mV
- Fluid resistivity – Ohm/M
- Single point resistivity - Ohm
- 16 inch normal resistivity – Ohm/M
- 24 inch normal resistivity – Ohm/M
- Computed lateral resistivity – Ohm/M

Century 9065 tool

- Caliper, 3-arm - inches

Mount Sopris 2IDA tool – ammonia configuration

- Temperature – degrees Centigrade
- Fluid conductivity – $\mu\text{S}/\text{cm}$
- Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
- Hydraulic pressure - dBar
- Oxygen – saturated - percent
- Oxygen – ppm
- Redox - mV
- Chloride – mg/L
- Ammonia – mg/L (option sensor)

Mount Sopris 2IDA tool – nitrate configuration


- Temperature – degrees Centigrade
- Fluid conductivity – $\mu\text{S}/\text{cm}$
- Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
- Hydraulic pressure - dBar
- Oxygen – saturated - percent
- Oxygen – ppm
- Redox - mV
- Chloride – mg/L
- Nitrate – mg/L (option sensor)

Mount Sopris 2EMA-1000 tool

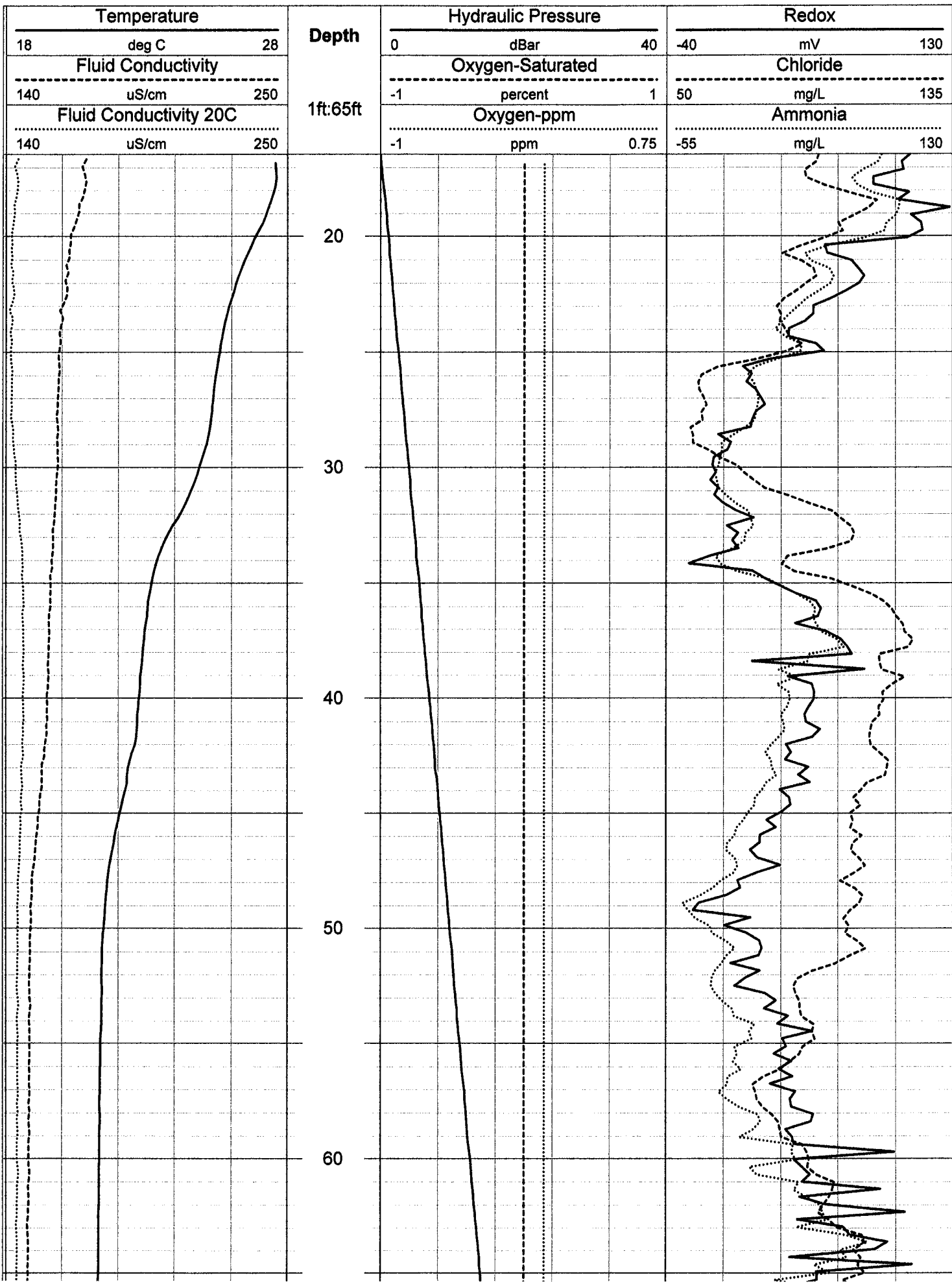
- Ground conductivity - ppt

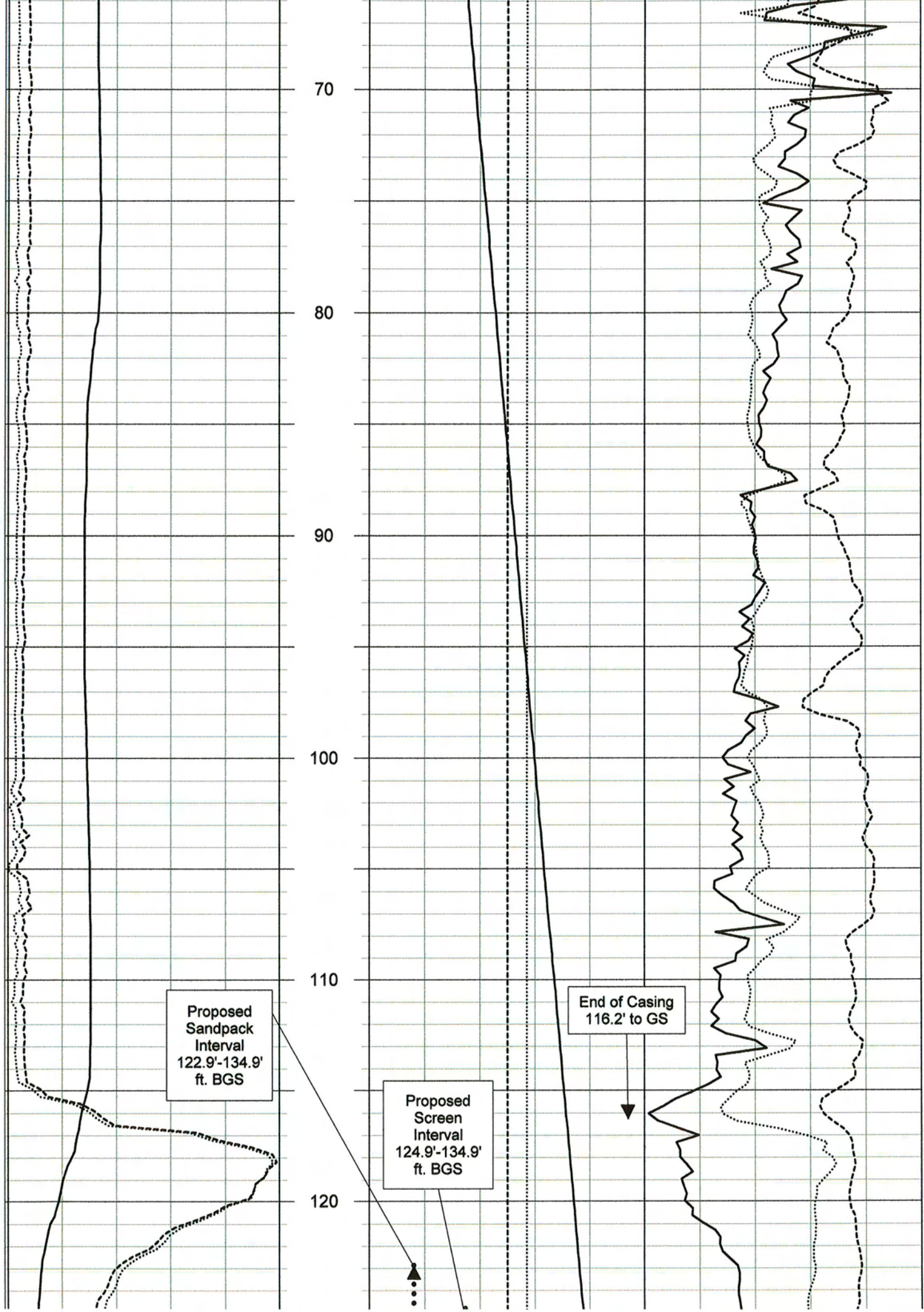
Mount Sopris ALT OBI-40 Tool

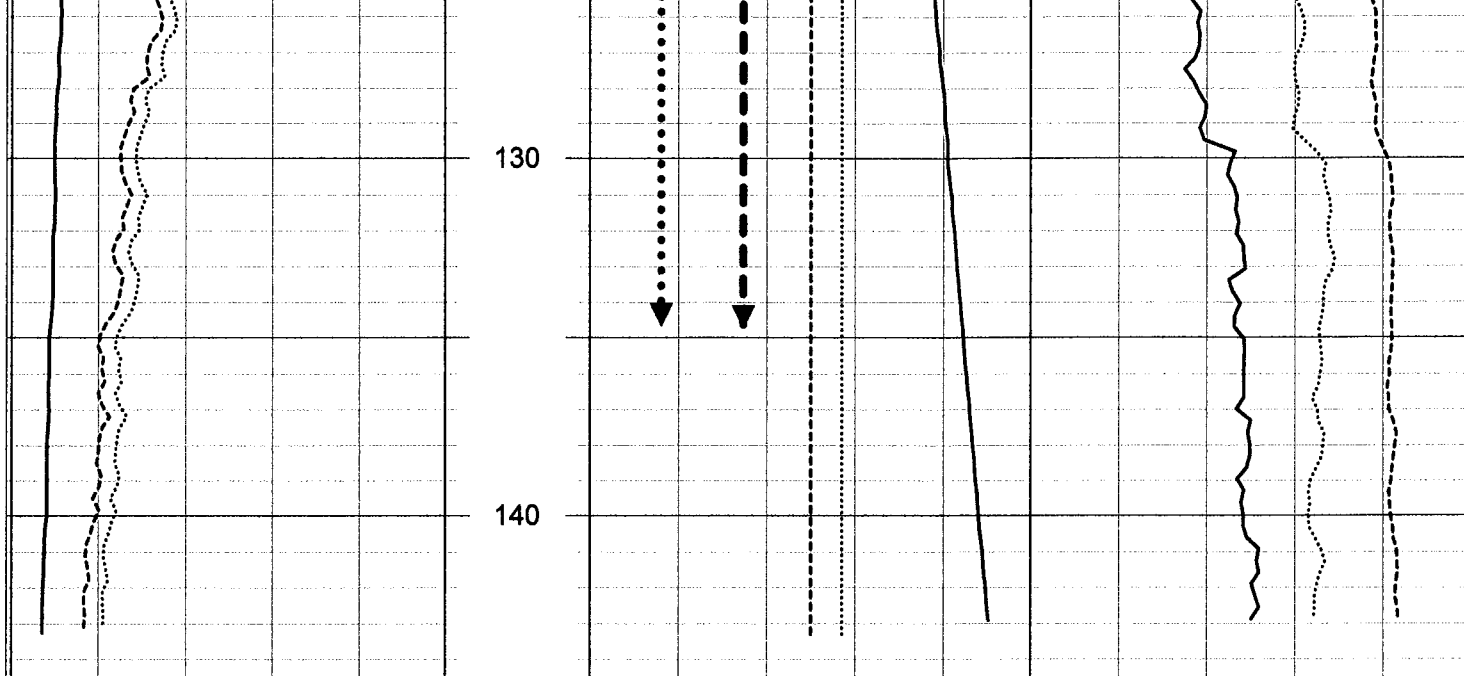
- Optical televiewer – color digital image


| | | |
|-------------------------------------------------------------------------------------|------------------------------------|-----------------------------------------|
| Well: RIMW 22 | | Log: 22-A |
| Site: PSC | | |
| City/State: Rock Hill, South Carolina | | |
| Date: 8/22/07 | Time: 07:25 | |
| System Configuration: Mount Sopris: 2IDA with ammonia sensor option | | |
| Water Level: 16.06' | Measured From: GS at ~ 07:15 08/22 | |
| Outer Casing Height AGL (with cap open/removed): 1.65' Type: Steel | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | Casing Type: N/A |
| Log Direction: Down | Measured from: GS | Log Speed: 12 fpm |
| Log Top: 16.7' | Log Bottom: 143.4' | Reference Point: Ground Surface |
| Analysis Software: WellCAD | | Smoothing Points: Redox=1; Cl & NH4 = 3 |
| Operator: JRU | Witness: None | Other Tools Used: 2EMA; 9041&86; OTV |
| Well Diameter: 6.25" | Well Depth: 145.55' | Referenced From: GS |
| Casing Material: Steel | | Non-Cased Interval: 116.2' to bottom |
| Screen Interval: None | | Screen Type: N/A |
| Latitude: 34.88911822° N | | Longitude: -81.07154162° W |
| Notes: GPS: NAD83 | | |
| Logged from TOC but converted data to measure from GS | | |
|  | | |





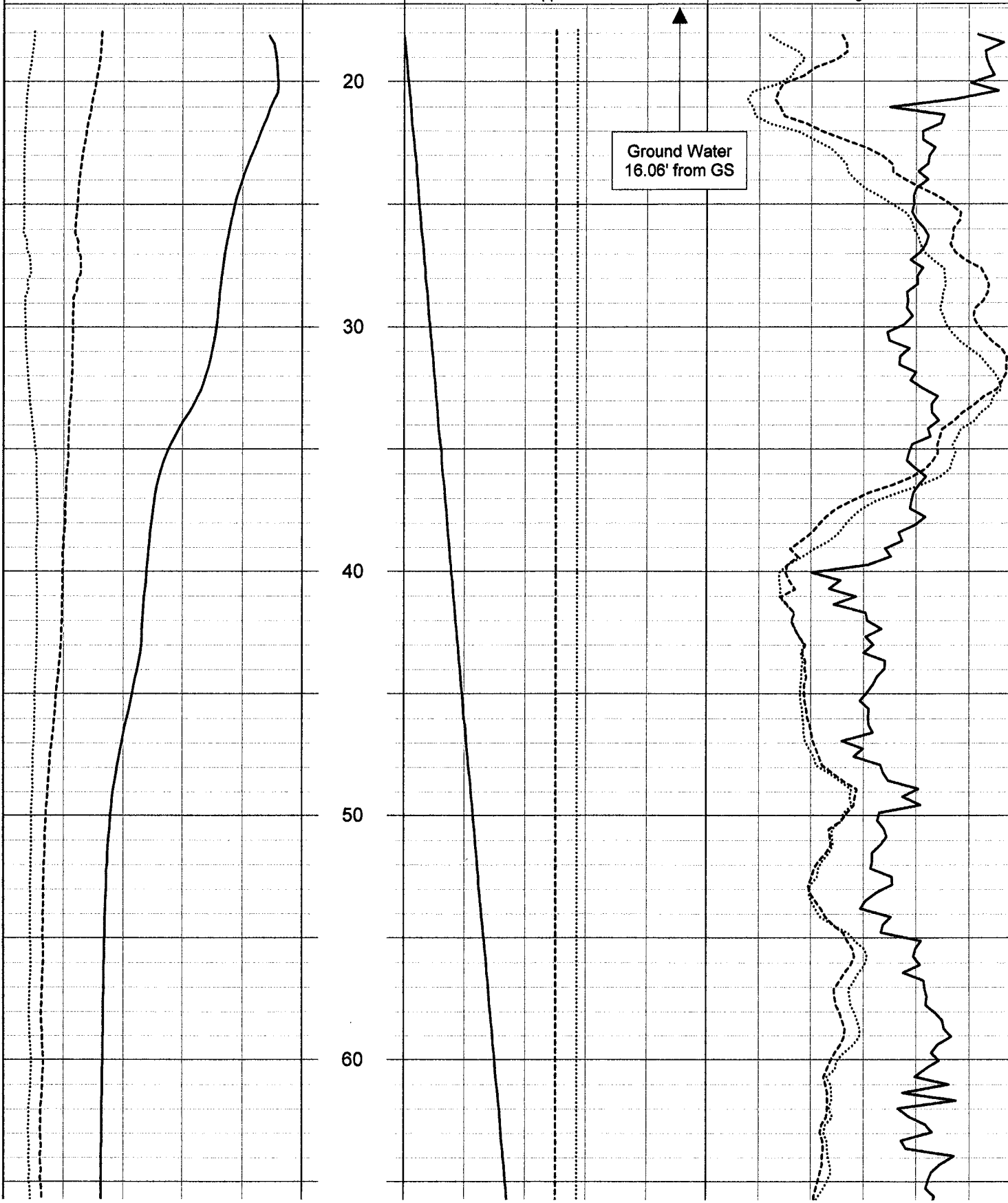


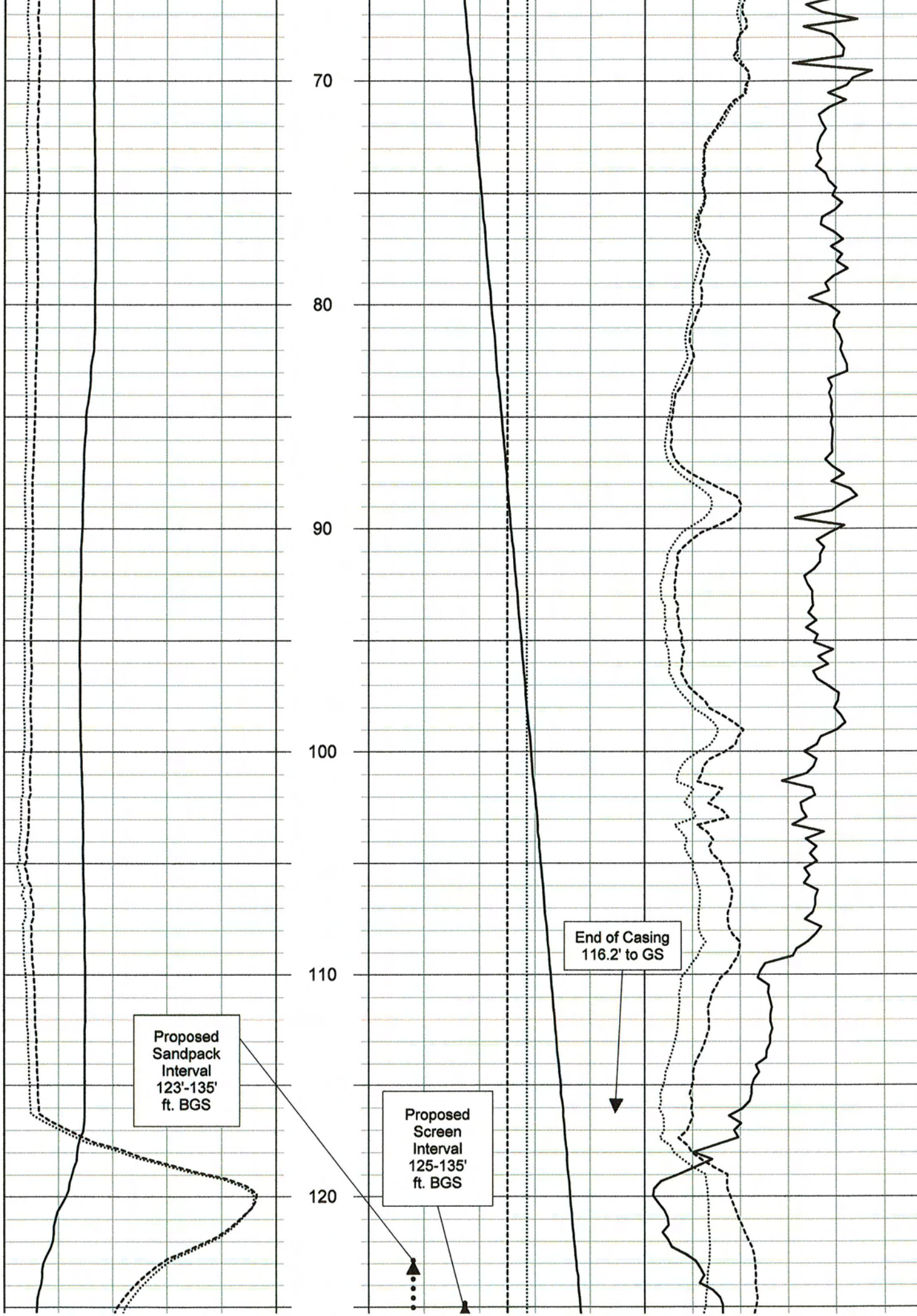


| | | | | | |
|-------------------------------------------------------------------------------------|--|------------------------------------|--------------------------------------|--------------------------------------|--|
| Well: | | RIMW 22 | | Log: 22-B | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 08/22/07 | | | Time: 08:04 | | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | | | | |
| Water Level: 16.06' | | Measured From: GS at ~ 07:15 08/22 | | | |
| Outer Casing Height AGL (with cap open/removed): 1.65" Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: Down | | Measured from: Ground Surface | | Log Speed: ~13 fpm | |
| Log Top: 118.0' | | Log Bottom: 145.0' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: Redox = 1 | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; 9041&86; OTV | |
| Well Diameter: 6.25" | | Well Depth: 145.55' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 116.2' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88911822° N | | | Longitude: -81.07154162° W | | |
| Notes: GPS NAD83 | | | | | |
| Logged from TOC but converted data to measure from GS | | | | | |
|  | | | | | |



| | | | | | | | | | |
|-------------------------------|-------|-----|-----------------|---------------------------|---------|------|-----------------|------|-----|
| Temperature | | | Depth | Hydraulic Pressure | | | Redox | | |
| 18 | Deg C | 28 | | 0 | dBar | 40 | -15 | mV | 130 |
| Fluid Conductivity | | | | Oxygen-saturated | | | Chloride | | |
| 135 | uS/cm | 245 | | -1 | percent | 1 | 105 | mg/L | 175 |
| Fluid Conductivity 20C | | | 1ft:65ft | Oxygen-ppm | | | Nitrate | | |
| 135 | uS/cm | 245 | | -1 | ppm | 0.75 | 55 | mg/L | 195 |





70

80

90

100

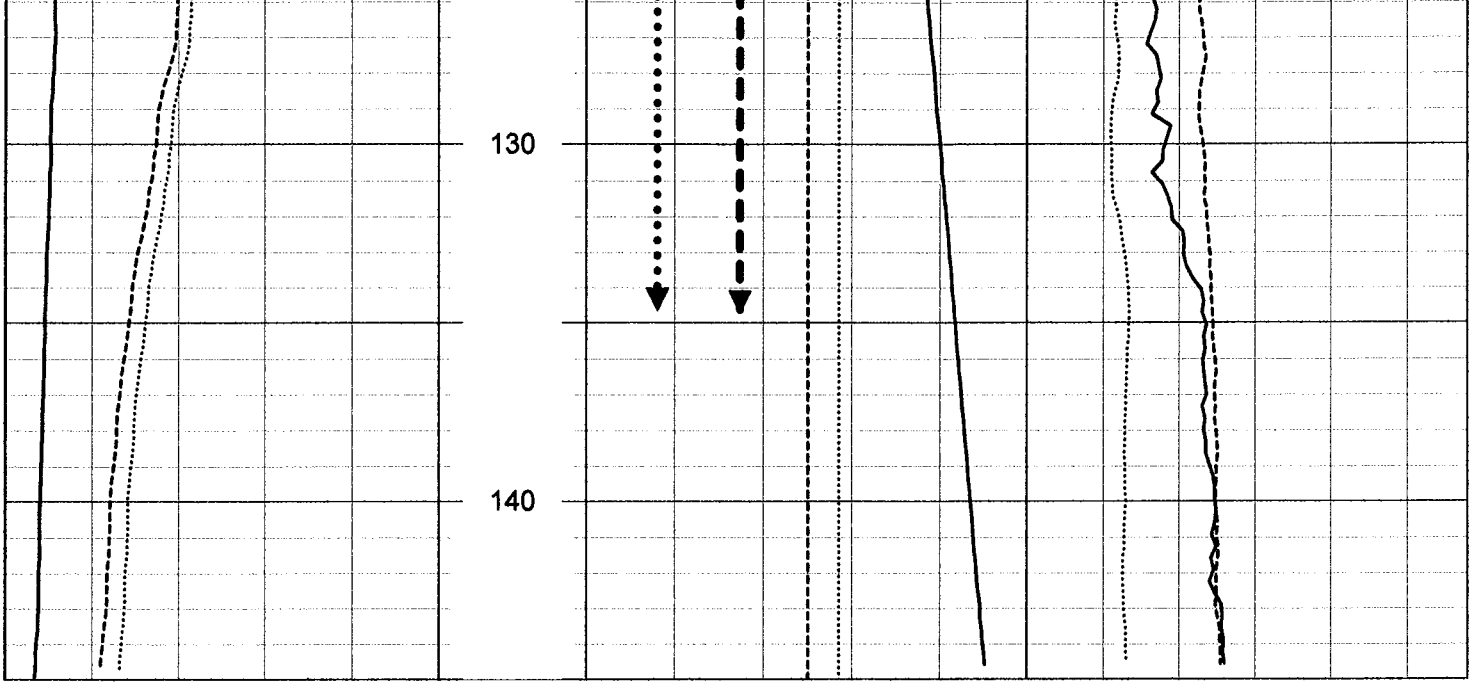
110

120

Proposed Sandpack Interval
123'-135'
ft. BGS

Proposed Screen Interval
125'-135'
ft. BGS

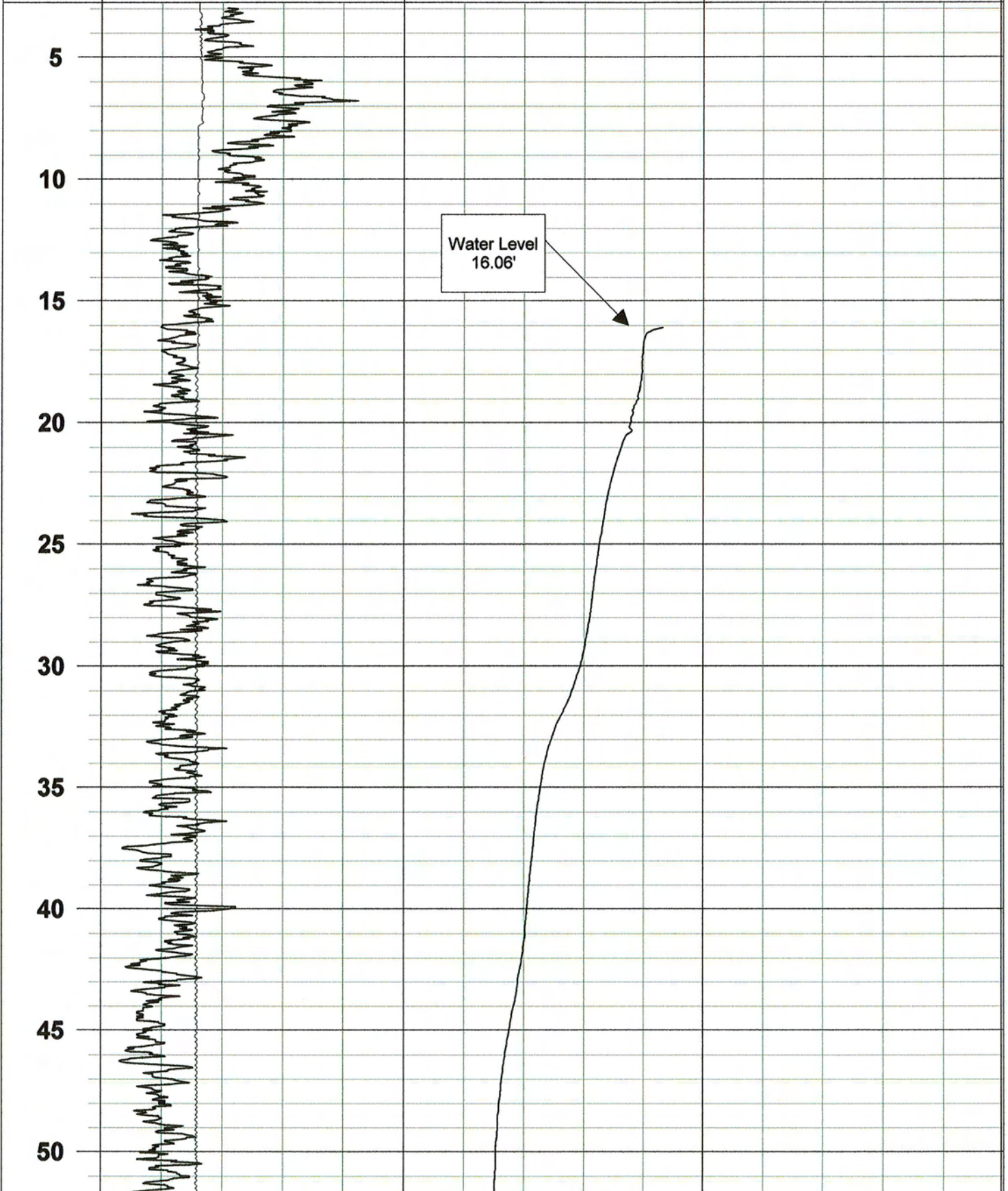
End of Casing
116.2' to GS



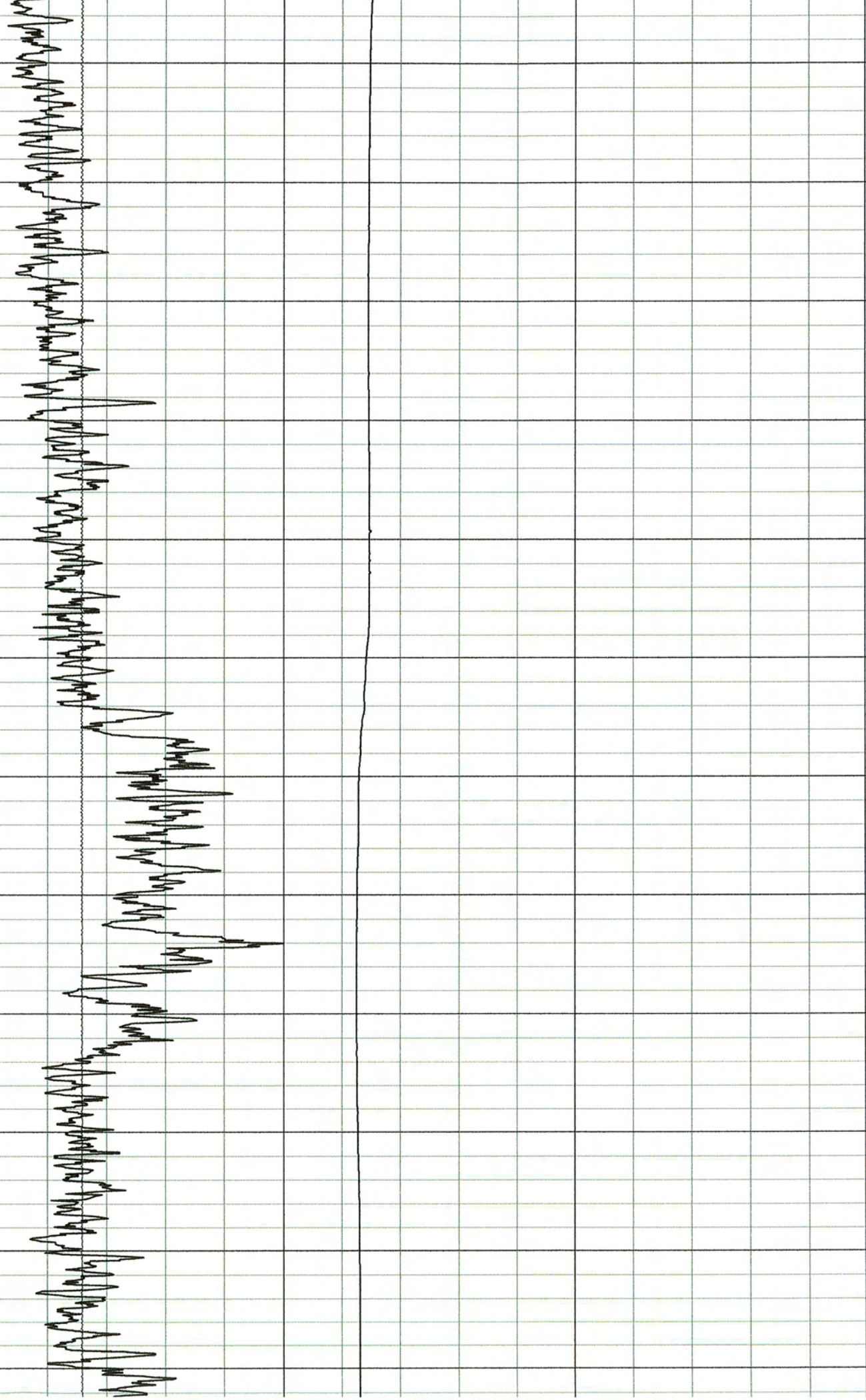
| | | | | | |
|--------------------------------------------------------|--|--------------------------------------|--------------------------------------|-----------------------------------|--|
| Well: | | RIMW 22 | | Log: 22 - C | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 08/22/07 | | | Time: See notes | | |
| System Configuration: Century 9041, 9065 | | | | | |
| Water Level: 16.06' | | Measured From: Ground Surface | | | |
| Outer Casing Height AGL (with cap open/removed): 1.65' | | | | Type: Steel | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: See notes | | Measured from: GS | | Log Speed: see notes | |
| Log Top: 2.8' | | Log Bottom: 144.5' | | Reference Point: GS | |
| Analysis Software: WellCAD | | Smoothing Points: Natural gamma = 11 | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; 2IDA; OTV | |
| Well Diameter: 6.25" | | Well Depth: 1455.5' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 116.2' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88911822° N | | | Longitude: -81.07154162° W | | |
| Notes: GPS NAD83 | | | | | |
| Caliper logged up on 8/22/07 @ 08:55; speed ~16 fpm | | | | | |
| 9041 logged down on 8/22/07 @ 09:20; speed 15 fpm | | | | | |

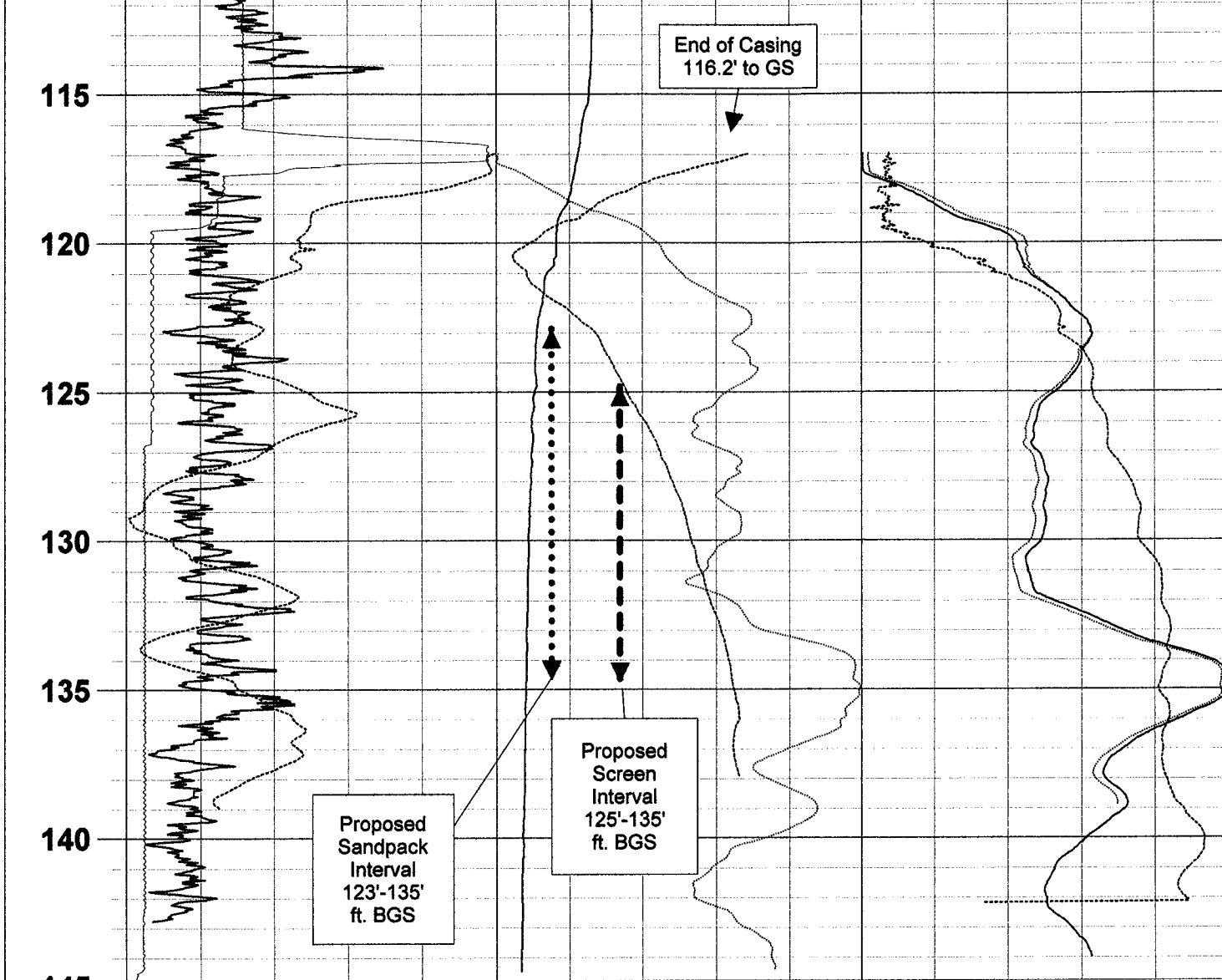



| Depth | Natural Gamma | | Temperature | | 16" Normal Resistivity | |
|----------|-----------------------|---------|--------------------------|----------|------------------------------|-----------|
| | 0 | CPS 90 | 65 | DEG F 85 | 0 | OHM-M 215 |
| 1ft:65ft | Spontaneous Potential | | Fluid Resistivity | | 64" Normal Resistivity | |
| | 155 | mV 340 | 45 | OHM-M 60 | -5 | OHM-M 80 |
| | Caliper | | Single Point Resistivity | | Computed Lateral Resistivity | |
| | 5 | Inch 10 | 115 | OHM 3810 | -5 | OHM-M 265 |

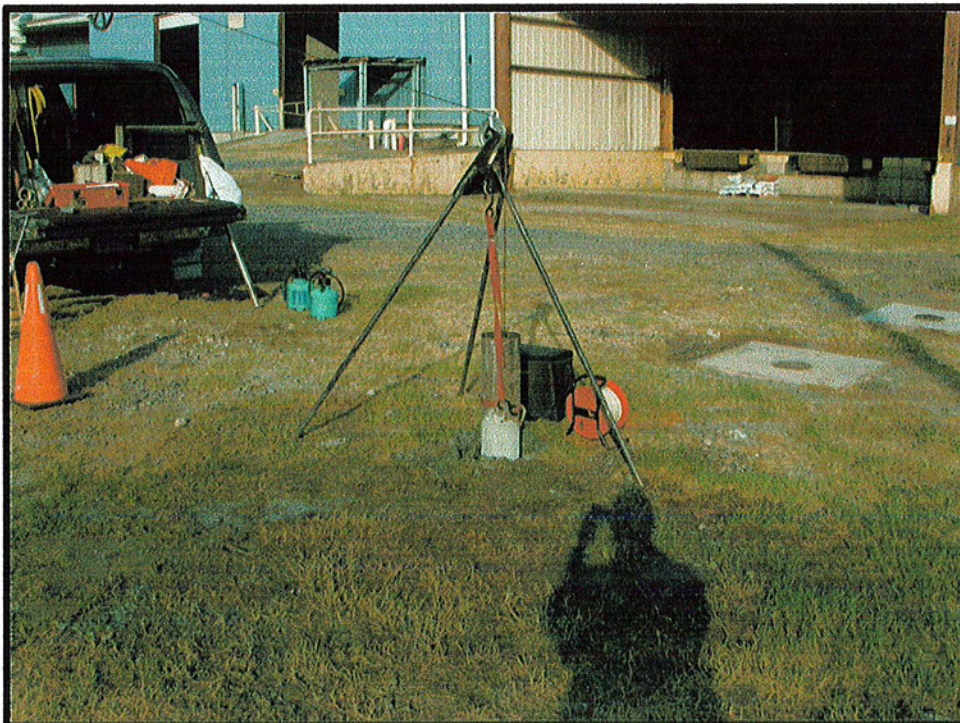


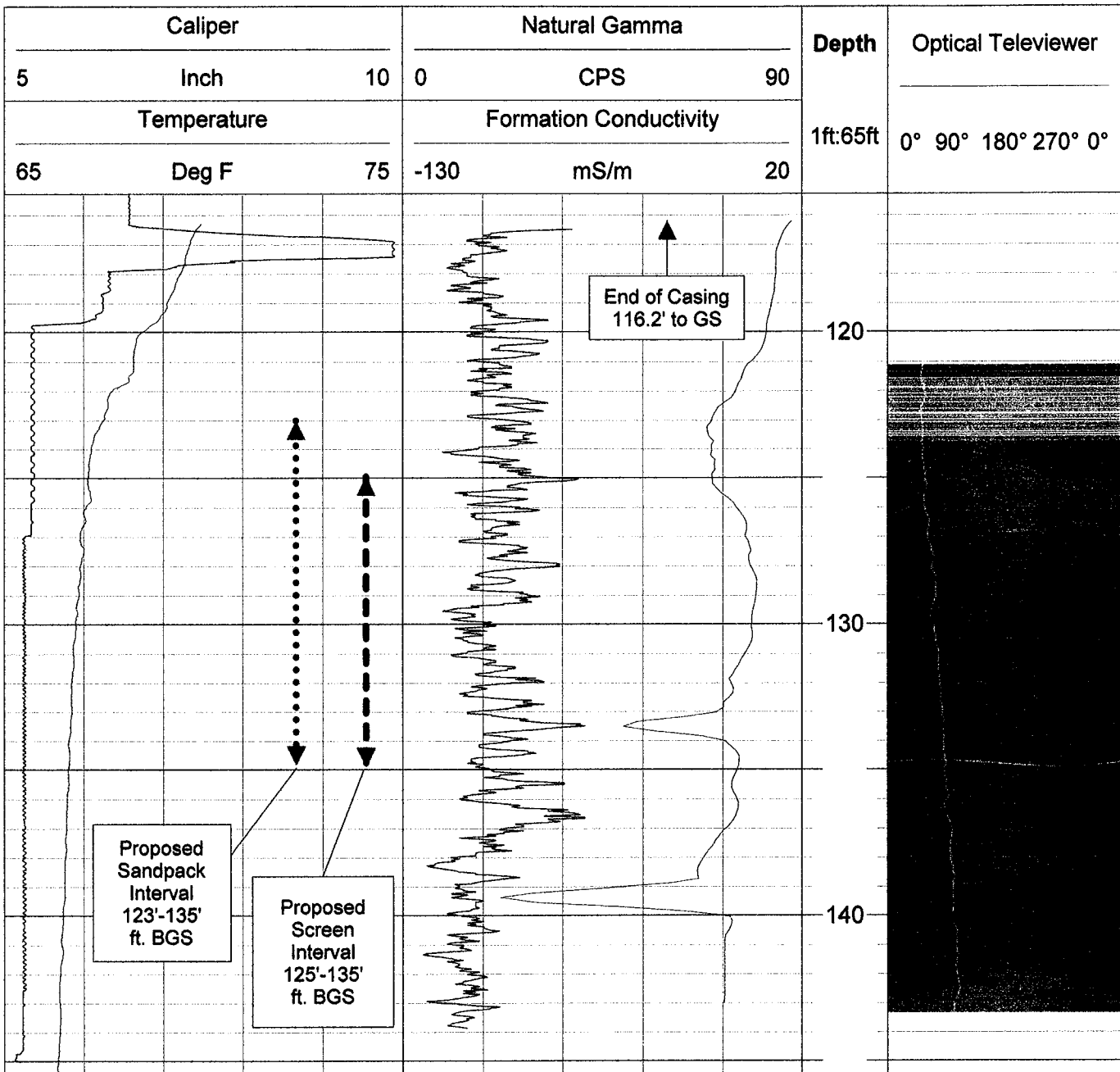
55
60
65
70
75
80
85
90
95
100
105
110





| | | |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------|--------------------------------------|
| Well: | RIMW 22 | Log: 22-D |
| Site: | PSC | |
| City/State: Rock Hill, South Carolina | | |
| Date: 8/22/07 | Time: See notes | |
| System Configuration: Mount Sopris 2IDA with ammonia option | | |
| Water Level: 16.06" | Measured From: GS at ~ 07:15 on 8/22 | |
| Outer Casing Height AGL (with cap open/removed): 1.65" Type: Steel | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | Casing Type: N/A |
| Log Direction: See notes | Measured from: Ground Surface | Log Speed: see notes |
| Log Top: 114.3' | Log Bottom: 145.5' | Reference Point: GS |
| Analysis Software: WellCAD | | Smoothing Points: Natural gamma = 11 |
| Operator: JRU | Witness: None | Other Tools Used: 2IDA |
| Well Diameter: 6" | Well Depth: 145.55' | Referenced From: GS |
| Casing Material: None | | Non-Cased Interval: 116.2' to bottom |
| Screen Interval: None | | Screen Type: N/A |
| Latitude: 34.88911822° N | | Longitude: -81.07154162° W |
| Notes: GPS NAD83 | | |
|  | Caliper logged up on 8/22/07 @ 08:55; speed ~16 fpm | |
| | 9041 logged down on 8/22/07 @ 09:20; speed 15 fpm | |
| | Optical televiewer logged up on 8/27/07 @ 12:30; speed 2.3 fpm | |





PSC Site
August 22 – 28, 2007
Rock Hill, South Carolina

Geophysical Logs

Well Logs for RIMW 23

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log 23 – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L

Log 23 – B

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log 23 - C

Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity - Ohm/M
Computed lateral resistivity – Ohm/M
Caliper – inches

Log 23 - D

Natural gamma – cps
Caliper, 3-arm - inches
Formation conductivity – mS/m
Optical televiewer – color digital image

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool

- Temperature – degrees Fahrenheit
- Natural gamma – cps
- Spontaneous potential - mV
- Fluid resistivity – Ohm/M
- Single point resistivity - Ohm
- 16 inch normal resistivity – Ohm/M
- 24 inch normal resistivity – Ohm/M
- Computed lateral resistivity – Ohm/M

Century 9065 tool

- Caliper, 3-arm - inches

Mount Sopris 2IDA tool – ammonia configuration

- Temperature – degrees Centigrade
- Fluid conductivity – $\mu\text{S}/\text{cm}$
- Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
- Hydraulic pressure - dBar
- Oxygen – saturated - percent
- Oxygen – ppm
- Redox - mV
- Chloride – mg/L
- Ammonia – mg/L (option sensor)

Mount Sopris 2IDA tool – nitrate configuration


- Temperature – degrees Centigrade
- Fluid conductivity – $\mu\text{S}/\text{cm}$
- Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
- Hydraulic pressure - dBar
- Oxygen – saturated - percent
- Oxygen – ppm
- Redox - mV
- Chloride – mg/L
- Nitrate – mg/L (option sensor)

Mount Sopris 2EMA-1000 tool

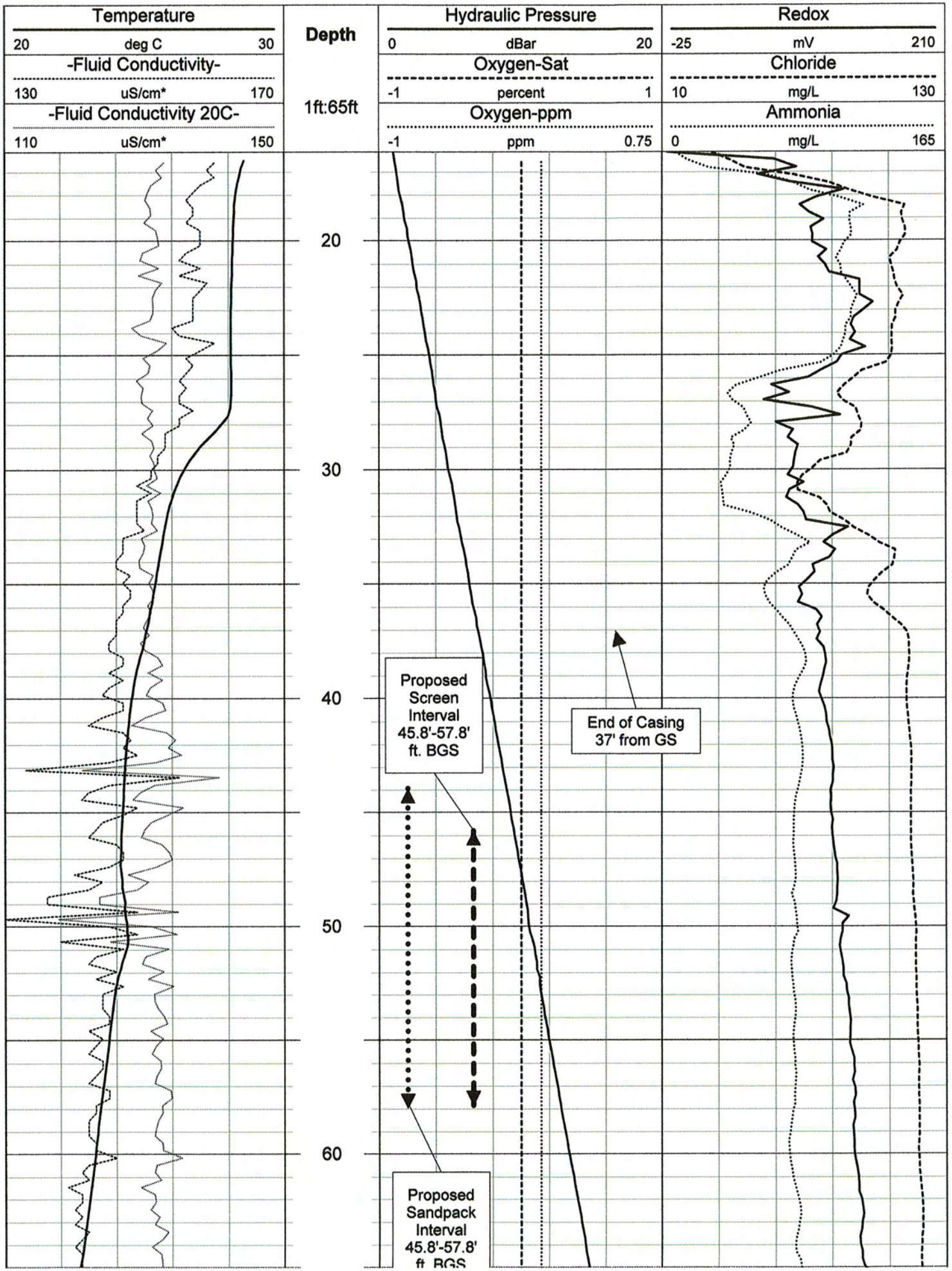
- Formation conductivity – mS/m

Mount Sopris ALT OBI-40-2 Tool


- Optical televiewer – color digital image

| | | | | | |
|---------------------------------------------------------------------------------------------------------|--|------------------------------------------|-------------------------------------|--------------------------------------|--|
| Well: | | RIMW 23 | | Log: 23-A | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/24/07 | | | Time: 13:45 | | |
| System Configuration: Mount Sopris 2IDA with ammonia option | | | | | |
| Water Level: 12.65' | | Measured From: GS at ~ 13:15 on 8/24 | | | |
| Outer Casing Height AGL (with cap open/removed): 3.12' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: down | | Measured from: Ground Surface | | Log Speed: 14 fpm | |
| Log Top: 16.2' | | Log Bottom: 68' | | Reference Point: GS | |
| Analysis Software: WellCAD | | Smoothing Points: Redox = 1; Cl, NH4 = 5 | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; 9041&65; OTV | |
| Well Diameter: 6" | | Well Depth: 69.48' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 70.6' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88862735° N | | | Longitude: -81.07101140° W | | |
| Notes: GPS values ± 5.71M; NAD83 * fluid conductivity data collected at mS/cm but displayed as uS/cm | | | | | |
|  | | | | | |

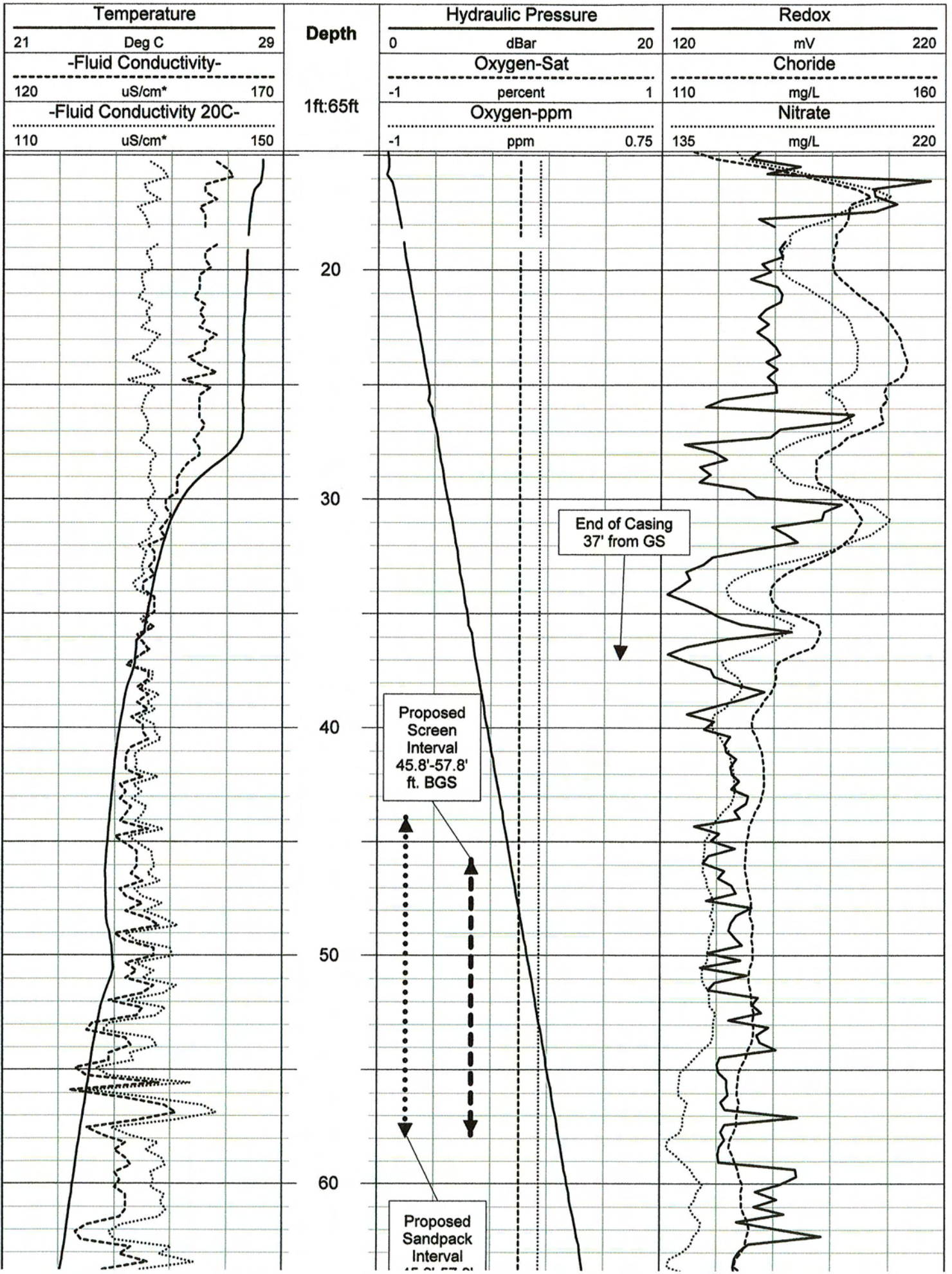







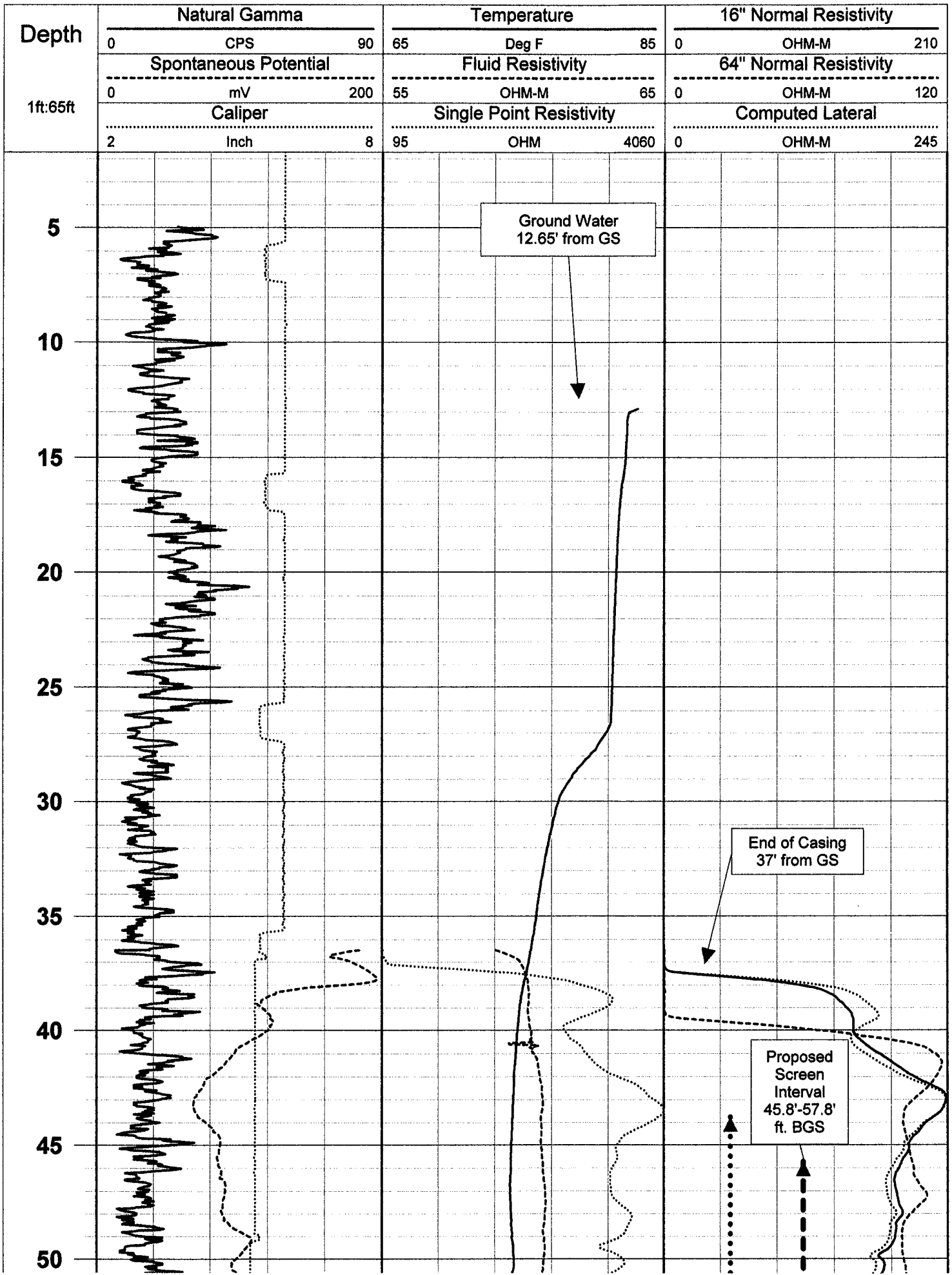
| | | | | | |
|-------------------------------------------------------------------------------------|--|------------------------------------------|-----------------------------------|--------------------------------------|--|
| Well: | | RIMW 23 | | Log: 23-B | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/24/07 | | | Time: 14:05 | | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | | | | |
| Water Level: 12.65' | | Measured From: GS at ~ 13:15 on 8/24 | | | |
| Outer Casing Height AGL (with cap open/removed): 3.12' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: down | | Measured from: Ground Surface | | Log Speed: 13 fpm | |
| Log Top: 14.9' | | Log Bottom: 68' | | Reference Point: GS | |
| Analysis Software: WellCAD | | Smoothing Points: Redox = 1; Cl, NO3 = 5 | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; 9041&65; OTV | |
| Well Diameter: 6" | | Well Depth: 69.48' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 37' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88862735° N | | | Longitude: -81.07101140° W | | |
| Notes: GPS values; NAD83 | | | | | |
| * fluid conductivity data collected at mS/cm but displayed as uS/cm | | | | | |
|  | | | | | |

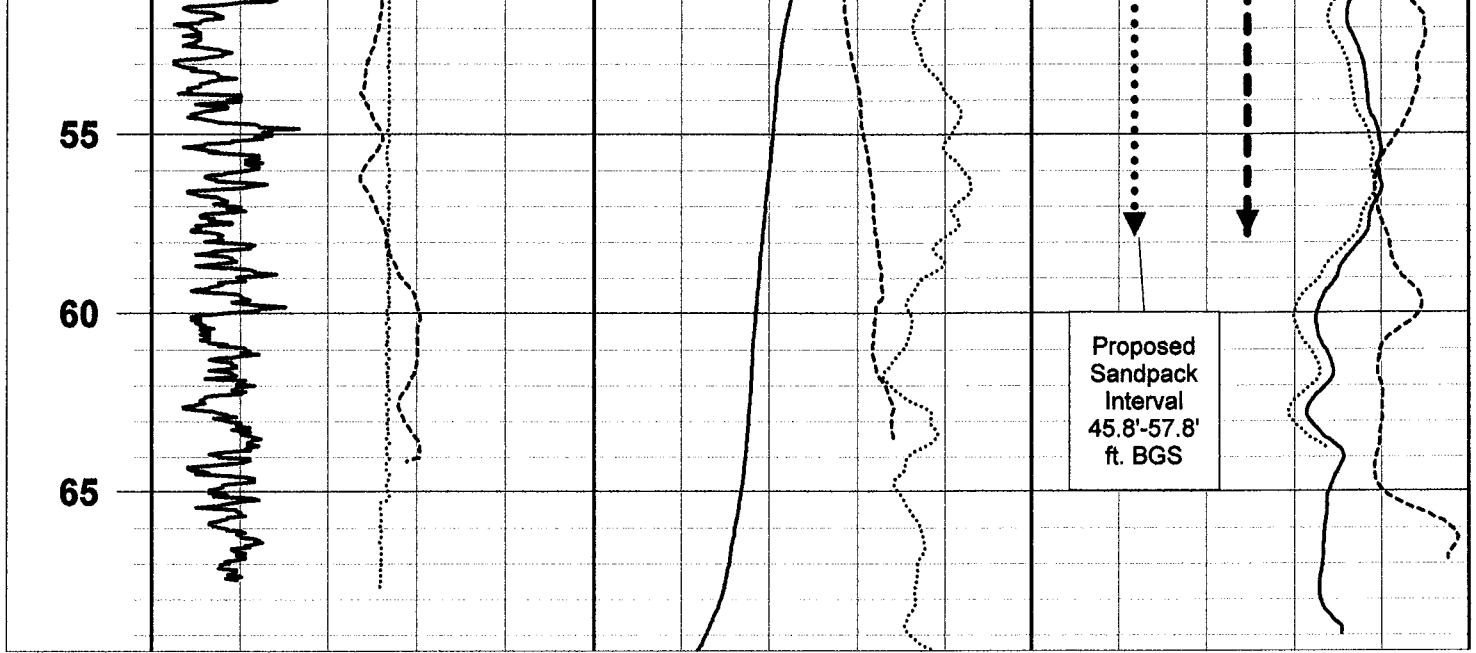





| | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------|-------------------------------------|--------------------------------------|--|
| Well: | | RIMW 23 | | Log: 23-C | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/24/07 | | | Time: See notes | | |
| System Configuration: Century 9041 & 9065 | | | | | |
| Water Level: 12.65' | | Measured From: GS at ~ 13:15 on 8/24 | | | |
| Outer Casing Height AGL (with cap open/removed): 3.12' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: see notes | | Measured from: Ground Surface | | Log Speed: see notes | |
| Log Top: 16.2' | | Log Bottom: 68' | | Reference Point: GS | |
| Analysis Software: WellCAD | | Smoothing Points: natural gamma = 11 | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; 9041&65; OTV | |
| Well Diameter: 6" | | Well Depth: 69.48' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 70.6' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88862735° N | | | Longitude: -81.07101140° W | | |
| Notes: GPS values; NAD83 Caliper logged up at 15:00 on 8/24; speed 18 fpm 9041 logged down at 15:15 on 8/24; speed 16 fpm | | | | | |
|  | | | | | |

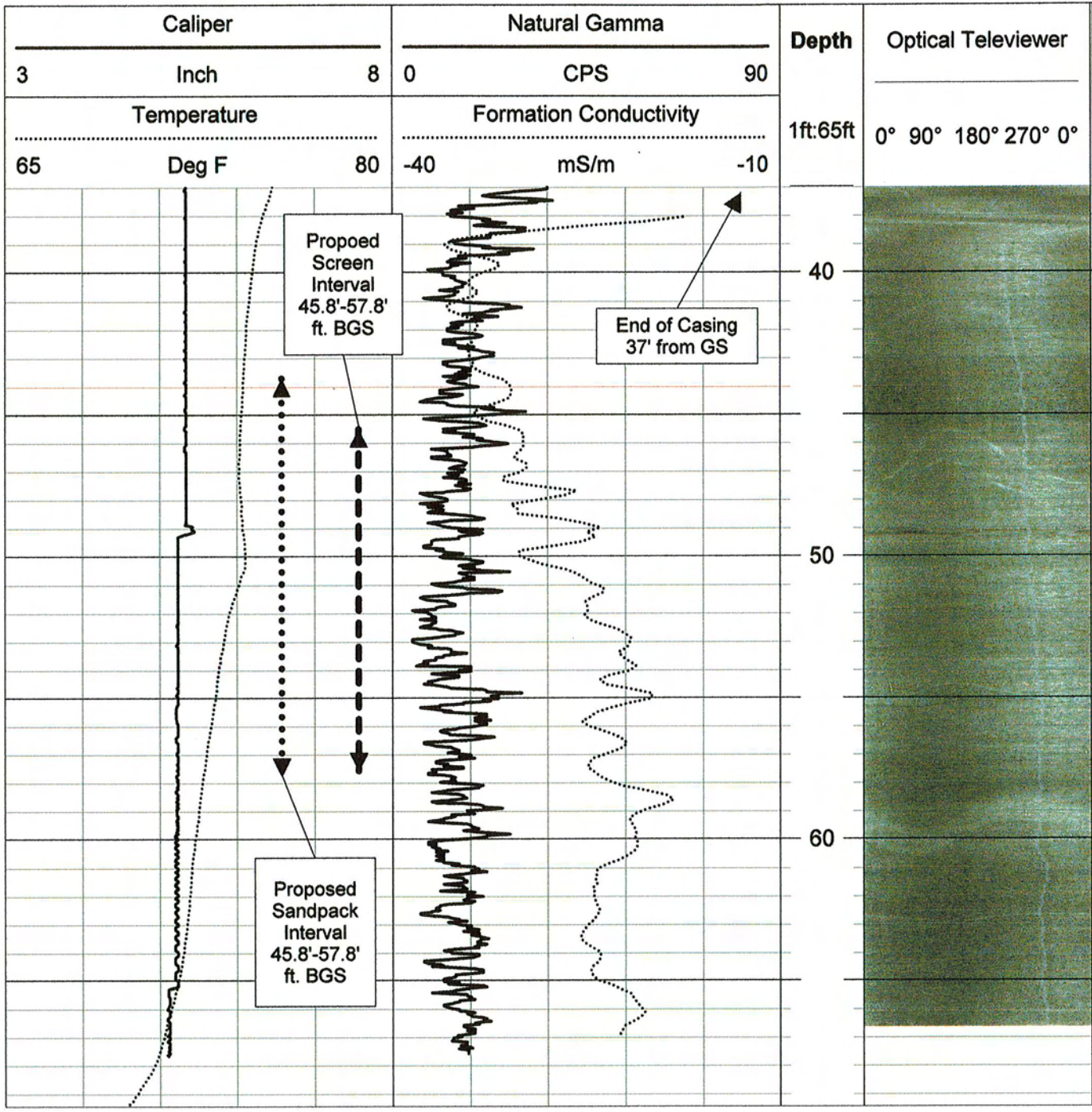






| | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------|-----------------------------------|------------------------------|--|
| Well: | | RIMW 23 | | Log: 23-D | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/24/07 | | | Time: See notes | | |
| System Configuration: Century & Mount Sopris | | | | | |
| Water Level: 12.65' | | Measured From: GS at ~ 13:15 on 8/24 | | | |
| Outer Casing Height AGL (with cap open/removed): 3.12' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: See notes | | Measured from: Ground Surface | | Log Speed: see notes | |
| Log Top: 37' | | Log Bottom: 69.4' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: Redox = 1 | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2IDA; 9041 | |
| Well Diameter: 6" | | Well Depth: 69.48' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 37' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88862735° N | | | Longitude: -81.07101140° W | | |
| Notes: GPS values; NAD83 Formation conductivity logged up at 14:30 on 8/24; speed 15 fpm Caliper logged up at 15:00 on 8/24; speed 18 fpm 9041 logged down at 15:15 on 8/24; speed 16 fpm Optical televiewer logged down at 07:40 on 8/28; speed 2.1 fpm | | | | | |
|  | | | | | |





PSC Site
August 22 – 28, 2007
Rock Hill, South Carolina

Geophysical Logs

Well Logs for RIMW 25

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log 25 – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L

Log 25 – B

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log 25 - C

Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity - Ohm/M
Computed lateral resistivity – Ohm/M
Caliper – inches

Log 25 - D

Natural gamma – cps
Caliper, 3-arm - inches
Formation conductivity – mS/m
Optical televiewer – color digital image

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool

- Temperature – degrees Fahrenheit
- Natural gamma – cps
- Spontaneous potential - mV
- Fluid resistivity – Ohm/M
- Single point resistivity - Ohm
- 16 inch normal resistivity – Ohm/M
- 24 inch normal resistivity – Ohm/M
- Computed lateral resistivity – Ohm/M

Century 9065 tool

- Caliper, 3-arm - inches

Mount Sopris 2IDA tool – ammonia configuration

- Temperature – degrees Centigrade
- Fluid conductivity – $\mu\text{S}/\text{cm}$
- Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
- Hydraulic pressure - dBar
- Oxygen – saturated - percent
- Oxygen – ppm
- Redox - mV
- Chloride – mg/L
- Ammonia – mg/L (option sensor)

Mount Sopris 2IDA tool – nitrate configuration


- Temperature – degrees Centigrade
- Fluid conductivity – $\mu\text{S}/\text{cm}$
- Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
- Hydraulic pressure - dBar
- Oxygen – saturated - percent
- Oxygen – ppm
- Redox - mV
- Chloride – mg/L
- Nitrate – mg/L (option sensor)

Mount Sopris 2EMA-1000 tool

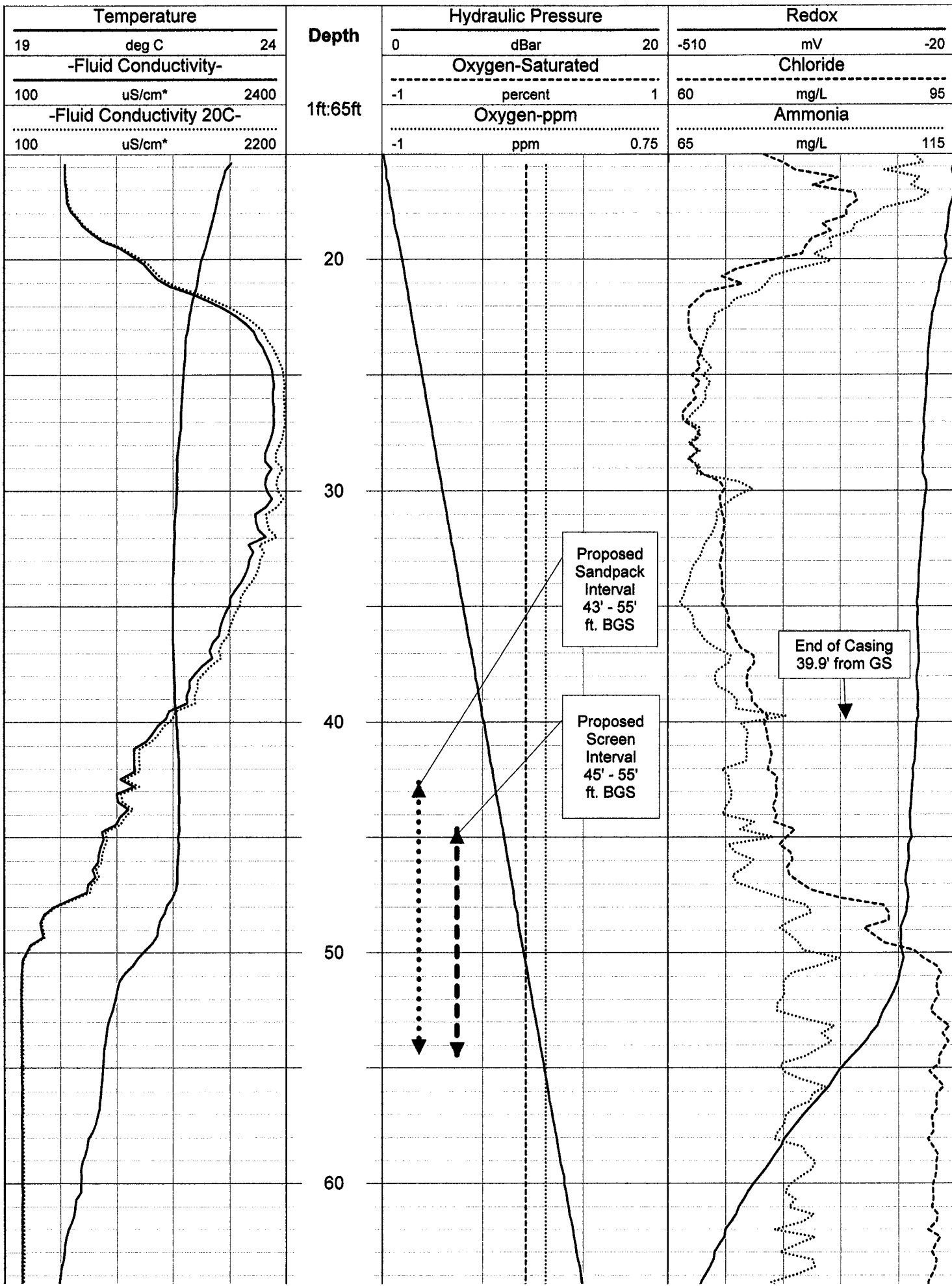
- Formation conductivity – mS/m

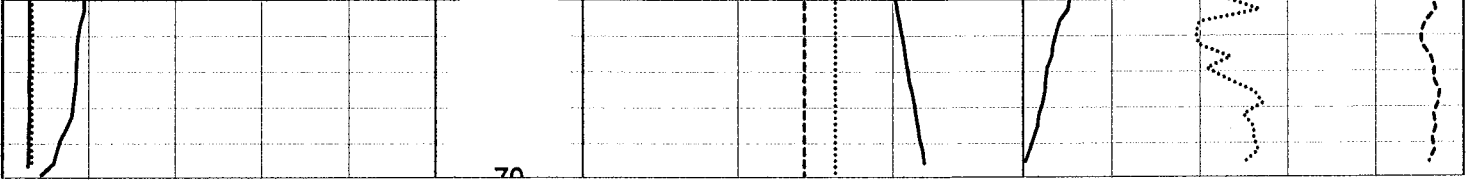
Mount Sopris ALT OBI-40-2 Tool


- Optical televiewer – color digital image

| | | | | | |
|---------------------------------------------------------------------------------------------------------|--|-----------------------------------|-------------------------------------|--------------------------------------|--|
| Well: | | RIMW 25 | | Log: 25-A | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/28/07 | | | Time: 09:30 | | |
| System Configuration: Mount Sopris 2IDA with ammonia option | | | | | |
| Water Level: 15.2' | | Measured From: GS at ~ 09:15 8/07 | | | |
| Outer Casing Height AGL (with cap open/removed): 0.7' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: See notes | | Measured from: Ground Surface | | Log Speed: 13.8 fpm | |
| Log Top: 15.5' | | Log Bottom: 69.9' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: Redox = 1 | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; 9041&65; OTV | |
| Well Diameter: 6.25" | | Well Depth: ~70.3' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 39.9' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.888535° N | | | Longitude: -81.072158° W | | |
| Notes: * fluid conductivity data collected at mS/cm but displayed as uS/cm. GPS values; NAD83 | | | | | |
|  | | | | | |

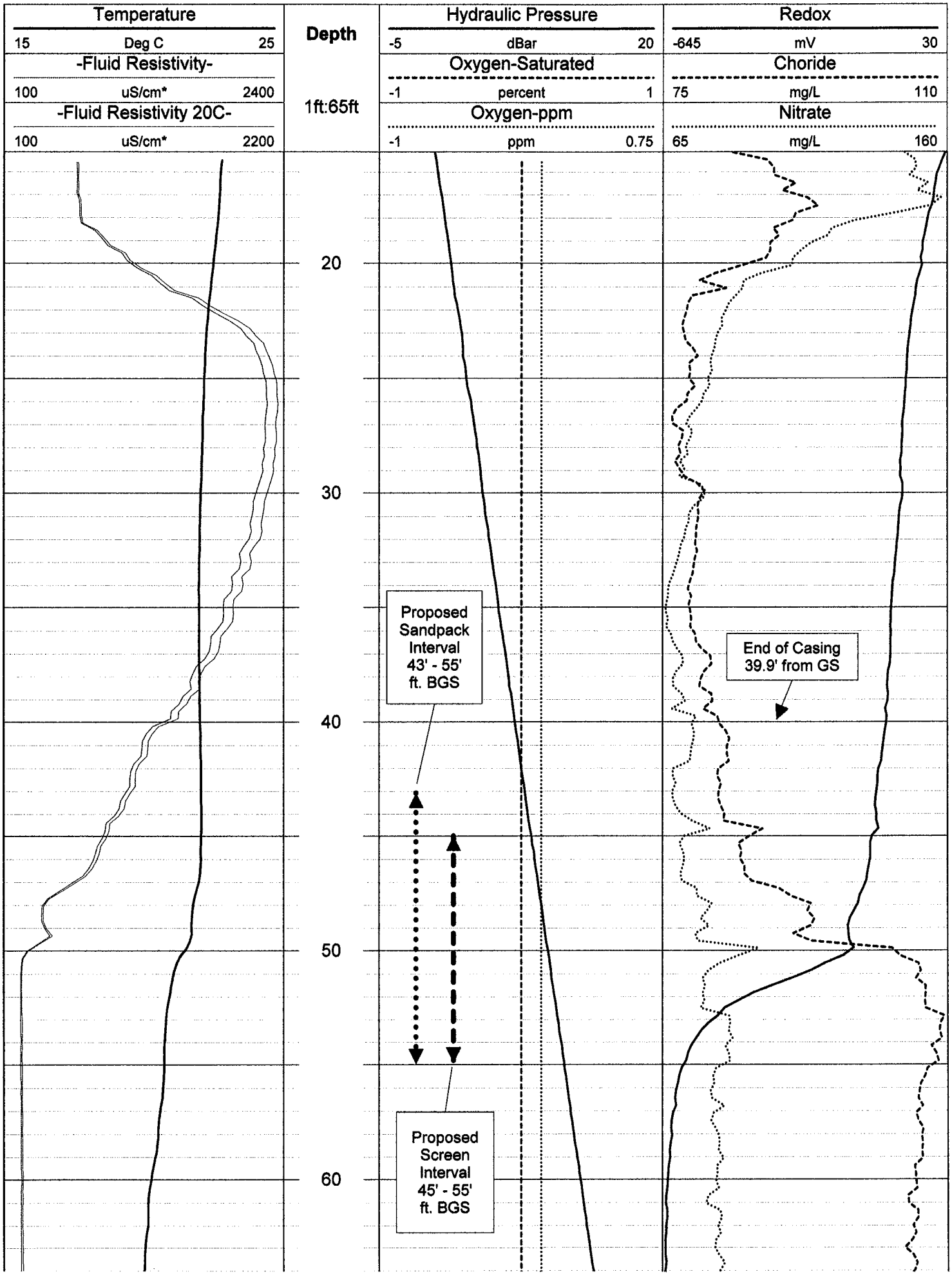


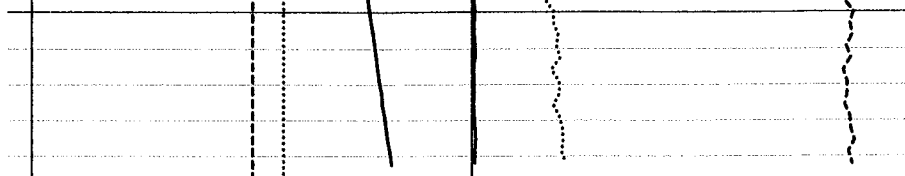
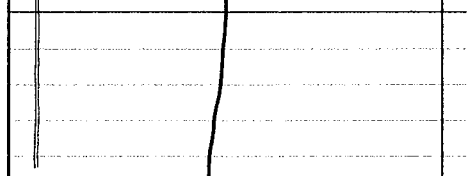





| | | | | | |
|---------------------------------------------------------------------------------------------------------|--|-----------------------------------|-------------------------------------|--------------------------------------|--|
| Well: | | RIMW 25 | | Log: 25-B | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/28/07 | | | Time: 09:55 | | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | | | | |
| Water Level: 15.2' | | Measured From: GS at ~ 09:15 8/07 | | | |
| Outer Casing Height AGL (with cap open/removed): 0.7' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: See notes | | Measured from: Ground Surface | | Log Speed: 14 fpm | |
| Log Top: 15.2' | | Log Bottom: 69.7' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: Rodox = 1 | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; 9041&65; OTV | |
| Well Diameter: 6.25" | | Well Depth: ~70.3' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 39.9' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.888535° N | | | Longitude: -81.072158 ° W | | |
| Notes: * fluid conductivity data collected at mS/cm but displayed as uS/cm. GPS values; NAD83 | | | | | |
|  | | | | | |



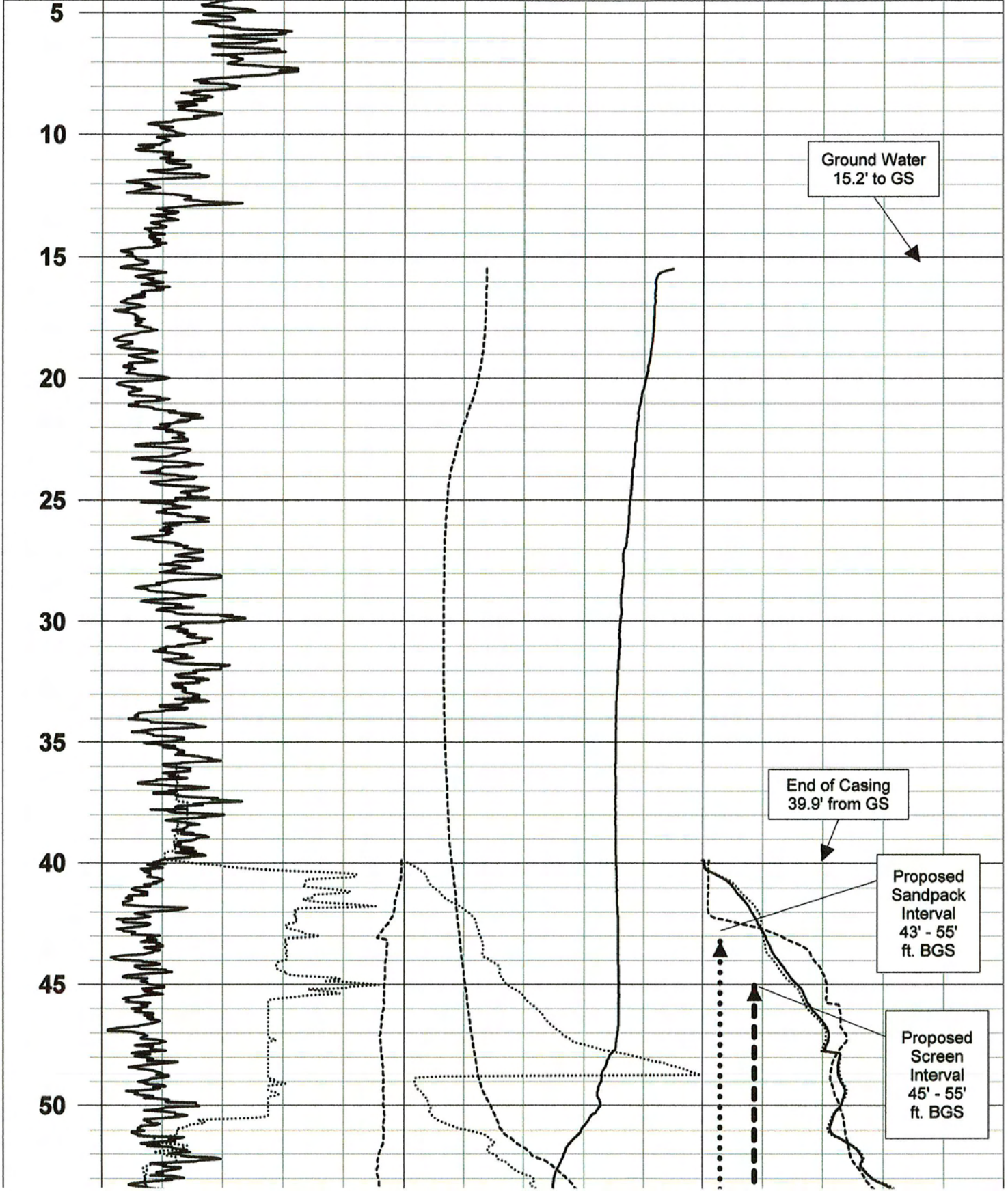


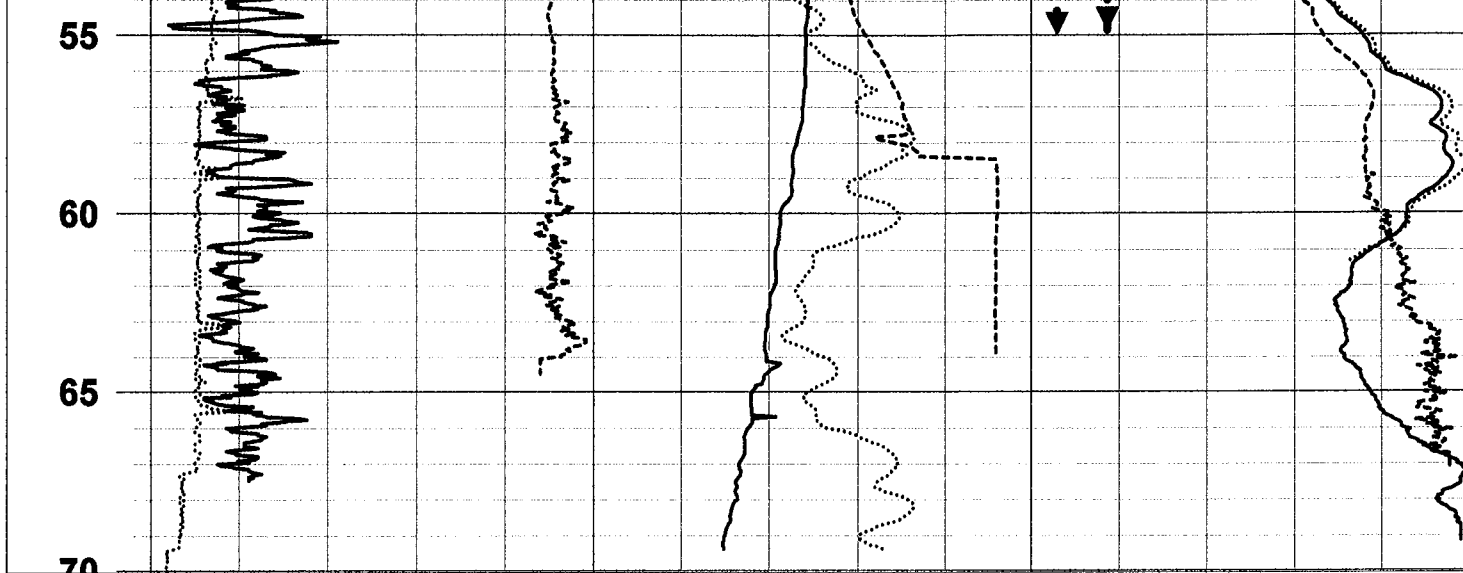



| | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------|--------------------------------------|-----------------------------------|--|
| Well: | | RIMW 25 | | Log: 25-C | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/28/07 | | | Time: See notes | | |
| System Configuration: Century 9041, 9065 | | | | | |
| Water Level: 15.2' | | Measured From: GS at ~ 09:15 8/07 | | | |
| Outer Casing Height AGL (with cap open/removed): 0.7' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: See notes | | Measured from: Ground Surface | | Log Speed: see notes | |
| Log Top: 4.5' | | Log Bottom: 70.1' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: Natural gamma = 11 | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; 2IDA; OTV | |
| Well Diameter: 6.25" | | Well Depth: ~70.3' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 39.9' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.888535° N | | | Longitude: -81.072158° W | | |
| Notes: Caliper logged up on 8/28/07 @ 11:00; speed ~16 fpm 9041 logged down on 8/28/07 @ 10:47; speed 15 fpm GPS values; NAD83 | | | | | |
|  | | | | | |



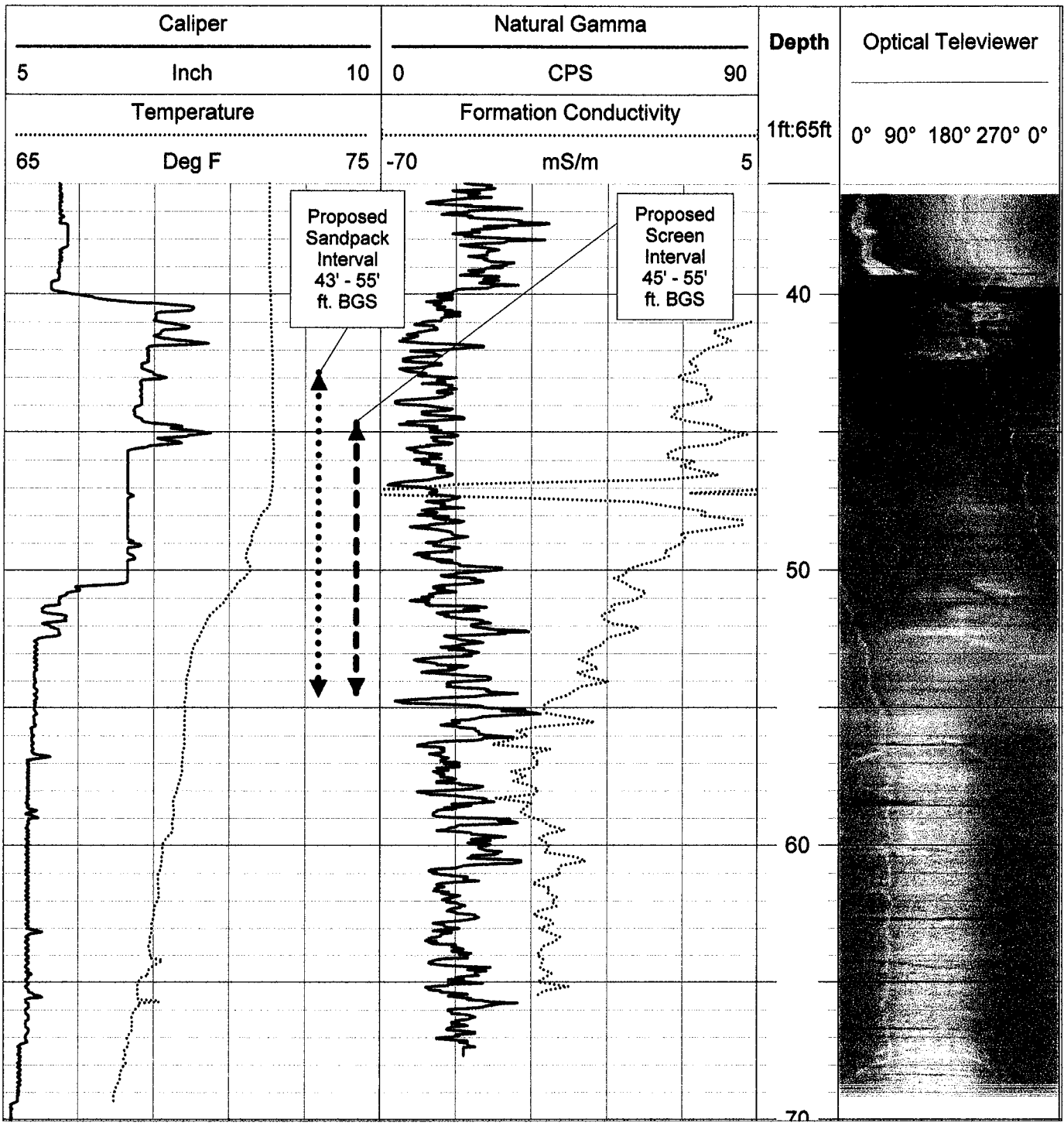
| Depth | Natural Gamma | | Temperature | | 16" Normal Resistivity | |
|----------|-----------------------|-----|--------------------------|------|------------------------|-----|
| | 0 | 90 | 65 | 75 | 0 | 155 |
| 1ft:65ft | Spontaneous Potential | | Fluid Resistivity | | 64" Normal Resistivity | |
| | 0 | 575 | 0 | 40 | 0 | 80 |
| | Caliper | | Single Point Resistivity | | Computed Lateral | |
| | 5 | 8 | 640 | 3315 | 0 | 180 |
| | CPS | | Deg F | | OHM-M | |
| | mV | | OHM-M | | OHM-M | |
| | INCH | | OHM | | OHM-M | |





| | | | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------|--------------------------------------|-------------------------------------|--|---------------|--|
| Well: | | RIMW 25 | | Log: | | 25 - D | |
| Site: | | PSC | | | | | |
| City/State: Rock Hill, South Carolina | | | | | | | |
| Date: 8/28/07 | | | | Time: See notes | | | |
| System Configuration: Century 9041, 9065, OTV; Mount Sopris 2EMA | | | | | | | |
| Water Level: 15.2' | | Measured From: GS at ~ 09:15 on 8/07 | | | | | |
| Outer Casing Height AGL (with cap open/removed): 0.7' Type: Steel | | | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | | Casing Type: N/A | | | |
| Log Direction: See notes | | Measured from: Ground Surface | | Log Speed: see notes | | | |
| Log Top: 36' | | Log Bottom: 70.1' | | Reference Point: GS | | | |
| Analysis Software: WellCAD | | | Smoothing Points: Natural gamma = 11 | | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2IDA | | | |
| Well Diameter: 6.25" | | Well Depth: ~70.3' | | Referenced From: GS | | | |
| Casing Material: Steel | | | | Non-Cased Interval: 39.9' to bottom | | | |
| Screen Interval: None | | | | Screen Type: N/A | | | |
| Latitude: 34.888535° N | | | | Longitude: -81.072158° W | | | |
| Notes: GPS values; NAD83 Caliper logged up on 8/28/07 @ 11:00; speed ~16 fpm 9041 logged down on 8/28/07 @ 10:47; speed 15 fpm Optical televiewer logged up on 8/28/07 @ 11:30; speed 2.0 fpm Formation conductivity logged up at 10:15 on 8/28; speed 15 fpm | | | | | | | |
|  | | | | | | | |





PSC Site
August 22 – 28, 2007
Rock Hill, South Carolina

Geophysical Logs

Well Logs for RIMW 26

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log 26 – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L

Log 26 – B

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log 26 - C

Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity - Ohm/M
Computed lateral resistivity – Ohm/M
Caliper – inches

Log 26 - D

Natural gamma – cps
Caliper, 3-arm - inches
Formation conductivity – mS/m
Optical televiewer – color digital image

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool

- Temperature – degrees Fahrenheit
- Natural gamma – cps
- Spontaneous potential - mV
- Fluid resistivity – Ohm/M
- Single point resistivity - Ohm
- 16 inch normal resistivity – Ohm/M
- 24 inch normal resistivity – Ohm/M
- Computed lateral resistivity – Ohm/M

Century 9065 tool

- Caliper, 3-arm - inches

Mount Sopris 2IDA tool – ammonia configuration

- Temperature – degrees Centigrade
- Fluid conductivity – $\mu\text{S}/\text{cm}$
- Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
- Hydraulic pressure - dBar
- Oxygen – saturated - percent
- Oxygen – ppm
- Redox - mV
- Chloride – mg/L
- Ammonia – mg/L (option sensor)

Mount Sopris 2IDA tool – nitrate configuration


- Temperature – degrees Centigrade
- Fluid conductivity – $\mu\text{S}/\text{cm}$
- Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
- Hydraulic pressure - dBar
- Oxygen – saturated - percent
- Oxygen – ppm
- Redox - mV
- Chloride – mg/L
- Nitrate – mg/L (option sensor)

Mount Sopris 2EMA-1000 tool

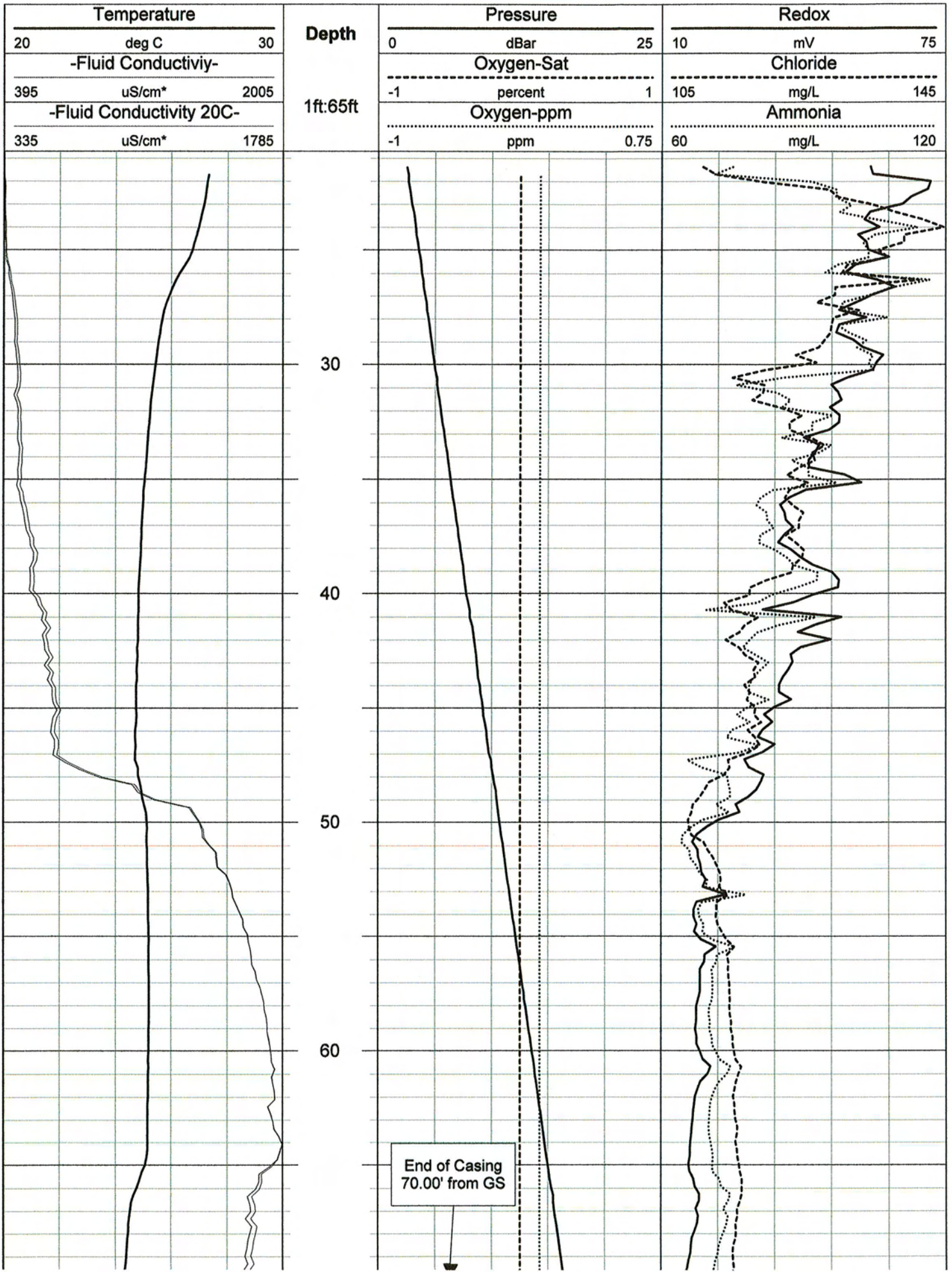
- Formation conductivity – mS/m

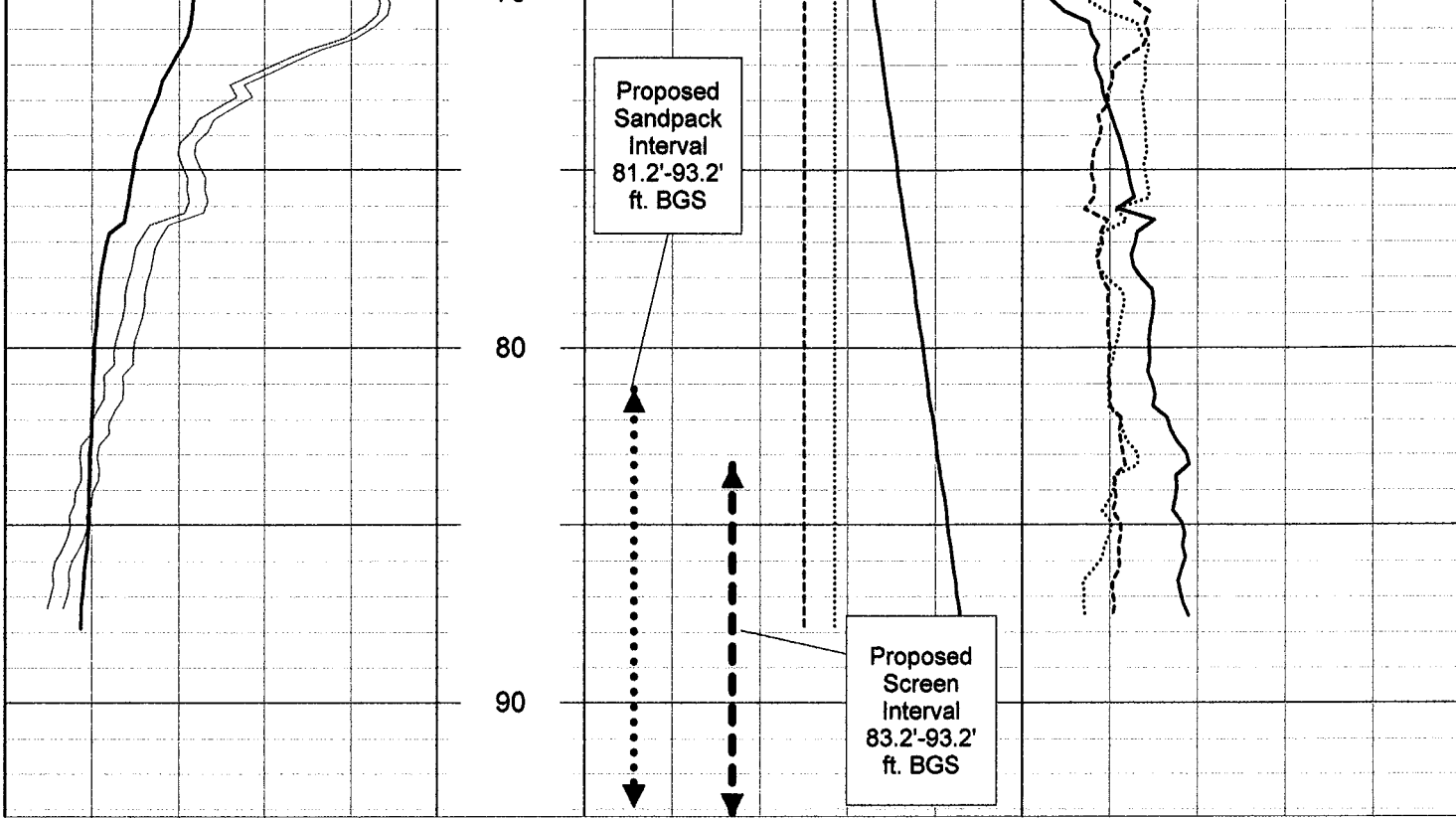
Mount Sopris ALT OBI-40-2 Tool


- Optical televiewer – color digital image

| | | |
|------------------------------------------------------------------------------------------|------------------------------------|--------------------------------------|
| Well: RIMW 26 | | Log: 26-A |
| Site: PSC | | |
| City/State: Rock Hill, South Carolina | | |
| Date: 08/22/07 | Time: 12:55 | |
| System Configuration: Mount Sopris with ammonia option | | |
| Water Level: 11.65' | Measured From: GS at ~ 11:15 08/22 | |
| Outer Casing Height AGL (with cap open/removed): -0.65' Type: Steel | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | Casing Type: N/A |
| Log Direction: Down | Measured from: GS | Log Speed: 10.8 fpm |
| Log Top: 21.4' | Log Bottom: 88.0' | Reference Point: Ground Surface |
| Analysis Software: WellCAD | | Smoothing Points: Redox = 1 |
| Operator: JRU | Witness: None | Other Tools Used: 2EMA; 9041&65; OTV |
| Well Diameter: 6.25" | Well Depth: 98.6' | Referenced From: GS |
| Casing Material: Steel | | Non-Cased Interval: 70.00' to bottom |
| Screen Interval: None | | Screen Type: N/A |
| Latitude: 34.88837161° N | | Longitude: -81.07170296° W |
| Notes: GPS NAD 83 * fluid conductivity data collected at mS/cm but displayed as uS/cm | | |
|  | | |

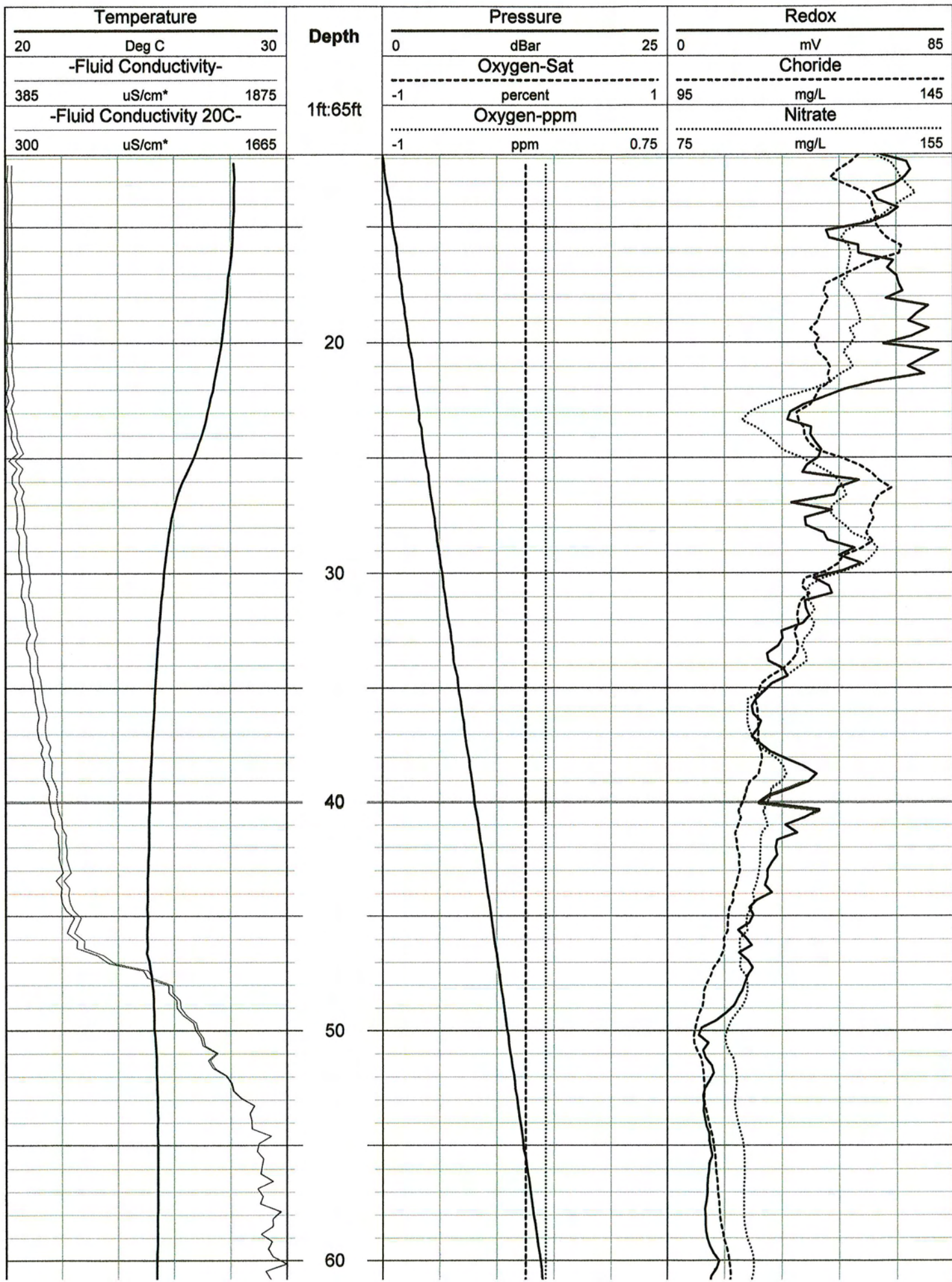


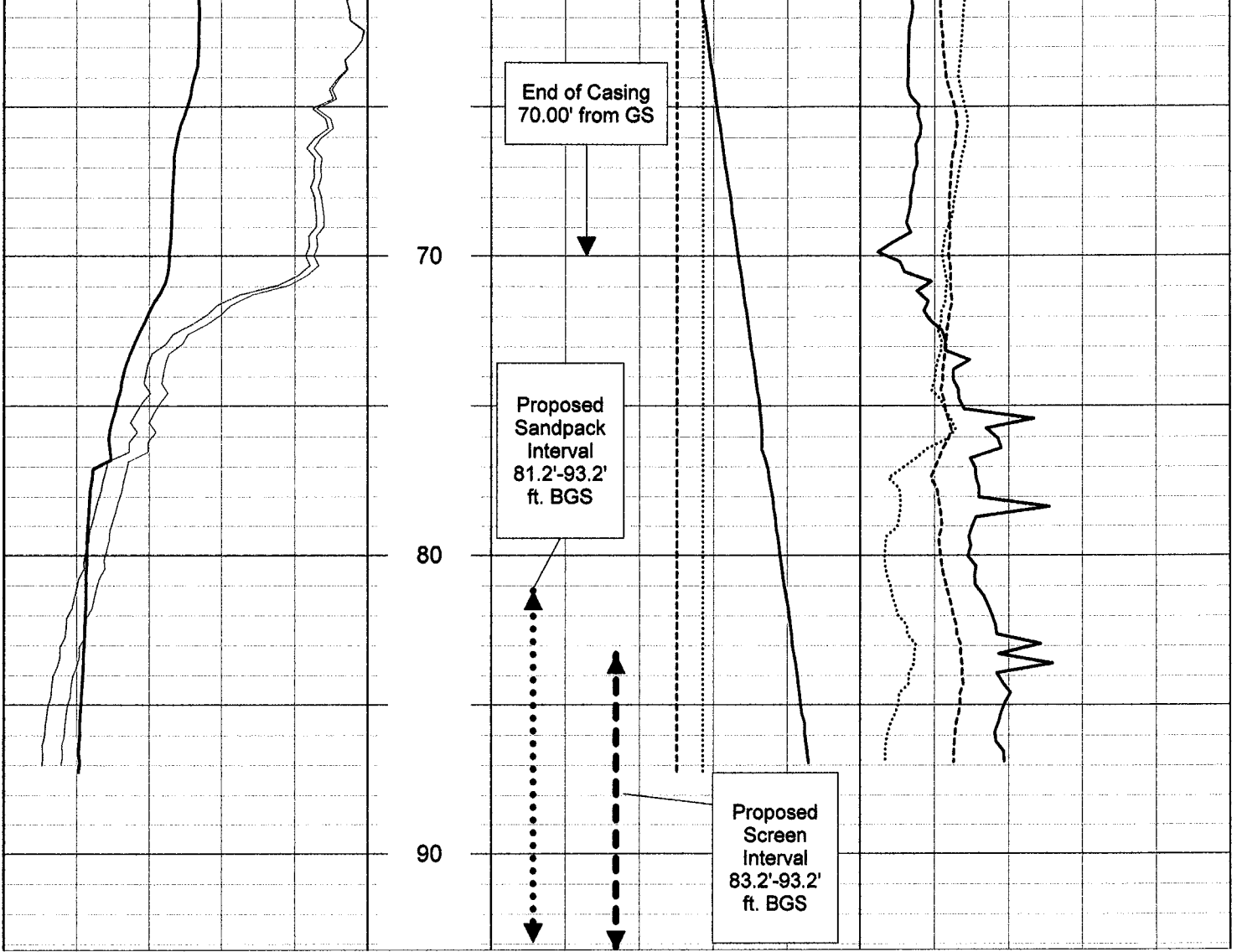




| | | |
|-------------------------------------------------------------------------------------|------------------------------------|--------------------------------------|
| Well: RIMW 26 | | Log: 26-B |
| Site: PSC | | |
| City/State: Rock Hill, South Carolina | | |
| Date: 08/22/07 | Time: 12:18 | |
| System Configuration: Mount Sopris with nitrate option | | |
| Water Level: 11.65' | Measured From: GS at ~ 11:15 08/22 | |
| Outer Casing Height AGL (with cap open/removed): -0.65' Type: Steel | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | Casing Type: N/A |
| Log Direction: Down | Measured from: GS | Log Speed: 10.8 fpm |
| Log Top: 12.3' | Log Bottom: 85.8' | Reference Point: Ground Surface |
| Analysis Software: WellCAD | | Smoothing Points: Redox = 1 |
| Operator: JRU | Witness: None | Other Tools Used: 2EMA; 9041&65; OTV |
| Well Diameter: 6.25" | Well Depth: 98.6' | Referenced From: GS |
| Casing Material: Steel | | Non-Cased Interval: 70.00' to bottom |
| Screen Interval: None | | Screen Type: N/A |
| Latitude: 34.88837161° N | | Longitude: -81.07170296° W |
| Notes: GPS NAD 83 | | |
| * fluid conductivity data collected at mS/cm but displayed as uS/cm | | |
|  | | |



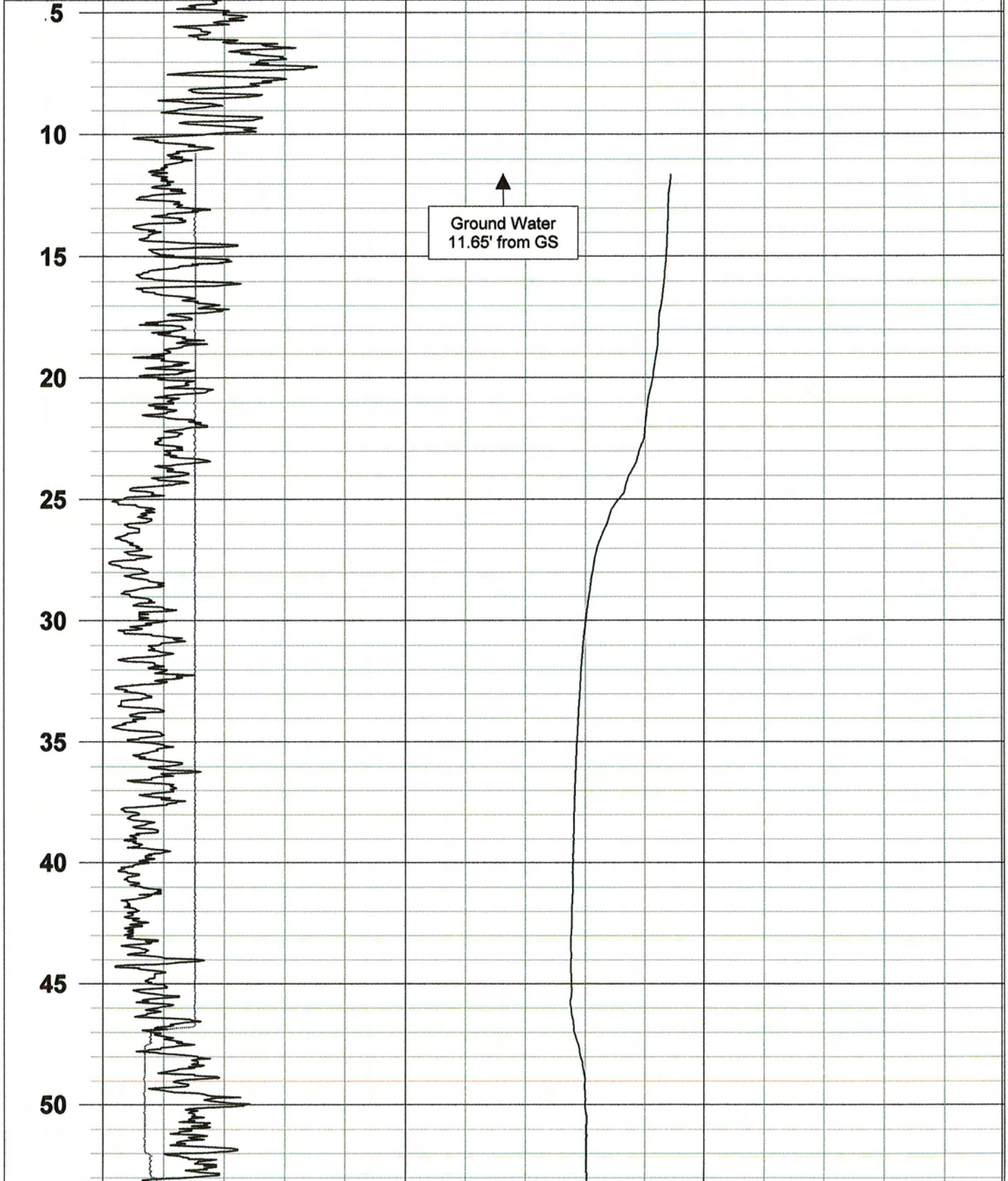


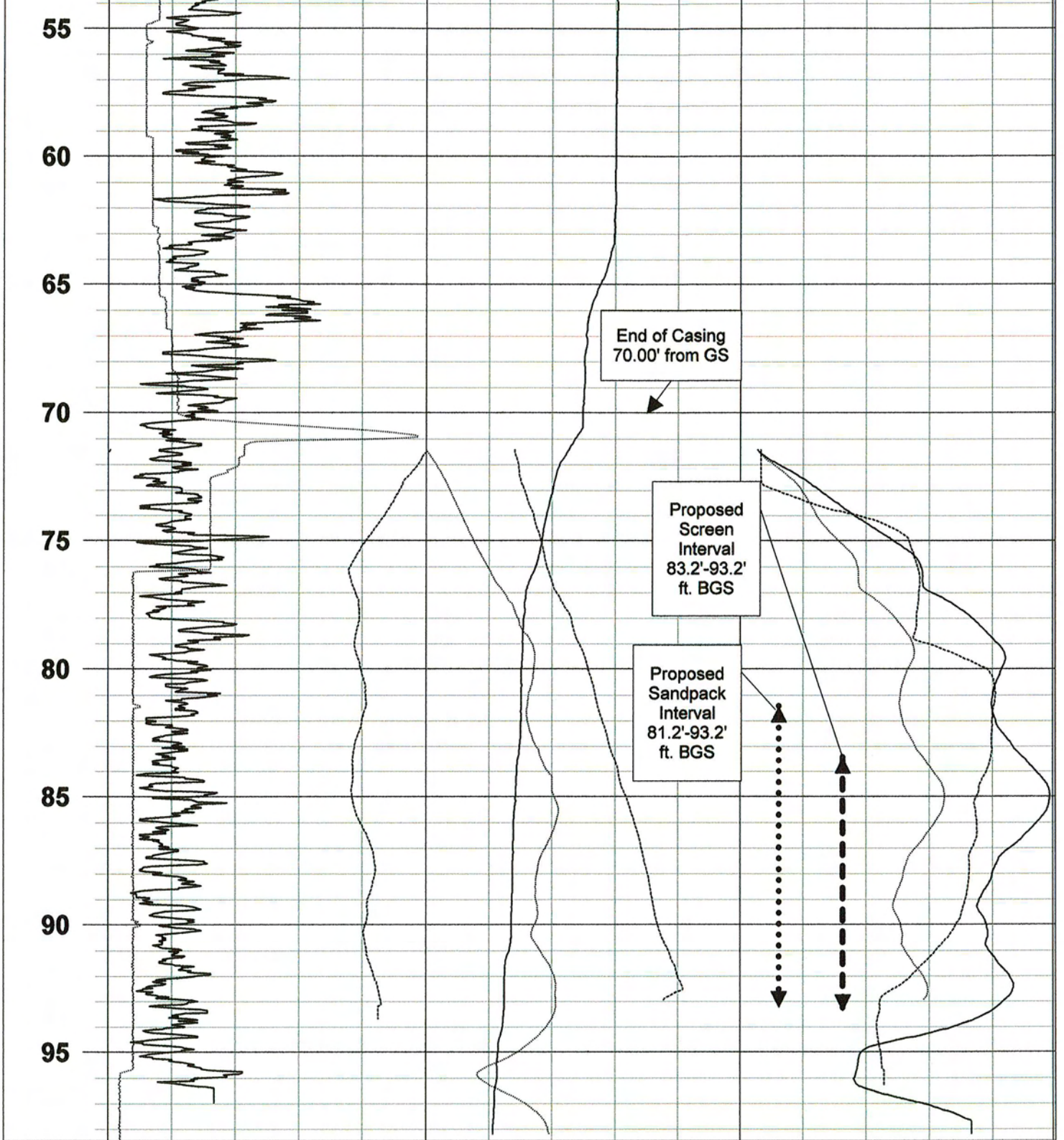



| | | |
|---------------------------------------------------------------------|------------------------------------|--------------------------------------|
| Well: | RIMW26 | Log: 26-C |
| Site: | PSC | |
| City/State: Rock Hill, South Carolina | | |
| Date: 08/22/07 | Time: See notes | |
| System Configuration: Century 9041, 9065 | | |
| Water Level: 11.65' | Measured From: GS at ~ 11:15 08/22 | |
| Outer Casing Height AGL (with cap open/removed): -0.65' Type: Steel | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | Casing Type: N/A |
| Log Direction: See notes | Measured from: GS | Log Speed: see notes |
| Log Top: 4.5' | Log Bottom: 98.5' | Reference Point: GS |
| Analysis Software: WellCAD | | Smoothing Points: Natural gamma = 11 |
| Operator: JRU | Witness: None | Other Tools Used: 2EMA; 2IDA |
| Well Diameter: 6.25" | Well Depth: 98.6' | Referenced From: GS |
| Casing Material: Steel | | Non-Cased Interval: 70.00' to bottom |
| Screen Interval: None | | Screen Type: N/A |
| Latitude: 34.88837161° N | | Longitude: -81.07170296° W |
| Notes: GPS values NAD83 | | |
| Caliper logged up on 08/22/07 @ 14:12; speed ~16 fpm | | |
| 9041 logged down 08/22/07 @ 15:47; speed ~16 fpm | | |



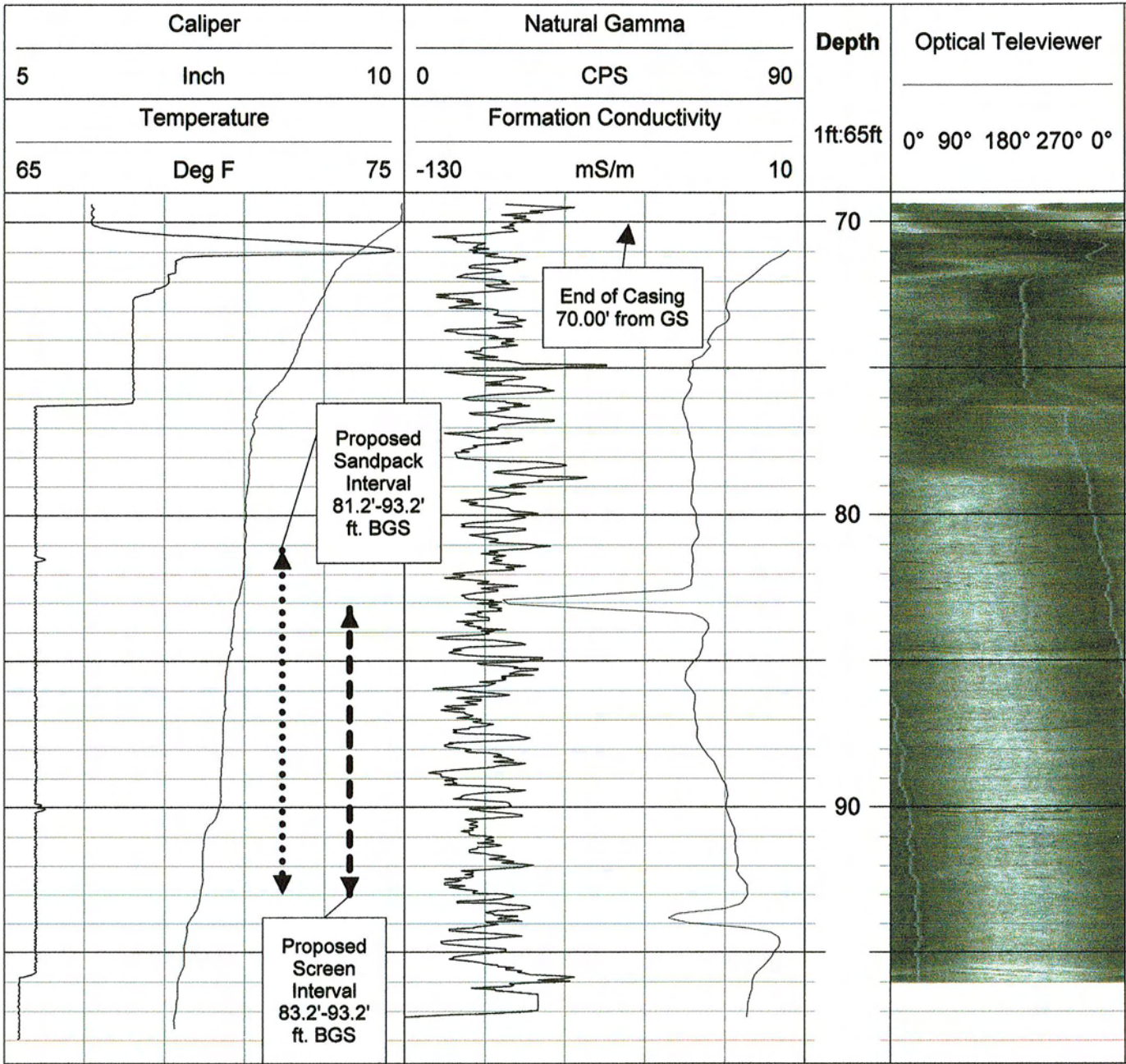
| Depth | Natural Gamma | | Temperature | | 16" Normal Resistivity | |
|----------|-----------------------|---------|--------------------------|----------|------------------------------|-----------|
| | 0 | CPS 90 | 65 | Deg F 85 | 0 | OHM-M 150 |
| 1ft:65ft | Spontaneous Potential | | Fluid Resistivity | | 64" Normal Resistivity | |
| | 155 | mV 340 | 0 | OHM-M 20 | -5 | OHM-M 100 |
| | Caliper | | Single Point Resistivity | | Computed Lateral Resistivity | |
| | 5 | Inch 10 | -230 | OHM 3810 | -5 | OHM-M 265 |





| | | |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------|--------------------------------------|
| Well: | RIMW26 | Log: 26-D |
| Site: | PSC | |
| City/State: Rock Hill, South Carolina | | |
| Date: 08/22/07 | Time: See notes | |
| System Configuration: Century 9041, 9065 | | |
| Water Level: 11.65' | Measured From: GS at ~ 11:15 08/22 | |
| Outer Casing Height AGL (with cap open/removed): -0.65' Type: Steel | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | Casing Type: N/A |
| Log Direction: See notes | Measured from: GS | Log Speed: see notes |
| Log Top: 69.4' | Log Bottom: 98.00' | Reference Point: GS |
| Analysis Software: WellCAD | | Smoothing Points: Natural gamma = 11 |
| Operator: JRU | Witness: None | Other Tools Used: 2EMA; 2IDA |
| Well Diameter: 6.25" | Well Depth: 98.6' | Referenced From: GS |
| Casing Material: Steel | | Non-Cased Interval: 70.00' to bottom |
| Screen Interval: None | | Screen Type: N/A |
| Latitude: 34.88837161° N | | Longitude: -81.07170296° W |
| Notes: GPS values NAD83 | | |
|  | Formation conductivity logged up at 13:26 on 8/22; speed 14.8 fpm | |
| | Caliper logged up at 14:12 on 8/22; speed ~16 fpm | |
| | 9041 logged down at 14:00 on 8/23; speed ~16 fpm | |
| | Optical televiewer logged down at 16:12 on 8/27; speed 2 fpm | |





PSC Site
August 22 – 28, 2007
Rock Hill, South Carolina

Well Logs for RIMW 28

Geophysical Logs

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log 28 - A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L

Log 28 - B

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log 28 - C

Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity - Ohm/M
Computed lateral resistivity – Ohm/M
Caliper – inches

Log 28 - D

Natural gamma – cps
Caliper, 3-arm - inches
Formation conductivity – mS/m
Optical televiewer – color digital image

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool

- Temperature – degrees Fahrenheit
- Natural gamma – cps
- Spontaneous potential - mV
- Fluid resistivity – Ohm/M
- Single point resistivity - Ohm
- 16 inch normal resistivity – Ohm/M
- 24 inch normal resistivity – Ohm/M
- Computed lateral resistivity – Ohm/M

Century 9065 tool

- Caliper, 3-arm - inches

Mount Sopris 2IDA tool – ammonia configuration

- Temperature – degrees Centigrade
- Fluid conductivity – $\mu\text{S}/\text{cm}$
- Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
- Hydraulic pressure - dBar
- Oxygen – saturated - percent
- Oxygen – ppm
- Redox - mV
- Chloride – mg/L
- Ammonia – mg/L (option sensor)

Mount Sopris 2IDA tool – nitrate configuration


- Temperature – degrees Centigrade
- Fluid conductivity – $\mu\text{S}/\text{cm}$
- Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
- Hydraulic pressure - dBar
- Oxygen – saturated - percent
- Oxygen – ppm
- Redox - mV
- Chloride – mg/L
- Nitrate – mg/L (option sensor)

Mount Sopris 2EMA-1000 tool

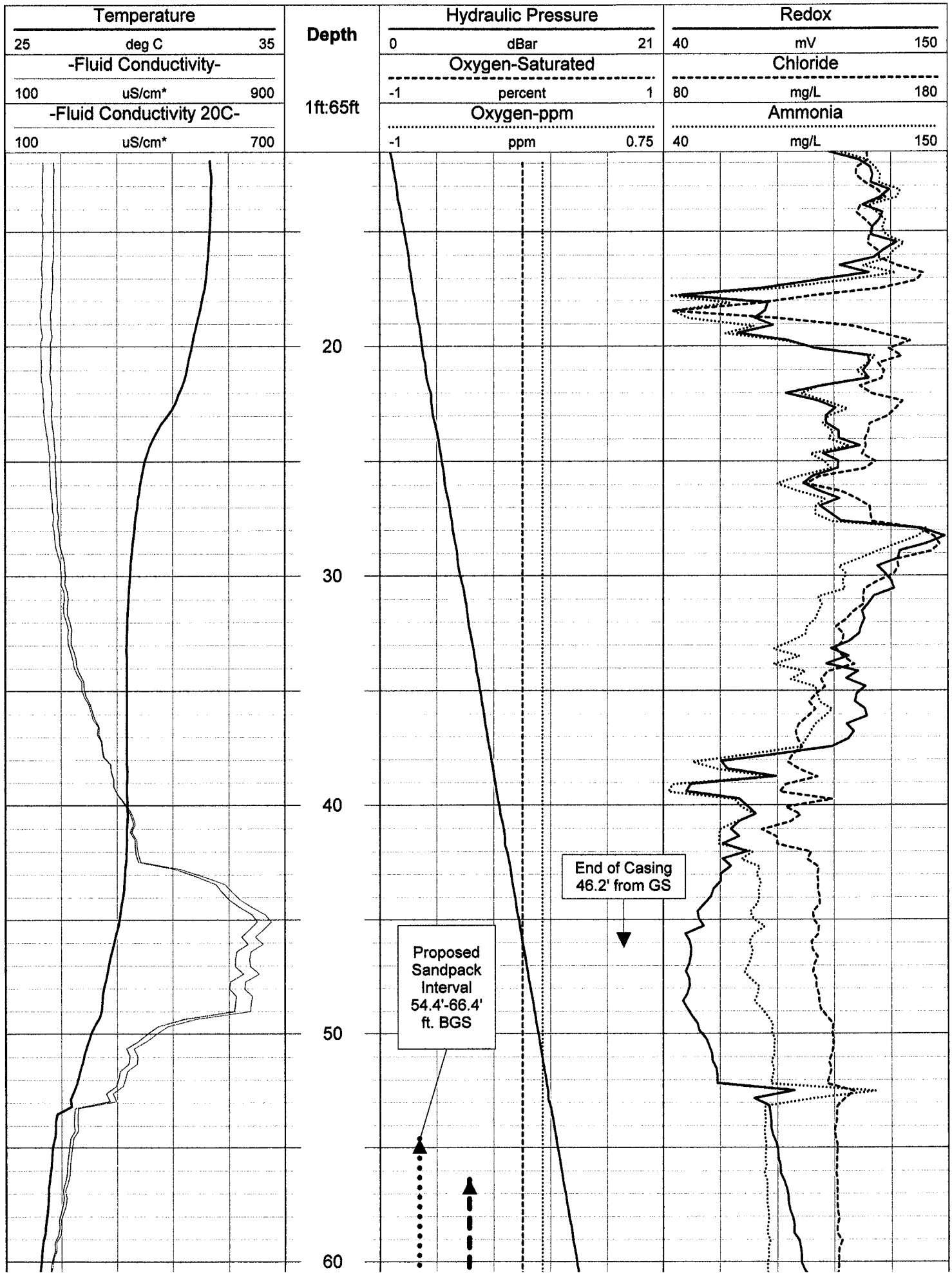
- Ground conductivity - ppt

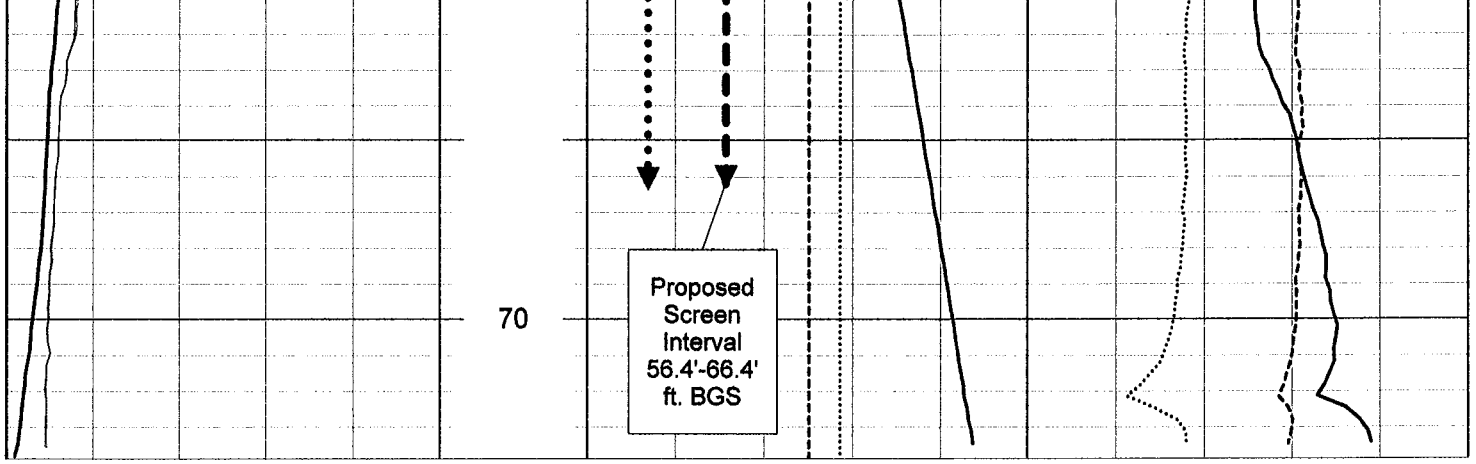
Mount Sopris ALT OBI-40-2 Tool


- Optical televiewer – color digital image

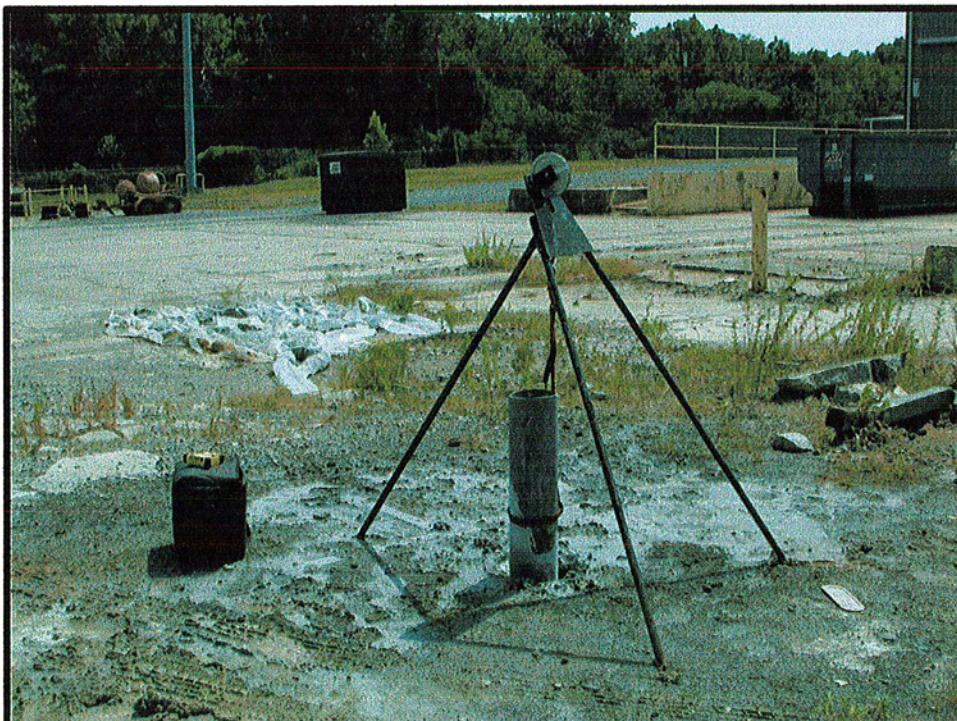
| | | | | | |
|-------------------------------------------------------------------------------------|--|--------------------------------------|-------------------------------------|--------------------------------------|--|
| Well: | | RIMW 28 | | Log: 28-A | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/23/07 | | | Time: 14:50 | | |
| System Configuration: Mount Sopris 2IDA with ammonia option | | | | | |
| Water Level: 6.63' | | Measured From: GS at ~ 14:15 on 8/23 | | | |
| Outer Casing Height AGL (with cap open/removed): 2.15' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: down | | Measured from: Ground Surface | | Log Speed: 14.4 fpm | |
| Log Top: 11.6' | | Log Bottom: 127.8 | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: Redox = 1 | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; 9041&65; OTV | |
| Well Diameter: 6" | | Well Depth: 75.00' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 46.2' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88824904° N | | | Longitude: -81.07256796° W | | |
| Notes: GPS values; NAD83 | | | | | |
| * fluid conductivity data collected at mS/cm but displayed at uS/cm | | | | | |
|  | | | | | |



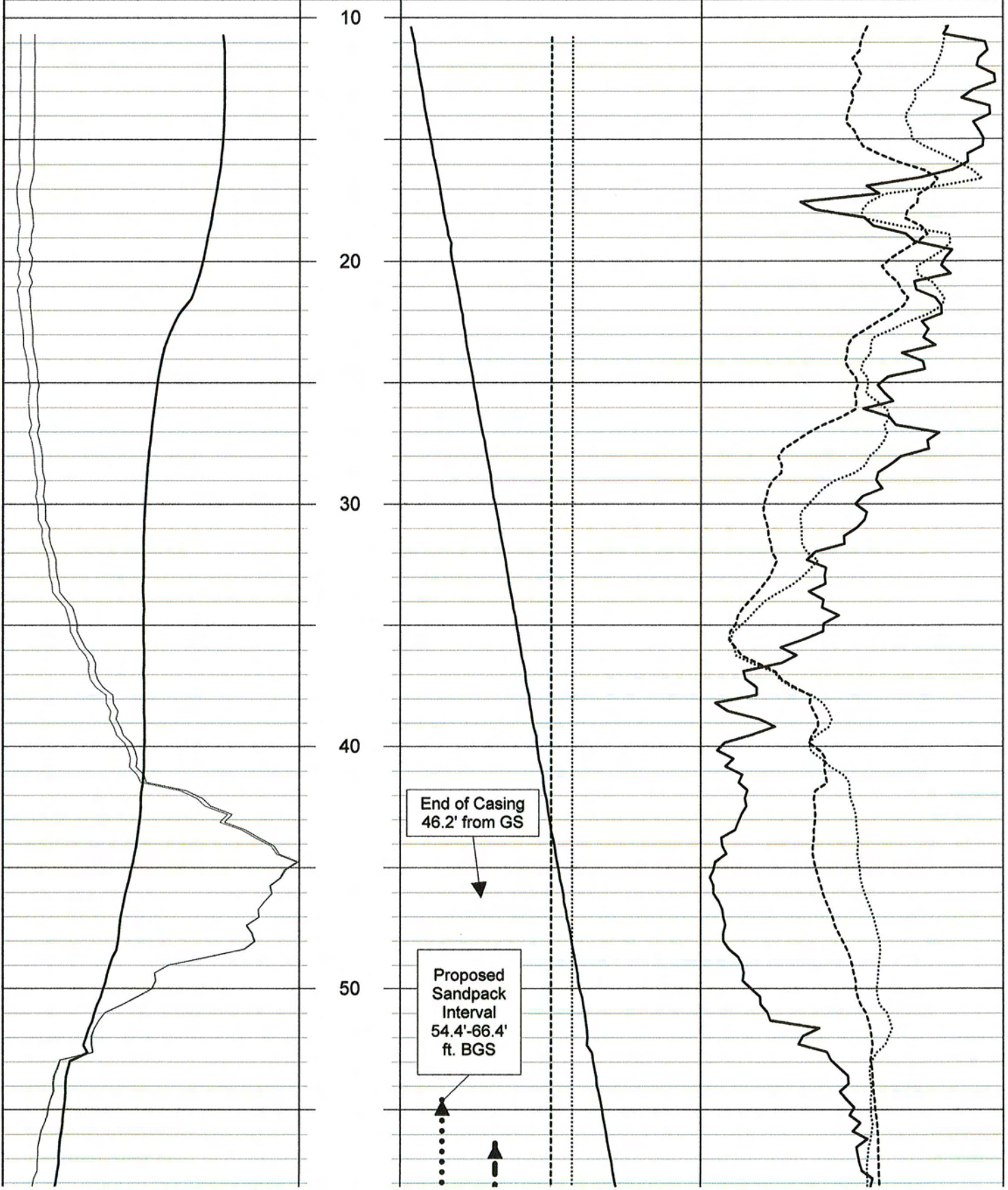


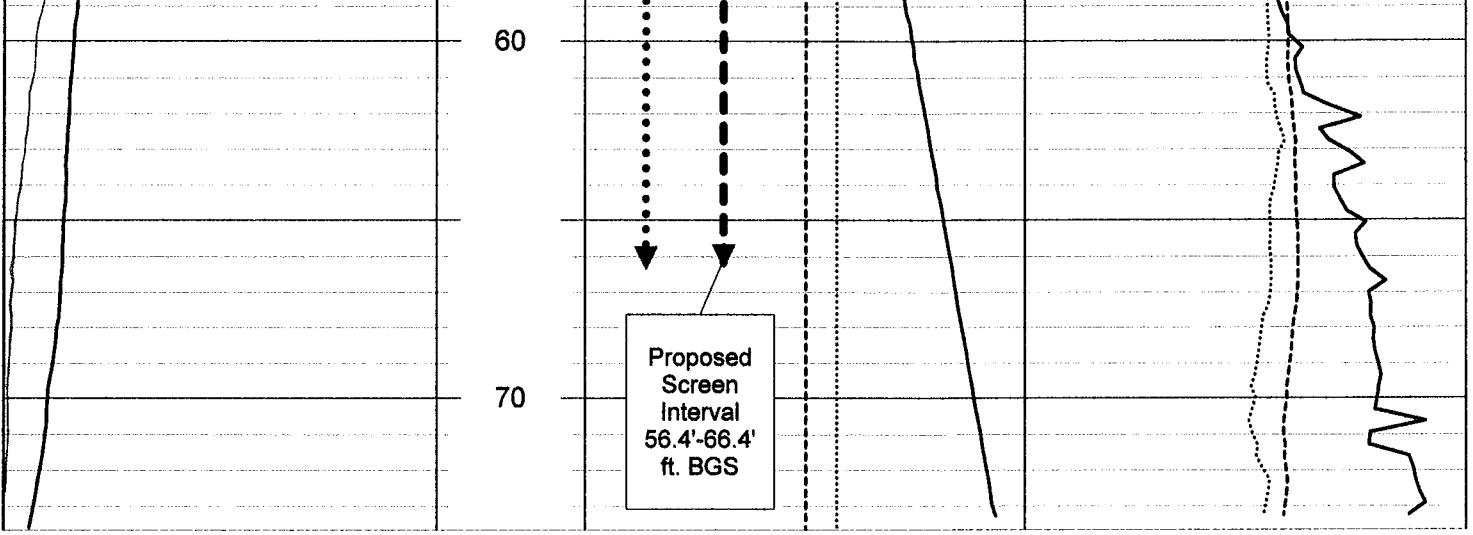


| | | | | | |
|-------------------------------------------------------------------------------------|--|--------------------------------------|-------------------------------------|--------------------------------------|--|
| Well: | | RIMW 28 | | Log: 28-B | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/23/07 | | | Time: 14:25 | | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | | | | |
| Water Level: 6.63' | | Measured From: GS at ~ 14:15 on 8/23 | | | |
| Outer Casing Height AGL (with cap open/removed): 2.15' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: down | | Measured from: Ground Surface | | Log Speed: 11.8 fpm | |
| Log Top: 10.4' | | Log Bottom: 73.7' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: Redox = 1 | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; 9041&65; OTV | |
| Well Diameter: 6" | | Well Depth: 75.00' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 46.2' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88824904° N | | | Longitude: -81.07256796° W | | |
| Notes: GPS values; NAD83 | | | | | |
| * fluid conductivity data collected at mS/cm but displayed at uS/cm | | | | | |
|  | | | | | |

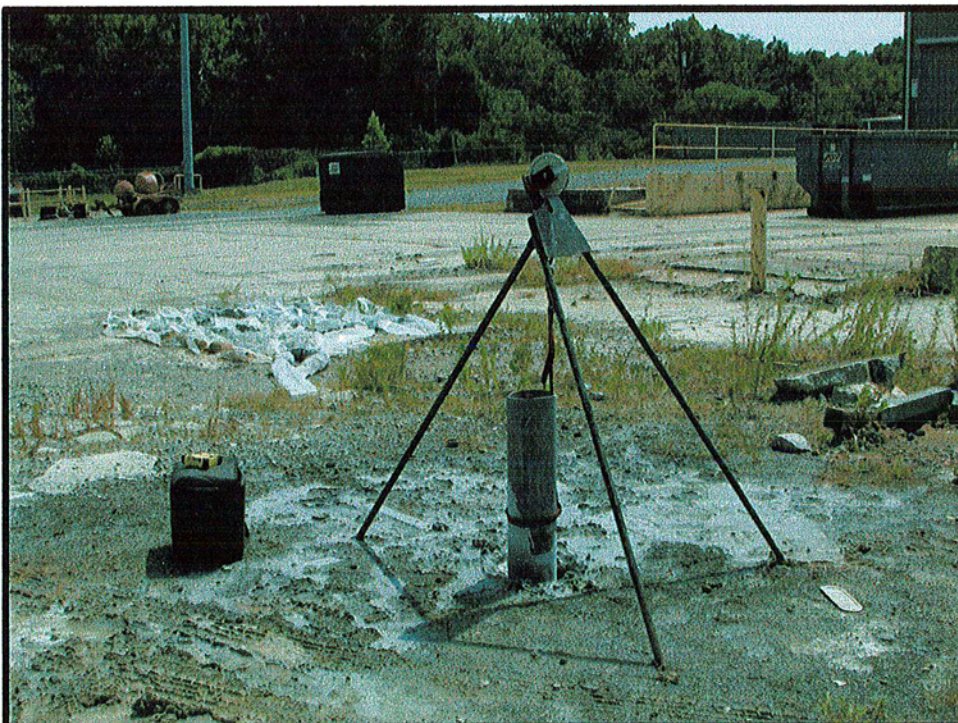


| Temperature | | | Depth 1ft:65ft | Hydraulic Pressure | | | Redox | | |
|--------------------------|--------|-----|-------------------|--------------------|---------|---------|----------|------|-----|
| 25 | Deg C | 35 | | 0 | dBar | 20 | 45 | mV | 145 |
| -Fluid Conductivity- | | | | Oxygen-Saturated | | | Chloride | | |
| 170 | uS/cm* | 810 | | -1 | percent | 1 | 90 | mg/L | 170 |
| -Fluid Conductivity 20C- | | | Oxygen-ppm | | | Nitrate | | | |
| 150 | uS/cm* | 660 | -1 | ppm | 0.75 | 45 | mg/L | 135 | |

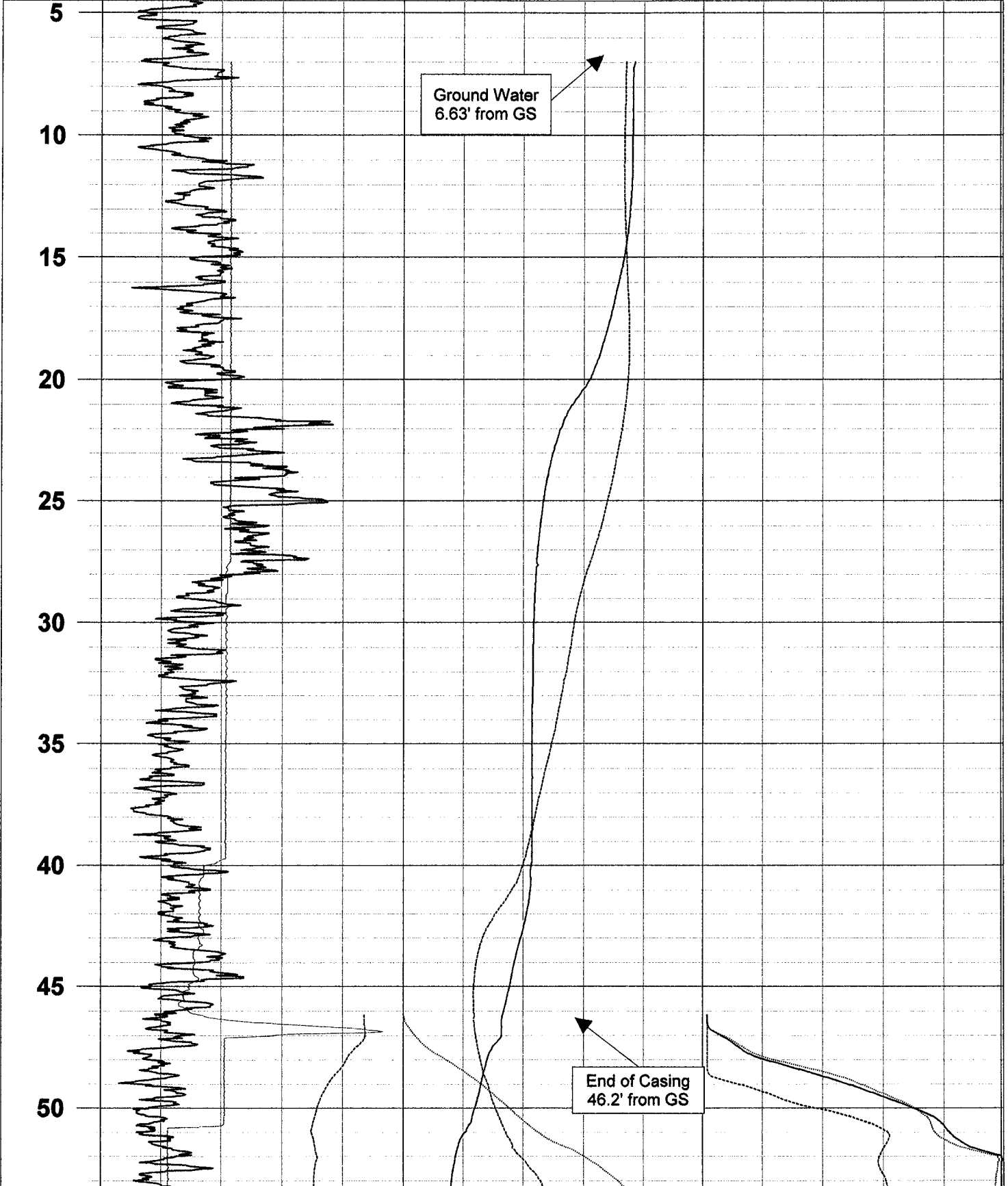


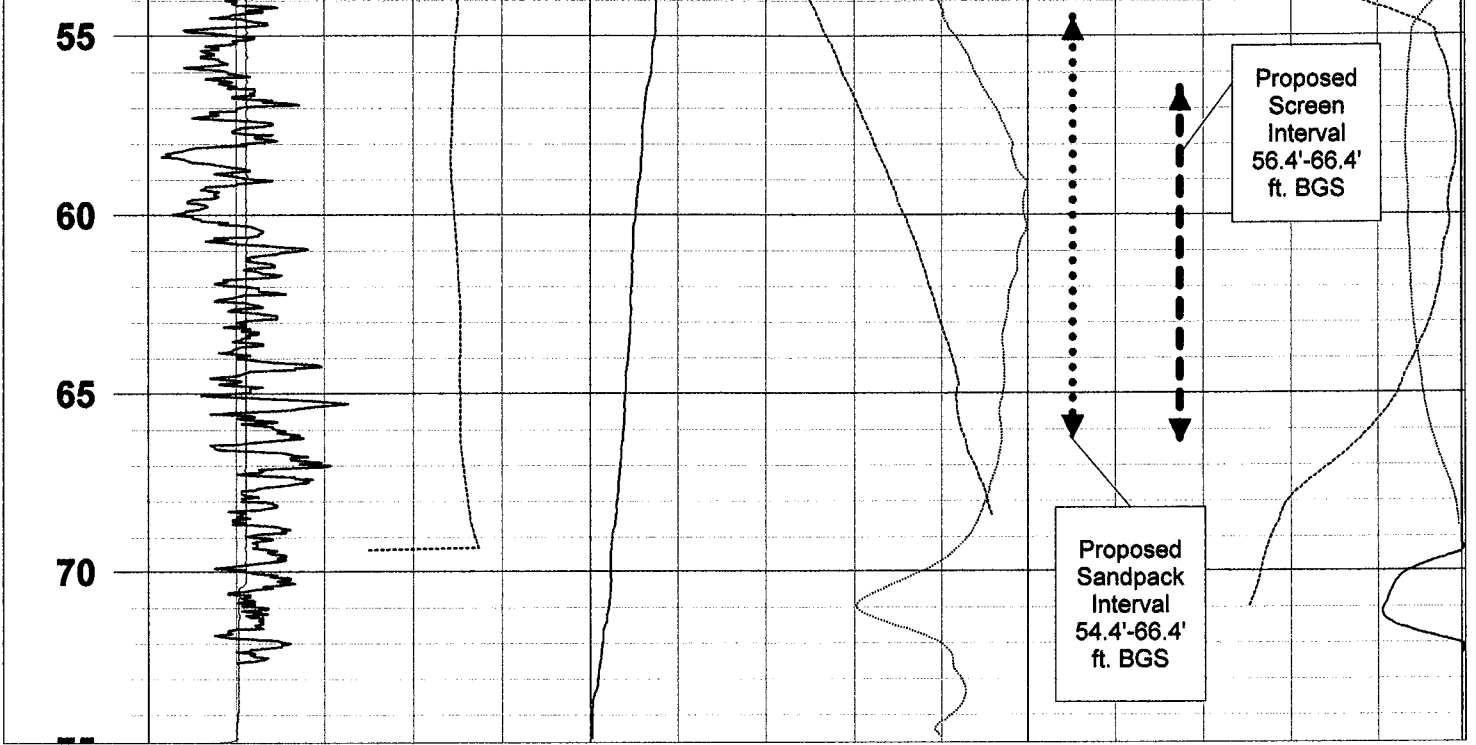


| | | | | | |
|--------------------------------------------------------------------|--|--------------------------------------|-------------------------------------|-----------------------------------|--|
| Well: | | RIMW 28 | | Log: 28-C | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/23/07 | | | Time: See notes | | |
| System Configuration: Century 9041 & 9065 | | | | | |
| Water Level: 6.63' | | Measured From: GS at ~ 14:15 on 8/23 | | | |
| Outer Casing Height AGL (with cap open/removed): 2.15' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: See notes | | Measured from: Ground Surface | | Log Speed: see notes | |
| Log Top: 8.8' | | Log Bottom: 127.8 | | Reference Point: GS | |
| Analysis Software: WellCAD | | Smoothing Points: Natural gamma = 11 | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; 2IDA; OTV | |
| Well Diameter: 6" | | Well Depth: 75.00' | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 46.2' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88824904° N | | | Longitude: -81.07256796° W | | |
| Notes: GPS values; NAD83 | | | | | |
| Caliper logged up at 15:33 on 8/23; speed 16 fpm | | | | | |
| 9041 logged down at 16:00 on 8/23; speed 15 fpm | | | | | |

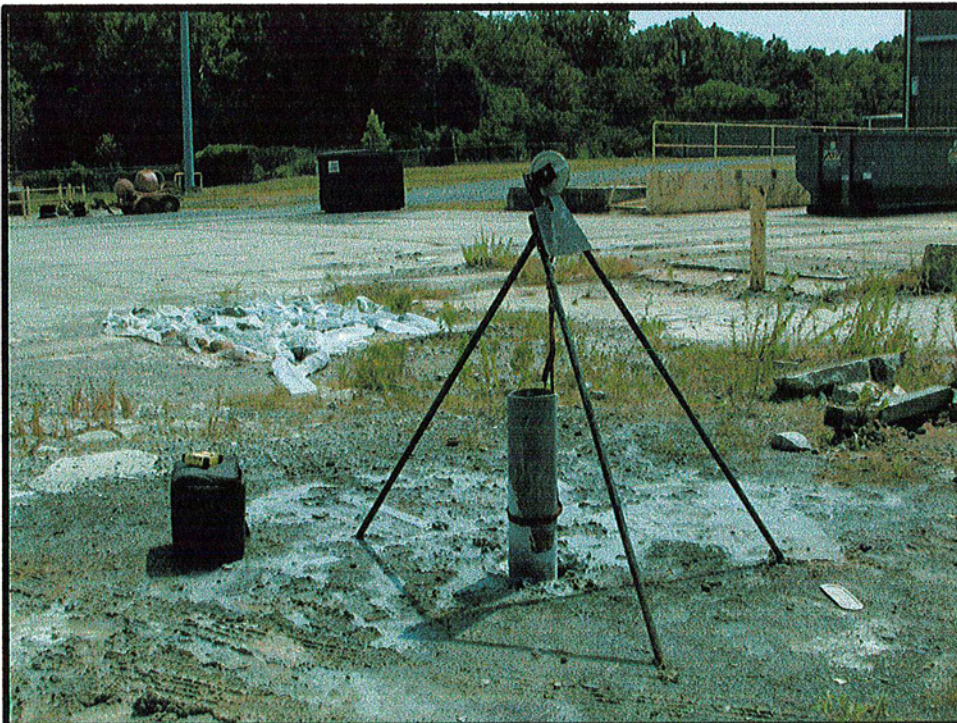


| Depth | Natural Gamma | | Temperature | | 16" Normal Resistivity | | | | |
|----------|-----------------------|------|--------------------------|-----|------------------------|------|----|-------|-----|
| | 0 | CPS | 90 | 75 | Deg F | 95 | -5 | OHM-M | 320 |
| 1ft:65ft | Spontaneous Potential | | Fluid Resistivity | | 64" Normal Resistivity | | | | |
| | -285 | mV | 290 | 0 | OHM-M | 50 | -5 | OHM-M | 320 |
| | Caliper | | Single Point Resistivity | | Computed Lateral | | | | |
| | 4 | Inch | 10 | 185 | OHM | 6500 | -5 | OHM-M | 365 |





| | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------|--------------------------------------|------------------------|--|
| Well: | | RIMW 28 | | Log: 28-D | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/23/07 | | | Time: See notes | | |
| System Configuration: Century and Mount Sopris | | | | | |
| Water Level: 6.63' | | Measured From: GS at ~ 14:15 on 8/23 | | | |
| Outer Casing Height AGL (with cap open/removed): 2.15' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: See notes | | Measured from: Ground surface | | Log Speed: see notes | |
| Log Top: | | Log Bottom: | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: Natural gamma = 11 | | |
| Operator: JRU | | Witness: none | | Other Tools Used: 2IDA | |
| Well Diameter: 6" | | Well Depth: 75.00 | | Referenced From: GS | |
| Casing Material: Steel | | | Non-Cased Interval: 46.2' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88824904° N | | | Longitude: -81.07256796° W | | |
| Notes: GPS values ± 5.71M; NAD83 Formation conductivity logged up at 13:25 on 8/23; speed 13.2 fpm Caliper logged up at 13:33 on 8/23; speed 16 fpm 9041 logged down at 14:00 on 8/23; speed 16 fpm Optical televiewer logged down at 17:40 on 8/27; speed 2.3 fpm | | | | | |



PSC Site
August 22 – 28, 2007
Rock Hill, South Carolina

Geophysical Logs

Well Logs for RIMW 29

(note: some logs may have data parameters combined from other tools to improve comprehension)

Log 29 – A

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Ammonia – mg/L

Log 29 – B

Temperature – degrees Centigrade
Fluid conductivity - $\mu\text{S}/\text{cm}$
Fluid conductivity at 20° C - $\mu\text{S}/\text{cm}$
Hydraulic pressure - dBar
Oxygen – saturated - percent
Oxygen – ppm
Redox - mV
Chloride – mg/L
Nitrate – mg/L

Log 29 - C

Temperature – degrees Fahrenheit
Natural gamma – cps
Spontaneous potential - mV
Fluid resistivity – Ohm/M
Single point resistivity - Ohm
16 inch normal resistivity – Ohm/M
24 inch normal resistivity - Ohm/M
Computed lateral resistivity – Ohm/M
Caliper – inches

Log 29 - D

Natural gamma – cps
Caliper, 3-arm - inches
Formation conductivity – mS/m
Optical televiewer – color digital image

List of Individual Logging Tools Used at PSC and Selected Parameters

Century 9041 tool

- Temperature – degrees Fahrenheit
- Natural gamma – cps
- Spontaneous potential - mV
- Fluid resistivity – Ohm/M
- Single point resistivity - Ohm
- 16 inch normal resistivity – Ohm/M
- 24 inch normal resistivity – Ohm/M
- Computed lateral resistivity – Ohm/M

Century 9065 tool

- Caliper, 3-arm - inches

Mount Sopris 2IDA tool – ammonia configuration

- Temperature – degrees Centigrade
- Fluid conductivity – $\mu\text{S}/\text{cm}$
- Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
- Hydraulic pressure - dBar
- Oxygen – saturated - percent
- Oxygen – ppm
- Redox - mV
- Chloride – mg/L
- Ammonia – mg/L (option sensor)

Mount Sopris 2IDA tool – nitrate configuration


- Temperature – degrees Centigrade
- Fluid conductivity – $\mu\text{S}/\text{cm}$
- Fluid conductivity at 20° C – $\mu\text{S}/\text{cm}$
- Hydraulic pressure - dBar
- Oxygen – saturated - percent
- Oxygen – ppm
- Redox - mV
- Chloride – mg/L
- Nitrate – mg/L (option sensor)

Mount Sopris 2EMA-1000 tool

- Formation conductivity – mS/m

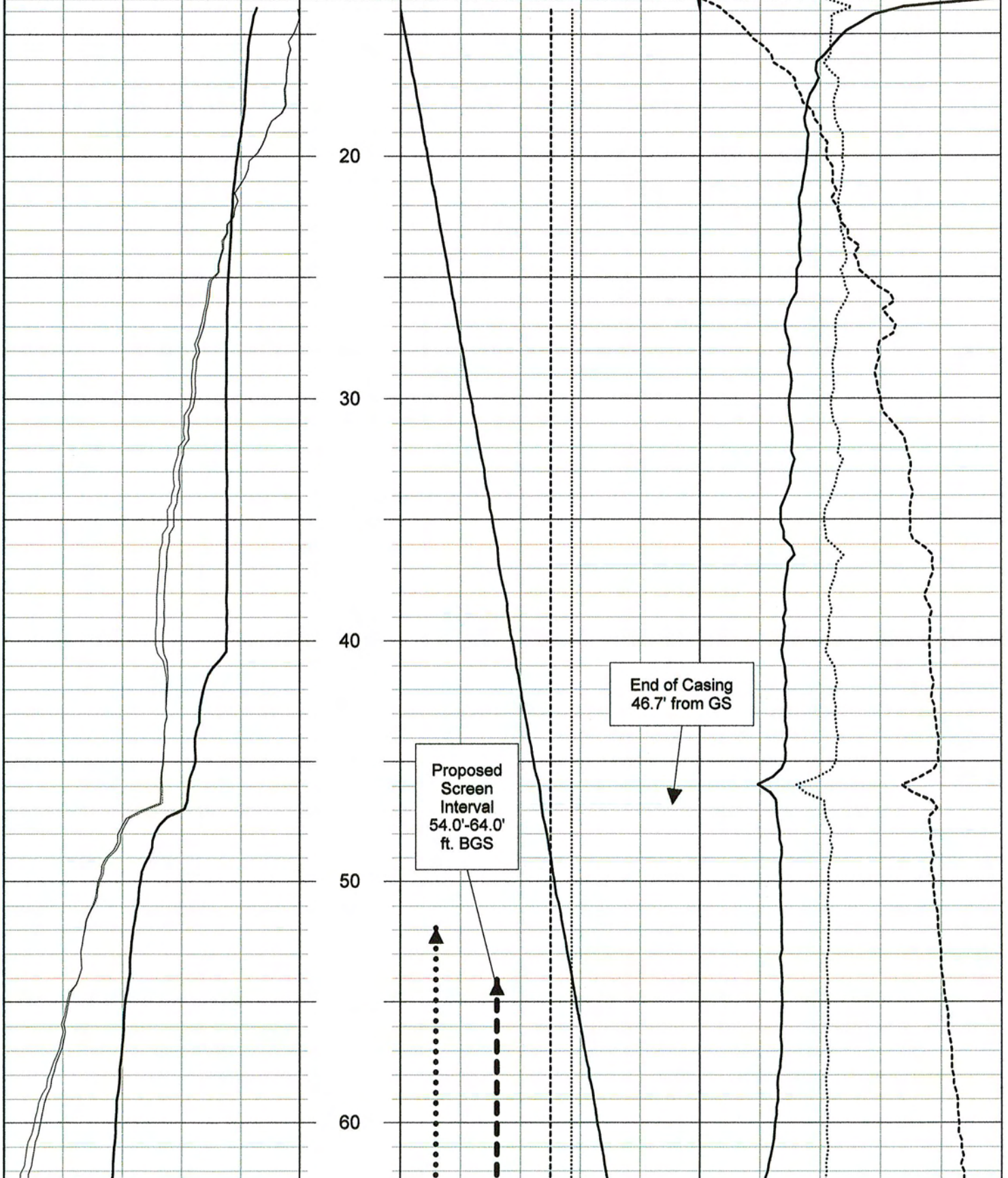
Mount Sopris ALT OBI-40-2 Tool

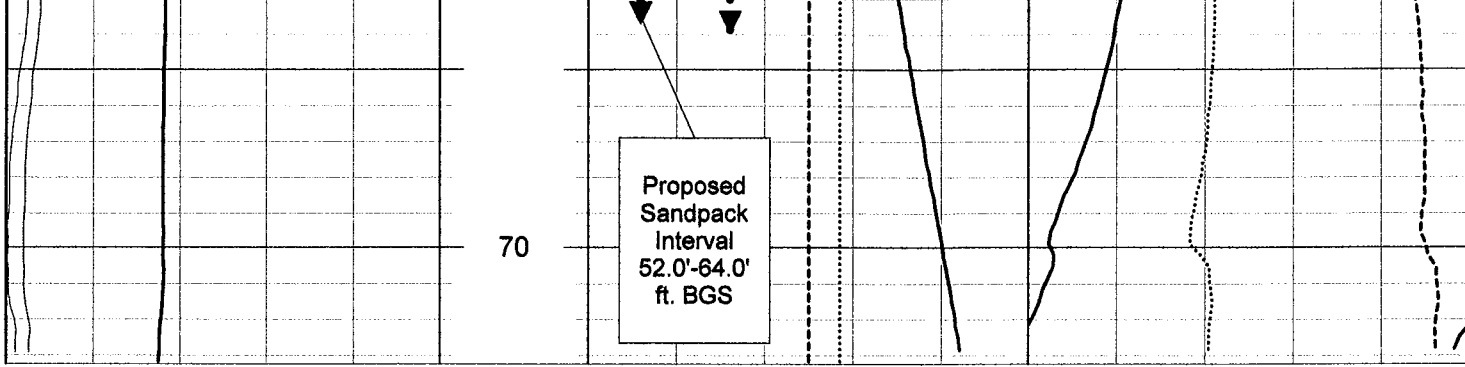
- Optical televiewer – color digital image

| | | | | | |
|-------------------------------------------------------------------------------------|--|--------------------------------------|-------------------------------------|--------------------------------------|--|
| Well: | | RIMW 29 | | Log: 29-A | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/23/07 | | | Time: 08:13 | | |
| System Configuration: Mount Sopris 2IDA with ammonia option | | | | | |
| Water Level: 13.4' | | Measured From: GS at ~ 08:00 on 8/23 | | | |
| Outer Casing Height AGL (with cap open/removed): -1.30' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: Down | | Measured from: Ground Surface | | Log Speed: 13.1 fpm | |
| Log Top: 14 | | Log Bottom: 73.3' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: Redox = 1 | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; 9041&65; OTV | |
| Well Diameter: 6" | | Well Depth: 74.35' | | Referenced From: GS | |
| Casing Material: None | | | Non-Cased Interval: 46.7' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88756758° N | | | Longitude: -81.07156490° W | | |
| Notes: GPS values; NAD83 | | | | | |
| * fluid conductivity data collected at mS/cm but displayed at uS/cm | | | | | |
|  | | | | | |



| Temperature | | Depth | Hydraulic Pressure | | Redox | |
|--------------------------|--------|------------|--------------------|---------|----------|------|
| 15 | deg C | | 0 | dBar | -85 | mV |
| -Fluid Conductivity- | | | Oxygen-Sat | | Chloride | |
| 800 | uS/cm* | | -1 | percent | 40 | mg/L |
| -Fluid Conductivity 20C- | | Oxygen-ppm | | Ammonia | | |
| 900 | uS/cm* | -1 | ppm | 0 | mg/L | |





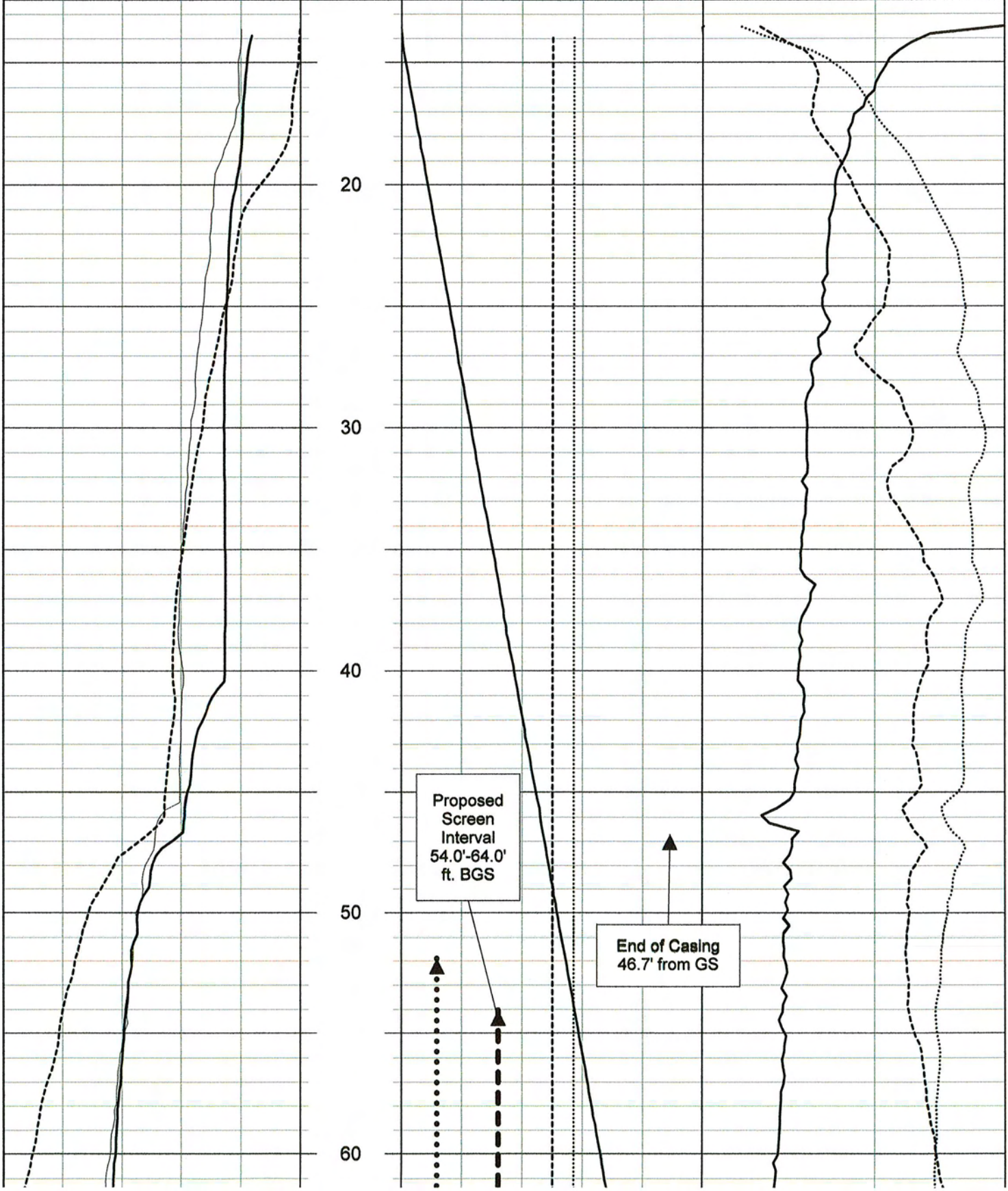
70

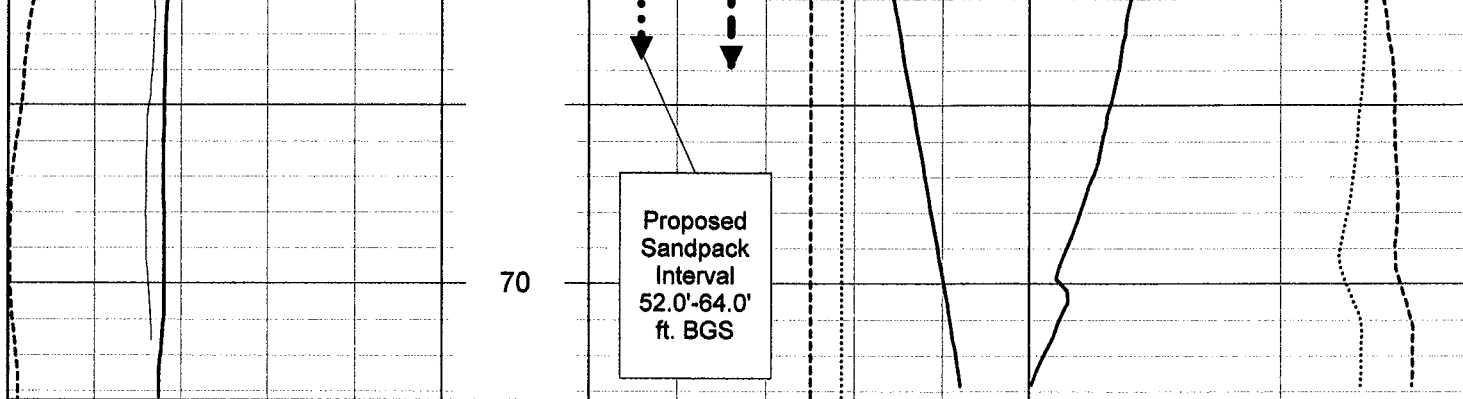
Proposed
Sandpack
Interval
52.0'-64.0'
ft. BGS

| | | | | | |
|---------------------------------------------------------------------|--|--------------------------------------|-------------------------------------|-------------------------------------|--|
| Well: | | RIMW 29 | | Log: 29-B | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/23/07 | | | Time: 08:40 | | |
| System Configuration: Mount Sopris 2IDA with nitrate option | | | | | |
| Water Level: 13.4' | | Measured From: GS at ~ 08:00 on 8/23 | | | |
| Outer Casing Height AGL (with cap open/removed): -1.30' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: Down | | Measured from: Ground Surface | | Log Speed: 17 fpm | |
| Log Top: 14' | | Log Bottom: 73.3' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: Redox = 1 | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2EMA; 9041&65;OTV | |
| Well Diameter: 6" | | Well Depth: 74.35' | | Referenced From: GS | |
| Casing Material: None | | | Non-Cased Interval: 46.7' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88756758° N | | | Longitude: -81.07156490° W | | |
| Notes: GPS values; NAD83 | | | | | |
| * fluid conductivity data collected at mS/cm but displayed at uS/cm | | | | | |



| Temperature | | | Depth 1ft:65ft | Hydraulic Pressure | | | Redox | | |
|--------------------------|--------|------|-------------------|--------------------|---------|---------|----------|------|-----|
| 15 | Deg C | 25 | | 0 | dBar | 20 | -85 | mV | 80 |
| -Fluid Conductivity- | | | | Oxygen-Sat | | | Chloride | | |
| 920 | uS/cm* | 2600 | | -1 | percent | 1 | 70 | mg/L | 100 |
| -Fluid Conductivity 20C- | | | Oxygen-ppm | | | Nitrate | | | |
| 0 | uS/cm* | 3000 | -1 | ppm | 0.75 | 60 | mg/L | 140 | |

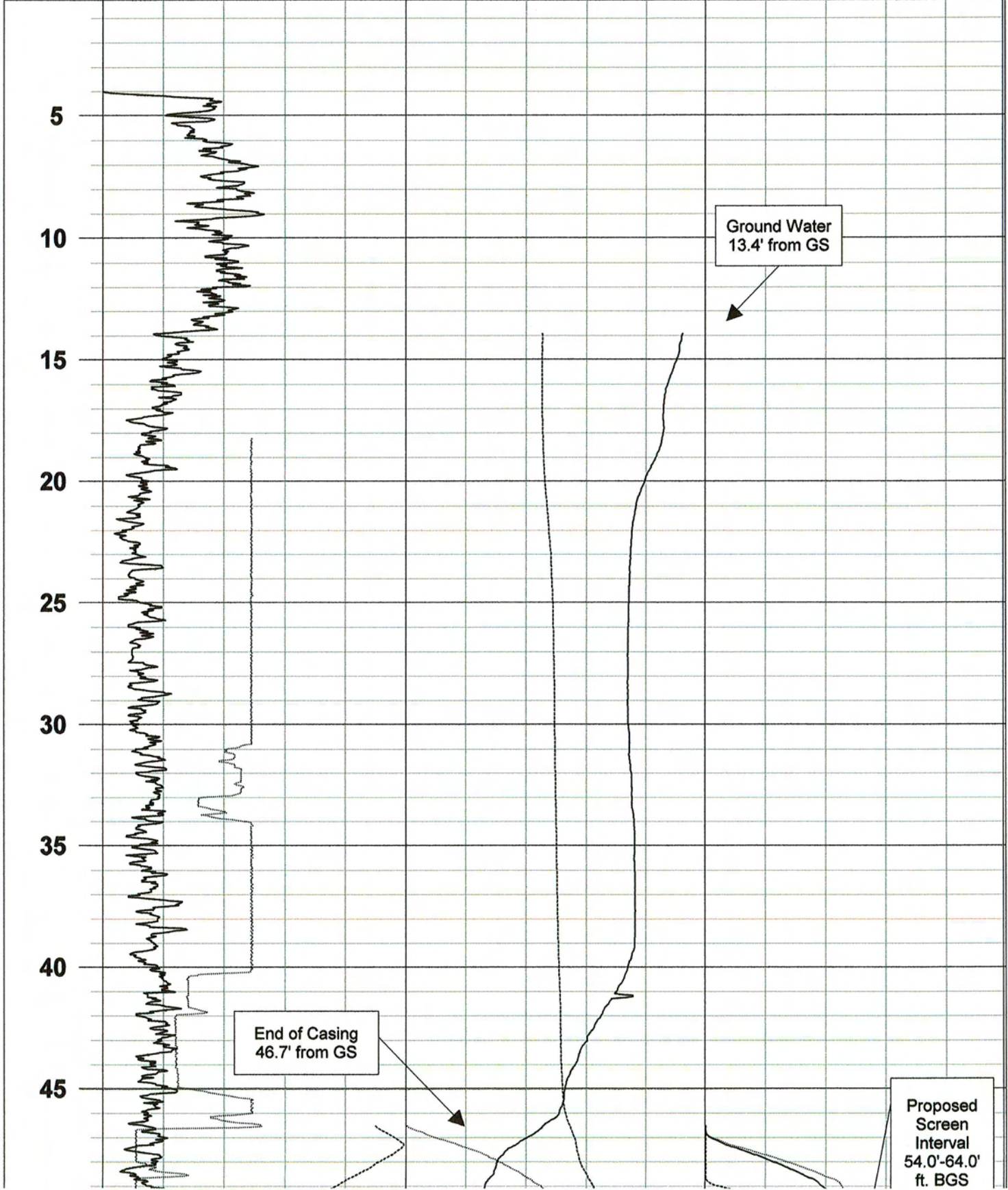


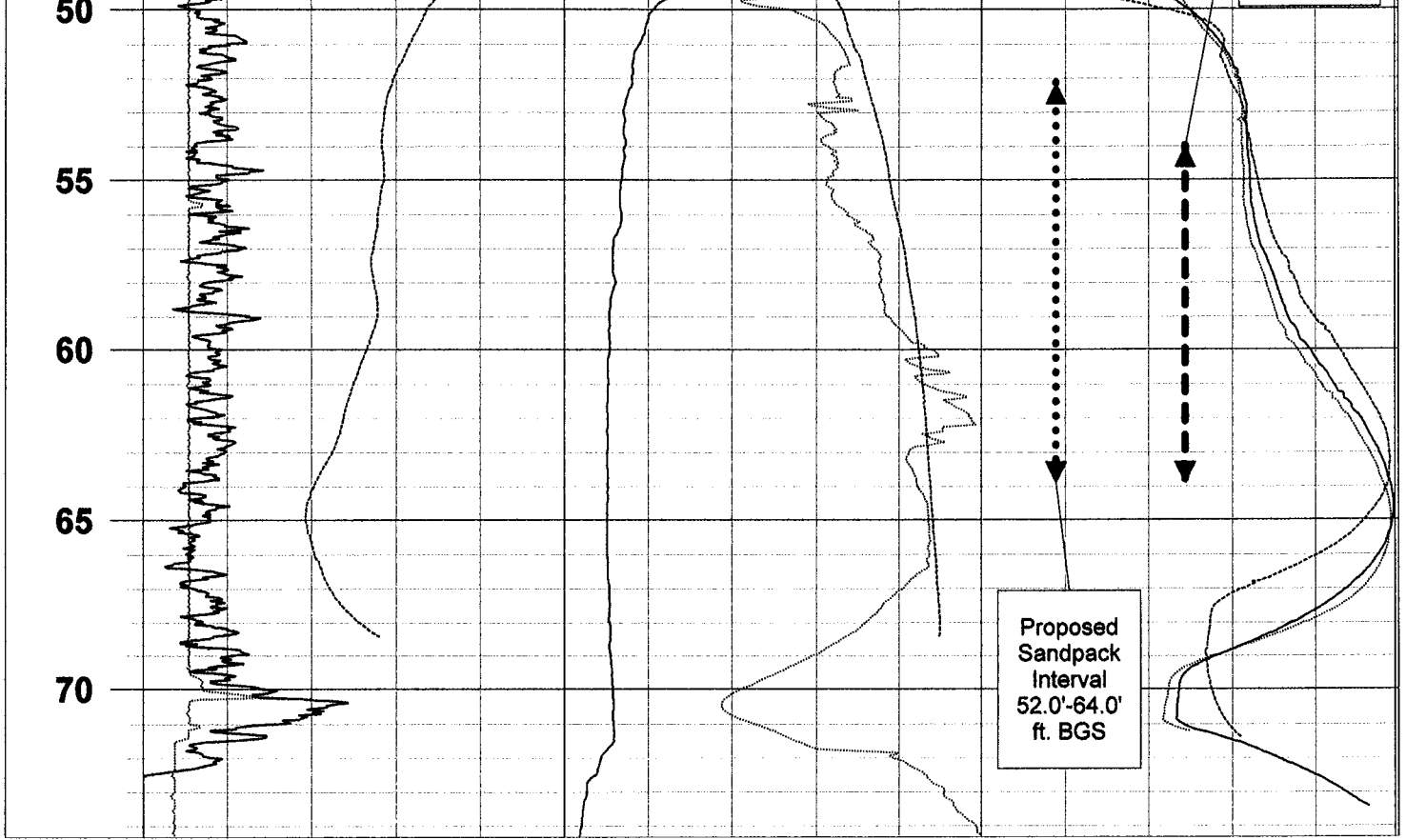


| | | | | | |
|---------------------------------------------------------------------|--|--------------------------------------|--------------------------------------|-----------------------------------|--|
| Well: | | RIMW 29 | | Log: 29-C | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/23/07 | | | Time: See notes | | |
| System Configuration: Century 9041 & 9065 | | | | | |
| Water Level: 13.4' | | Measured From: GS at ~ 08:00 on 8/23 | | | |
| Outer Casing Height AGL (with cap open/removed): -1.30' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: See notes | | Measured from: Ground Surface | | Log Speed: see notes | |
| Log Top: 4.2' | | Log Bottom: 74.3' | | Reference Point: GS | |
| Analysis Software: WellCAD | | | Smoothing Points: Natural gamma = 11 | | |
| Operator: JRJ | | Witness: None | | Other Tools Used: 2EMA; 2IDA; OTV | |
| Well Diameter: 6" | | Well Depth: 74.35' | | Referenced From: GS | |
| Casing Material: None | | | Non-Cased Interval: 46.7' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88756758° N | | | Longitude: -81.07156490° W | | |
| Notes: GPS values; NAD83 | | | | | |
| Caliper logged up at 10:05 on 8/23; speed 17 fpm | | | | | |
| 9041 logged down at 11:30 on 8/25; speed 16 fpm | | | | | |



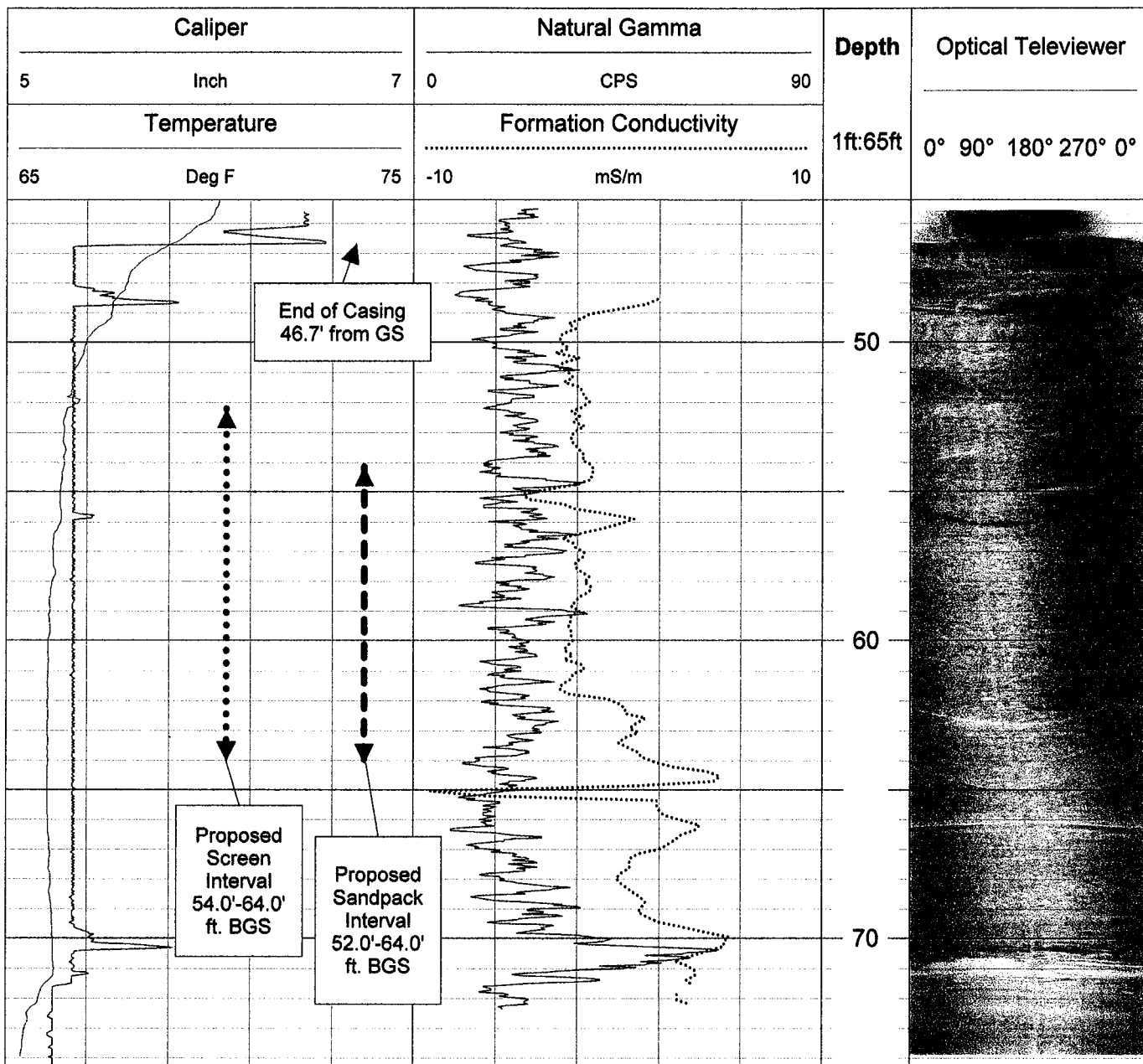
| Depth | Natural Gamma | | Temperature | | 16" Normal Resistivity | |
|----------|-----------------------|-----|-------------------------|------|------------------------------|-----|
| | 0 | 140 | 65 | 75 | 0 | 190 |
| | CPS | | Deg F | | OHM-M | |
| 1ft:65ft | Spontaneous Potential | | Fluid Resistivity | | 64" Normal Resistivity | |
| | 0 | 140 | 0 | 10 | 0 | 135 |
| | mV | | OHM-M | | OHM-M | |
| | Caliper | | Single Point Resistance | | Computed Lateral Resistivity | |
| | 5 | 8 | 295 | 2400 | 0 | 210 |
| | Inch | | OHM | | OHM-M | |





| | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------|-------------------------------------|------------------------|--|
| Well: | | RIMW 29 | | Log: 29-D | |
| Site: | | PSC | | | |
| City/State: Rock Hill, South Carolina | | | | | |
| Date: 8/23 & 28/07 | | | Time: See notes | | |
| System Configuration: Century 9041, 9065, OTV & Mount Sopris 2EMA | | | | | |
| Water Level: 13.4' | | Measured From: Ground Surface | | | |
| Outer Casing Height AGL (with cap open/removed): -1.3' Type: Steel | | | | | |
| Inner Casing Ht. ± Outer Casing Ht.: None | | | Casing Type: N/A | | |
| Log Direction: See notes | | Measured from: Ground Surface | | Log Speed: see notes | |
| Log Top: 45.5' | | Log Bottom: | | Reference Point: GS | |
| Analysis Software: WellCAD | | Smoothing Points: Natureal gamma = 11 | | | |
| Operator: JRU | | Witness: None | | Other Tools Used: 2IDA | |
| Well Diameter: 6" | | Well Depth: 74.35' | | Referenced From: GS | |
| Casing Material: None | | | Non-Cased Interval: 46.7' to bottom | | |
| Screen Interval: None | | | Screen Type: N/A | | |
| Latitude: 34.88756758° N | | | Longitude: -81.07156490° W | | |
| Notes: GPS values; NAD83 Formation conductivity logged up at 09:40 on 8/23; speed 11.2 fpm Caliper logged up at 10:305 on 8/23; speed 17 fpm 9041 logged down at 10:37 on 8/23; speed 16 fpm Optical televiwer logged down at 08:25on 8/28; speed 2.3 fpm | | | | | |





Appendix D

Analytical Results

Appendix D

Summary of Analytical Results

- D-1 Phase I Soil**
- D-2 Phase I Sediment**
- D-3 Phase I Groundwater**
- D-4 ColorTec**
- D-5 Phase II Soil**
- D-6 Phase II Groundwater**
- D-7 Phase III Groundwater**

PCB - Polychlorinated Biphenyl

SVOC - Semi-Volatile Organic Compound

VOC - Volatile Organic Compound

< indicates that the compound was not detected above the specified reporting limit

Start and end depths are listed in feet below ground surface

Laboratory Qualifiers:

J - Estimated value

J1 - Estimated value: surrogate recovery failed to meet established criteria.

J2 - Estimated value: sample result above the method detection limit but below the reporting limit.

M - Estimated value: a matrix effect was determined to be present in the sample.

D-1 Phase I Soil

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|-----------------------|---------------------------|---------------------------------------|-----------------------|--------------------|--------------------|------------------------|------------------------|-----------------------------|-------------------|---------------------|--------------------|---------------------|---------------------|---------------------|------------|------------|--------|------|
| | | | 1,1,1-Trichloroethane | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloro-1,2,2-trifluoroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethane | 1,1-Dichloroethene | 1,2,3-Trichlorobenzene | 1,2,4-Trichlorobenzene | 1,2-Dibromo-3-chloropropane | 1,2-Dibromoethane | 1,2-Dichlorobenzene | 1,2-Dichloroethane | 1,2-Dichloropropane | 1,3-Dichlorobenzene | 1,4-Dichlorobenzene | 2-Butanone | 2-Hexanone | | |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | |
| RISB-1 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | | | |
| RISB-2 | 0 | 1 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | | | |
| RISB-2-DUP | 0 | 1 | < 9.9 | < 410 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 410 | < 410 | < 9.9 | < 9.9 | 24.9 J2 | 71 | < 9.9 | < 410 | 23.2 J2 | < 9.9 | < 9.9 | |
| RISB-2 | 9 | 13 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | 110 | 780 | < 11 | 20 | 20 | 5200 | < 11 | |
| RISB-2 | 17 | 21 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | 350 J2 | < 480 | < 480 | < 480 | 530 | < 480 | |
| RISB-3 | 0 | 1 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | |
| RISB-3 | 9 | 13 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | |
| RISB-4 | 0 | 1 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | |
| RISB-4 | 5 | 9 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | 2.5 J2 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | 15 | < 9.7 | |
| RISB-5 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | |
| RISB-5 | 5 | 9 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | |
| RISB-6 | 0 | 1 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | 120 J2 | < 450 | |
| RISB-6 | 13 | 15 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | 2.7 J2 | 8.1 J2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | 1.2 J2 | 2 J2 | < 9.2 | < 9.2 | 0.72 J2 | < 9.2 | < 9.2 | < 9.2 | |
| RISB-7 | 0 | 1 | < 12 | < 12 | < 12 | < 12 | < 12 | 6.7 J2 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | |
| RISB-7 | 1 | 5 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | 9.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | |
| RISB-8 | 0 | 1 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | |
| RISB-8 | 5 | 8 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | |
| RISB-9 | 0 | 1 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | |
| RISB-9 | 5 | 9 | 2.7 J2 | < 8.7 | < 8.7 | < 8.7 | 2.1 J2 | 3.1 J2 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | |
| RISB-10 | 5 | 9 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | |
| RISB-11 | 0 | 1 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | 1.06 J2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | |
| RISB-11 | 1 | 5 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | 0.84 J2 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | 4.93 J2 | < 8.7 | < 8.7 | < 8.7 | 5.27 J2 | < 8.7 | < 8.7 | |
| RISB-11 | 5 | 9 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.11 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | 100 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | |
| RISB-12 | 0 | 1 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | |
| RISB-12 | 1 | 5 | < 1000 | < 1000 | < 1000 | < 1000 | 76 J2 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | 33000 | < 1000 | |
| RISB-12 | 17 | 21 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | 12 | 1.8 J2 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | 12 | < 9.6 | |
| RISB-13 | 0 | 1 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | |
| RISB-13 | 5 | 9 | < 11 | < 11 | < 11 | < 11 | 3.29 J2 | 2.04 J2 | < 11 | 0.52 J2 | < 11 | < 11 | 4.05 J2 | 1.56 J2 | < 11 | < 11 | 1.09 J2 | 8.31 J2 | < 11 | < 11 | |
| RISB-13-DUP | 5 | 9 | < 11 | < 11 | < 11 | < 11 | 0.89 J2 | < 11 | < 11 | 1.01 J2 | < 11 | < 11 | 5.96 J2 | 1.1 J2 | < 11 | < 11 | 1.46 J2 | 5.65 J2 | < 11 | < 11 | |
| RISB-14 | 0 | 1 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | |
| RISB-14 | 5 | 9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | |
| RISB-14-DUP | 5 | 9 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | |
| RISB-14 | 9 | 13 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | 1.25 J2 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | 0.63 J2 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | |
| RISB-15 | 0 | 1 | < 11 | < 11 | 0.98 J2 | < 11 | < 11 | 1.37 J2 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | |
| RISB-15 | 9 | 13 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | 0.93 J2 | 1.59 J2 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | 0.71 J2 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | |
| RISB-16 | 0 | 1 | 64.7 J2 | < 510 | < 510 | < 510 | 18.8 J2 | 39.2 J2 | < 510 | < 510 | < 510 | < 510 | < 510 | < 510 | < 510 | < 510 | < 510 | < 510 | < 510 | < 510 | |
| RISB-16 | 1 | 5 | 13 | < 7.6 | < 7.6 | 2 J2 | 6.23 J2 | 6.02 J2 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | |
| RISB-17 | 0 | 1 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | |
| RISB-17 | 9 | 13 | < 15 | < 15 | < 15 | < 15 | 4.1 J2 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | 5 J2 | < 15 | < 15 | |
| RISB-18 | 0 | 1 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | 3.4 J2 | < 12 | < 12 | 1600 J | 9.6 J2 | < 12 | 57 | 600 J | 30 | < 12 |
| RISB-18 | 1 | 5 | < 480 | < 480 | < 480 | 99 J2 | < 480 | < 480 | 76 J2 | 95 J2 | < 480 | < 480 | 22000 | 4800 | < 480 | 340 J2 | 4000 | < 480 | < 480 | < 480 | |
| RISB-19 | 0 | 1 | < 9 | < 9 | < 9 | < 9 | 4.3 J2 | < 9 | < 9 | < 9 | < 9 | < 9 | 7.3 J2 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | |
| RISB-20 | 5 | 9 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | |
| RISB-21 | 0 | 1 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|-----------------------|---------------------------|---------------------------------------|-----------------------|--------------------|--------------------|------------------------|------------------------|-----------------------------|-------------------|---------------------|--------------------|---------------------|---------------------|---------------------|------------|------------|
| | | | 1,1,1-Trichloroethane | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloro-1,2,2-trifluoroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethane | 1,1-Dichloroethene | 1,2,3-Trichlorobenzene | 1,2,4-Trichlorobenzene | 1,2-Dibromo-3-chloropropane | 1,2-Dibromoethane | 1,2-Dichlorobenzene | 1,2-Dichloroethane | 1,2-Dichloropropane | 1,3-Dichlorobenzene | 1,4-Dichlorobenzene | 2-Butanone | 2-Hexanone |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-21 | 5 | 9 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISB-22 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISB-23 | 0 | 1 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 |
| RISB-23 | 9 | 11 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | 1 J2 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 |
| RISB-24 | 0 | 1 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 |
| RISB-25 | 0 | 1 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | 2.5 J2 | 2.7 J2 | < 9.2 | < 9.2 | 0.45 J2 | < 9.2 | < 9.2 |
| RISB-25 | 9 | 13 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 |
| RISB-25 | 17 | 20 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | 45000 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 |
| RISB-26 | 0 | 1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | 7 J2 | < 9.1 | 1.3 J2 | < 9.1 | < 9.1 | 14 | < 9.1 | < 9.1 | < 9.1 | 3.5 J2 | < 9.1 | < 9.1 |
| RISB-26 | 1 | 5 | < 11 | < 11 | < 11 | < 11 | < 11 | 5.8 J2 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISB-27 | 0 | 1 | < 9.6 | < 9.6 | 2.3 J2 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | 2.9 J2 | < 9.6 |
| RISB-27 | 5 | 9 | < 8.6 | < 8.6 | 3.3 J2 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 9.5 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 |
| RISB-28 | 0 | 1 | 120 | < 13 | < 13 | < 13 | 15 | 7.7 J2 | < 13 | < 13 | < 13 | < 13 | < 13 | 7.2 J2 | < 13 | < 13 | < 13 | < 13 | < 13 |
| RISB-28 | 5 | 9 | 1900 J | < 8.3 | < 8.3 | < 8.3 | 25 | 400 J | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | 27 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 |
| RISB-28 | 9 | 13 | 26 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | 2.3 J2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | 10 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 |
| RISB-29 | 0 | 1 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 |
| RISB-29 | 1 | 5 | < 5400 | < 540 | < 540 | < 540 | < 5400 | < 5400 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 |
| RISB-29 | 9 | 13 | 2.8 J2 | < 8.6 | < 8.6 | < 8.6 | 0.89 J2 | 1.7 J2 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | 23 | < 8.6 | < 8.6 | < 8.6 | 8.4 J2 | < 8.6 |
| RISB-30 | 0 | 1 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 |
| RISB-30 | 9 | 13 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 |
| RISB-31 | 0 | 1 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 |
| RISB-31 | 9 | 13 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 |
| RISB-32 | 0 | 1 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 |
| RISB-33 | 5 | 9 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RISB-33 | 17 | 20 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 |
| RISB-33-DUP | 17 | 20 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 |
| RISB-34 | 11 | 13 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | 15 J1M | < 9.8 |
| RISB-35 | 0 | 1 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 |
| RISB-35 | 5 | 9 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | 2.76 J2 | < 9.7 |
| RISB-35-DUP | 5 | 9 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISB-36 | 0 | 1 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 |
| RISB-36 | 13 | 16 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 |
| RISB-37 | 0 | 1 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 |
| RISB-37 | 9 | 13 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.86 J2 | < 10 |
| RISB-38 | 0 | 1 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 |
| RISB-38 | 17 | 21 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | 140 | 27 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 |
| RISB-39 | 0 | 1 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 |
| RISB-39 | 13 | 17 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | 12 J2 | < 13 |
| RISB-40 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISB-40 | 9 | 13 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 |
| RISB-41 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | 3.58 J2 | < 11 |
| RISB-42 | 0 | 1 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 |
| RISB-43 | 0 | 1 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 |
| RISB-44 | 0 | 1 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|-----------------------|---------------------------|---------------------------------------|-----------------------|--------------------|--------------------|------------------------|------------------------|-----------------------------|-------------------|---------------------|--------------------|---------------------|---------------------|---------------------|------------|------------|--|
| | | | 1,1,1-Trichloroethane | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloro-1,2,2-trifluoroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethane | 1,1-Dichloroethene | 1,2,3-Trichlorobenzene | 1,2,4-Trichlorobenzene | 1,2-Dibromo-3-chloropropane | 1,2-Dibromoethane | 1,2-Dichlorobenzene | 1,2-Dichloroethane | 1,2-Dichloropropane | 1,3-Dichlorobenzene | 1,4-Dichlorobenzene | 2-Butanone | 2-Hexanone | |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | |
| RISB-44 | 5 | 8.5 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | |
| RISB-45 | 0 | 1 | < 460 | < 460 | < 460 | < 460 | 37 J2 | 340 J2 | < 460 | < 460 | < 460 | < 460 | < 460 | 1400 | < 460 | < 460 | < 460 | < 460 | < 460 | |
| RISB-45 | 1 | 5 | < 420 | < 420 | < 420 | < 420 | 48 J2 | 480 | < 420 | < 420 | < 420 | < 420 | < 420 | 2500 | < 420 | < 420 | < 420 | 120 J2 | < 420 | |
| RISB-46 | 0 | 1 | < 670 | < 670 | < 670 | < 670 | < 670 | < 670 | < 670 | < 670 | 3500 | < 670 | < 670 | 730 | < 670 | < 670 | 870 | 710 | < 670 | |
| RISB-46-DUP | 0 | 1 | < 600 | < 600 | < 600 | < 600 | < 600 | < 600 | 540 J2 | 17000 | < 600 | < 600 | 3700 | < 600 | < 600 | 5400 | 3700 | < 600 | < 600 | |
| RISB-46 | 1 | 5 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | 2.8 J2 | 1300 | < 13 | < 13 | 93 | < 13 | < 13 | 240 J2 | 120 | < 13 | < 13 | |
| RISB-47 | 0 | 1 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | |
| RISB-47 | 9 | 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | 14 | < 13 | < 13 | < 13 | < 13 | < 13 | |
| RISB-48 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | |
| RISB-48 | 13 | 15 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | |
| RISB-49 | 0 | 1 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | 0.53 J2 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | 7.8 J2 | < 7.9 | |
| RISB-49 | 13 | 17 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | |
| RISB-50 | 9 | 13 | 28 | < 9.7 | < 9.7 | < 9.7 | 3.1 J2 | 8.2 J2 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | 75 | < 9.7 | < 9.7 | < 9.7 | 2.5 J2 | < 9.7 | |
| RISB-51 | 9 | 13 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | |
| RISB-51-DUP | 9 | 13 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | |
| RISB-52 | 0 | 1 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | 0.54 J2 | < 8.6 | < 8.6 | < 8.6 | 8.5 J2 | < 8.6 | |
| RISB-52 | 9 | 13 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | |
| RI-BCK1 | 0 | 1 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | |
| RI-BCK1 | 3 | 4 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | |
| RI-BCK2 | 0 | 1 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | |
| RI-BCK2 | 3 | 4 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | |
| RISS-1 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISS-2 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISS-3 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISS-4 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISS-5 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISS-6 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISS-7 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISS-8 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISS-9 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISS-10 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISS-10-DUP | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|----------------------|----------|---------|--------------------|----------------------|-----------|--------------|------------------|----------------------|---------------|--------------|------------|---------------|------------------------|-------------------------|-------------|----------------------|
| | | | 4-Methyl-2-pentanone | Acetone | Benzene | Bromochloromethane | Bromodichloromethane | Bromoform | Bromomethane | Carbon disulfide | Carbon tetrachloride | Chlorobenzene | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | cis-1,3-Dichloropropene | Cyclohexane | Dibromochloromethane |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-1 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISB-2 | 0 | 1 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RISB-2-DUP | 0 | 1 | < 9.9 | < 9.9 | 0.86 J2 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | 6.94 J2 | < 9.9 | 6.31 J2 | < 9.9 | < 9.9 | < 9.9 |
| RISB-2 | 9 | 13 | 303 J2 | 2800 | 247 J2 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | 2.45 J2 | < 11 | 63 | < 11 | 323 J2 | < 11 | < 11 | < 11 |
| RISB-2 | 17 | 21 | 1600 | 229 J2 | 264 J2 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | 9.62 J2 | < 480 | 159 J2 | < 480 | < 480 | < 480 |
| RISB-3 | 0 | 1 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 |
| RISB-3 | 9 | 13 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 |
| RISB-4 | 0 | 1 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RISB-4 | 5 | 9 | < 9.7 | 110 | 0.64 J2 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | 2.2 J2 | < 9.7 | 4.1 J2 | < 9.7 | < 9.7 | < 9.7 | 6.3 J2 | < 9.7 | < 9.7 | < 9.7 |
| RISB-5 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISB-5 | 5 | 9 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 |
| RISB-6 | 0 | 1 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | 240 J2 | < 450 | < 450 | < 450 |
| RISB-6 | 13 | 15 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | 130 | < 9.2 | < 9.2 | < 9.2 |
| RISB-7 | 0 | 1 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 |
| RISB-7 | 1 | 5 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | 0.82 J2 | < 8.7 | < 8.7 | < 8.7 |
| RISB-8 | 0 | 1 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 |
| RISB-8 | 5 | 8 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 |
| RISB-9 | 0 | 1 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 |
| RISB-9 | 5 | 9 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 |
| RISB-10 | 5 | 9 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RISB-11 | 0 | 1 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | 38 | < 9.2 | < 9.2 | < 9.2 |
| RISB-11 | 1 | 5 | < 8.7 | 35 | 5.43 J2 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | 840 | < 8.7 | 1.41 J2 | < 8.7 |
| RISB-11 | 5 | 9 | < 10 | < 10 | 42 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 7.39 J2 | < 10 | 316 J2 | < 10 | < 10 | < 10 |
| RISB-12 | 0 | 1 | 420 J2 | < 970 | 150 J2 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 |
| RISB-12 | 1 | 5 | 48000 | 19000 J2 | 5600 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | 390 J2 | < 1000 | < 1000 | < 1000 |
| RISB-12 | 17 | 21 | 27 | 13 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | 14 | < 9.6 | < 9.6 | < 9.6 |
| RISB-13 | 0 | 1 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 |
| RISB-13 | 5 | 9 | 1.64 J2 | 580 J | 14 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | 1.18 J2 | < 11 | < 11 | < 11 | 4.37 J2 | < 11 | 1.36 J2 | < 11 |
| RISB-13-DUP | 5 | 9 | 1.62 J2 | 43 | 7.3 J2 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | 1.54 J2 | < 11 | < 11 | < 11 | 1.96 J2 | < 11 | < 11 | < 11 |
| RISB-14 | 0 | 1 | < 9.4 | 5.84 J2 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 |
| RISB-14 | 5 | 9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 |
| RISB-14-DUP | 5 | 9 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 |
| RISB-14 | 9 | 13 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | 0.3 J2 | < 9.3 | 0.64 J2 | < 9.3 | < 9.3 | < 9.3 |
| RISB-15 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISB-15 | 9 | 13 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | 0.24 J2 | < 9.4 | 0.55 J2 | < 9.4 | < 9.4 | < 9.4 |
| RISB-16 | 0 | 1 | < 510 | < 510 | < 510 | < 510 | < 510 | < 510 | < 510 | < 510 | < 510 | < 510 | < 510 | < 510 | < 510 | 55 J2 | < 510 | < 510 | < 510 |
| RISB-16 | 1 | 5 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | 0.54 J2 | < 7.6 | 20 | < 7.6 | < 7.6 | < 7.6 |
| RISB-17 | 0 | 1 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 |
| RISB-17 | 9 | 13 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | 140 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 |
| RISB-18 | 0 | 1 | 13 | 160 | 3.9 J2 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | 150 | 23 | < 12 | < 12 | 7.5 J2 | < 12 | < 12 | < 12 |
| RISB-18 | 1 | 5 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | 59 J2 | < 480 | < 480 | 450 J2 | < 480 | < 480 | < 480 | 460 J2 | < 480 | < 480 | < 480 |
| RISB-19 | 0 | 1 | < 9 | 57 | 12 | < 9 | < 9 | < 9 | < 9 | 0.98 J2 | < 9 | 1.9 J2 | < 9 | 0.47 J2 | < 9 | 70 | < 9 | < 9 | < 9 |
| RISB-20 | 5 | 9 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | 60 J2 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | 2100 | < 450 | < 450 | < 450 |
| RISB-21 | 0 | 1 | < 10 | 10 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|----------------------|---------|---------|--------------------|----------------------|-----------|--------------|------------------|----------------------|---------------|--------------|------------|---------------|------------------------|-------------------------|-------------|----------------------|
| | | | 4-Methyl-2-pentanone | Acetone | Benzene | Bromochloromethane | Bromodichloromethane | Bromoform | Bromomethane | Carbon disulfide | Carbon tetrachloride | Chlorobenzene | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | cis-1,3-Dichloropropene | Cyclohexane | Dibromochloromethane |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-21 | 5 | 9 | < 11 | 100 J1M | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | 8.4 J1MJ | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISB-22 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISB-23 | 0 | 1 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 |
| RISB-23 | 9 | 11 | < 9.4 | < 9.4 | 5.7 J2 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | 0.23 J2 | < 9.4 | 260 J2 | < 9.4 | < 9.4 | < 9.4 |
| RISB-24 | 0 | 1 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 |
| RISB-25 | 0 | 1 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | 0.91 J2 | < 9.2 | 1.5 J2 | < 9.2 | < 9.2 | < 9.2 |
| RISB-25 | 9 | 13 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | 460 J2 | < 1100 | 2900 | < 1100 | < 1100 | < 1100 |
| RISB-25 | 17 | 20 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | 690 | < 610 | 4100 | < 610 | < 610 | < 610 |
| RISB-26 | 0 | 1 | < 9.1 | 140 | 2.5 J2 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | 8 J2 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | 220 J | < 9.1 | < 9.1 | < 9.1 |
| RISB-26 | 1 | 5 | < 11 | 28 | 1.6 J2 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | 7.8 J2 | < 11 | 140 | < 11 | < 11 | < 11 |
| RISB-27 | 0 | 1 | < 9.6 | 10 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 |
| RISB-27 | 5 | 9 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | 2 J2 | < 8.6 | < 8.6 | < 8.6 |
| RISB-28 | 0 | 1 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | 1.1 J2 | < 13 | 2.2 J2 | < 13 | < 13 | < 13 |
| RISB-28 | 5 | 9 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | 0.87 J2 | < 8.3 | 10 | < 8.3 | 4.6 J2 | < 8.3 | < 8.3 | < 8.3 |
| RISB-28 | 9 | 13 | 9.1 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 |
| RISB-29 | 0 | 1 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 |
| RISB-29 | 1 | 5 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 |
| RISB-29 | 9 | 13 | 110 | 89 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 |
| RISB-30 | 0 | 1 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 |
| RISB-30 | 9 | 13 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | 650 | < 8.9 | < 8.9 | < 8.9 |
| RISB-31 | 0 | 1 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 |
| RISB-31 | 9 | 13 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 |
| RISB-32 | 0 | 1 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 |
| RISB-33 | 5 | 9 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RISB-33 | 17 | 20 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 |
| RISB-33-DUP | 17 | 20 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 |
| RISB-34 | 11 | 13 | < 9.8 | 43 J1M | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | 2.9 J1MJ | < 9.8 | < 9.8 | < 9.8 |
| RISB-35 | 0 | 1 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 |
| RISB-35 | 5 | 9 | < 9.7 | 17 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | 0.76 J2 | < 9.7 | 1 J2 | < 9.7 |
| RISB-35-DUP | 5 | 9 | < 11 | 21 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | 1.59 J2 | < 11 | < 11 | < 11 |
| RISB-36 | 0 | 1 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 |
| RISB-36 | 13 | 16 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | 0.81 J2 | < 8.2 | < 8.2 | < 8.2 |
| RISB-37 | 0 | 1 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 |
| RISB-37 | 9 | 13 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RISB-38 | 0 | 1 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 |
| RISB-38 | 17 | 21 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | 51 | < 9.6 | < 9.6 | < 9.6 |
| RISB-39 | 0 | 1 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 |
| RISB-39 | 13 | 17 | < 13 | 48 | 5.5 J2 | < 13 | < 13 | < 13 | < 13 | < 13 | 1.8 J2 | < 13 | 2.3 J2 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 |
| RISB-40 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISB-40 | 9 | 13 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 |
| RISB-41 | 0 | 1 | < 11 | 41 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | 0.93 J2 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISB-42 | 0 | 1 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 |
| RISB-43 | 0 | 1 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 |
| RISB-44 | 0 | 1 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|----------------------|---------|---------|--------------------|----------------------|-----------|--------------|------------------|----------------------|---------------|--------------|------------|---------------|------------------------|-------------------------|-------------|----------------------|
| | | | 4-Methyl-2-pentanone | Acetone | Benzene | Bromochloromethane | Bromodichloromethane | Bromoform | Bromomethane | Carbon disulfide | Carbon tetrachloride | Chlorobenzene | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | cis-1,3-Dichloropropene | Cyclohexane | Dibromochloromethane |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-44 | 5 | 8.5 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 |
| RISB-45 | 0 | 1 | 1200 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | 250 J2 | < 460 | < 460 | < 460 |
| RISB-45 | 1 | 5 | 2700 | 170 J2 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | 350 J2 | < 420 | < 420 | < 420 |
| RISB-46 | 0 | 1 | < 670 | < 670 | 64 J2 | < 670 | < 670 | < 670 | < 670 | < 670 | < 670 | < 670 | < 670 | < 670 | < 670 | < 670 | < 670 | < 670 | < 670 |
| RISB-46-DUP | 0 | 1 | < 600 | < 600 | 150 J2 | < 600 | < 600 | < 600 | < 600 | < 600 | < 600 | < 600 | < 600 | 2000 | < 600 | < 600 | < 600 | < 600 | < 600 |
| RISB-46 | 1 | 5 | < 13 | < 13 | 2.5 J2 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | 27 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 |
| RISB-47 | 0 | 1 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 |
| RISB-47 | 9 | 13 | < 13 | 25 | 5.16 J2 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | 110 | < 13 | 0.48 J2 | < 13 | 110 | < 13 | < 13 | < 13 |
| RISB-48 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISB-48 | 13 | 15 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 |
| RISB-49 | 0 | 1 | < 7.9 | 44 | 1.3 J2 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | 2.8 J2 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | 3.5 J2 | < 7.9 | < 7.9 | < 7.9 |
| RISB-49 | 13 | 17 | < 1100 | 990 J2 | 490 J2 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | 200 J2 | < 1100 | < 1100 | < 1100 |
| RISB-50 | 9 | 13 | 16 | 13 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 |
| RISB-51 | 9 | 13 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RISB-51-DUP | 9 | 13 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.4 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RISB-52 | 0 | 1 | < 8.6 | 44 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 |
| RISB-52 | 9 | 13 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 |
| RI-BCK1 | 0 | 1 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 |
| RI-BCK1 | 3 | 4 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 |
| RI-BCK2 | 0 | 1 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RI-BCK2 | 3 | 4 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISS-1 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-2 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-3 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-4 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-5 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-6 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-7 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-8 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-9 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-10 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-10-DUP | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
September 2008
Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|--------------------------|--------------|------------------|----------------|-------------------------|-------------------|--------------------|---------|-------------------|---------|--------------------------|---------------------------|-----------------|------------------------|----------------|-----------------|
| | | | Dichloro-difluoromethane | Ethylbenzene | Isopropylbenzene | Methyl acetate | Methyl tert butyl ether | Methylcyclohexane | Methylene chloride | Styrene | Tetrachloroethene | Toluene | trans-1,2-Dichloroethene | trans-1,3-Dichloropropene | Trichloroethene | Trichlorofluoromethane | Vinyl chloride | Xylenes (Total) |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-1 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISB-2 | 0 | 1 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RISB-2-DUP | 0 | 1 | < 9.9 | < 9.9 | < 410 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | 37 | 0.76 J2 | < 9.9 | < 9.9 | 24 | < 9.9 | < 9.9 | 5.04 J2 | < 9.8 |
| RISB-2 | 9 | 13 | < 11 | 90 | 3.89 J2 | < 11 | < 11 | < 11 | 9.38 J2 | < 11 | 15 | 5300 | < 11 | 67 | < 11 | 5.26 J2 | 279 J2 | < 9.8 |
| RISB-2 | 17 | 21 | < 480 | 28.9 J2 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | 3900 | < 480 | < 480 | < 480 | < 480 | < 480 | 180 J2 |
| RISB-3 | 0 | 1 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 |
| RISB-3 | 9 | 13 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 |
| RISB-4 | 0 | 1 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RISB-4 | 5 | 9 | < 9.7 | 7.7 J2 | 7.6 J2 | < 9.7 | < 9.7 | 9.5 J2 | < 9.7 | < 9.7 | 0.73 J2 | 3.3 J2 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | 0.98 J2 | 2.9 J2 |
| RISB-5 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISB-5 | 5 | 9 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 |
| RISB-6 | 0 | 1 | < 450 | 23 J2 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | 2700 | 110 J2 | < 450 | < 450 | 300 J2 | < 450 | < 450 | 100 J2 |
| RISB-6 | 13 | 15 | < 9.2 | 0.3 J2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | 1000 | 2.8 J2 | < 9.2 | < 9.2 | 39 | < 9.2 | < 9.2 | 0.81 J2 |
| RISB-7 | 0 | 1 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | 35 | < 12 | < 12 | 2.8 J2 | < 12 | < 12 | < 12 | < 12 |
| RISB-7 | 1 | 5 | < 8.7 | 0.66 J2 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | 48 | 6 J2 | < 8.7 | < 8.7 | 4.3 J2 | < 8.7 | < 8.7 | 2.1 J2 |
| RISB-8 | 0 | 1 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | 1.6 J2 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 |
| RISB-8 | 5 | 8 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 |
| RISB-9 | 0 | 1 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 |
| RISB-9 | 5 | 9 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | 4.2 J2 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 |
| RISB-10 | 5 | 9 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.5 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RISB-11 | 0 | 1 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | 0.98 J2 | < 9.2 | < 9.2 | < 9.2 | 5.62 J2 | < 9.2 | < 9.2 | < 9.2 |
| RISB-11 | 1 | 5 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | 4.01 J2 | < 8.7 | < 8.7 | 0.78 J2 | 0.71 J2 | 2.5 J2 | < 8.7 | 3.43 J2 | < 8.7 | 0.73 J2 | 0.99 J2 |
| RISB-11 | 5 | 9 | < 10 | < 10 | < 10 | < 10 | 1.96 J2 | < 10 | < 10 | 1.71 J2 | 1.03 J2 | 1.95 J2 | < 10 | 850 | < 10 | 0.92 J2 | 1.84 J2 | < 10 |
| RISB-12 | 0 | 1 | < 970 | 830 J2 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | < 970 | 9200 | < 970 | < 970 | < 970 | < 970 | < 970 | 3000 |
| RISB-12 | 1 | 5 | < 1000 | 150000 | 4100 | < 1000 | < 1000 | 17000 J2 | < 1000 | < 1000 | 300 J2 | 1900000 | < 1000 | < 1000 | 240 J2 | < 1000 | < 1000 | 650000 |
| RISB-12 | 17 | 21 | < 9.6 | 0.93 J2 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | 58 | 15 | < 9.6 | < 9.6 | 2.4 J2 | < 9.6 | < 9.6 | 4.4 J2 |
| RISB-13 | 0 | 1 | < 570 | 105 J2 | < 570 | < 570 | < 570 | < 570 | < 570 | < 570 | 111 J2 | 9200 | < 570 | < 570 | < 570 | < 570 | < 570 | 798 J2 |
| RISB-13 | 5 | 9 | < 11 | 17 | 1.68 J2 | < 11 | < 11 | 3.8 J2 | < 11 | < 11 | < 11 | 4.76 J2 | < 11 | < 11 | 0.73 J2 | < 11 | 4.07 J2 | 40 |
| RISB-13-DUP | 5 | 9 | < 11 | 13 | 1.62 J2 | < 11 | < 11 | 1.13 J2 | < 11 | < 11 | < 11 | 3.27 J2 | < 11 | < 11 | < 11 | < 11 | < 11 | 36 |
| RISB-14 | 0 | 1 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 |
| RISB-14 | 5 | 9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | 0.68 J2 | < 8.9 | < 8.9 | < 8.9 | 0.66 J2 | < 8.9 | < 8.9 | < 8.9 |
| RISB-14-DUP | 5 | 9 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | 0.58 J2 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 |
| RISB-14 | 9 | 13 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | 0.64 J2 | < 9.3 | < 9.3 | < 9.3 | 2 J2 | < 9.3 | < 9.3 | < 9.3 |
| RISB-15 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | 0.69 J2 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISB-15 | 9 | 13 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | 0.91 J2 | < 9.4 | < 9.4 | < 9.4 |
| RISB-16 | 0 | 1 | < 510 | < 510 | < 510 | < 510 | < 510 | < 510 | < 510 | < 510 | 2800 | < 510 | < 510 | < 510 | 61.6 J2 | < 510 | < 510 | < 510 |
| RISB-16 | 1 | 5 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | < 7.6 | 880 | < 7.6 | < 7.6 | < 7.6 | 11 | < 7.6 | < 7.6 | < 7.6 |
| RISB-17 | 0 | 1 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 |
| RISB-17 | 9 | 13 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 |
| RISB-18 | 0 | 1 | < 12 | 1.6 J2 | < 12 | < 12 | < 12 | < 12 | 1.2 J2 | < 12 | < 12 | 22 | 1.3 J2 | < 12 | 0.94 J2 | < 12 | 29 | 5.1 J2 |
| RISB-18 | 1 | 5 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | 31 J2 | 44 J2 | < 480 | < 480 | 452 J2 | < 480 | < 480 | < 480 |
| RISB-19 | 0 | 1 | < 9 | 310 J2 | 6.3 J2 | < 9 | < 9 | 31 | 0.88 J2 | < 9 | 49 | 7.5 J2 | < 9 | 9.2 | < 9 | 6.8 J2 | 69 | < 9 |
| RISB-20 | 5 | 9 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | 2100 | 19 J2 | < 450 | < 450 | 340 J2 | < 450 | < 450 | < 450 |
| RISB-21 | 0 | 1 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
September 2008
Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|--------------------------|--------------|------------------|----------------|-------------------------|-------------------|--------------------|---------|-------------------|---------|--------------------------|---------------------------|-----------------|------------------------|----------------|-----------------|
| | | | Dichloro-difluoromethane | Ethylbenzene | Isopropylbenzene | Methyl acetate | Methyl tert butyl ether | Methylcyclohexane | Methylene chloride | Styrene | Tetrachloroethene | Toluene | trans-1,2-Dichloroethene | trans-1,3-Dichloropropene | Trichloroethene | Trichlorofluoromethane | Vinyl chloride | Xylenes (Total) |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-21 | 5 | 9 | < 11 | 330 J1M | 82 J1M | < 11 | < 11 | < 11 | 2100 J1M | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | |
| RISB-22 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | 0.67 J2 | < 11 | < 11 | < 11 | < 11 | < 11 | |
| RISB-23 | 0 | 1 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | 0.55 J2 | < 8 | < 8 | < 8 | < 8 | < 8 | |
| RISB-23 | 9 | 11 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | 16 | < 9.4 | 0.74 J2 | < 9.4 | 340 J2 | < 9.4 | 2.6 J2 | |
| RISB-24 | 0 | 1 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | 0.76 J2 | < 12 | < 12 | < 12 | < 12 | < 12 | |
| RISB-25 | 0 | 1 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | 8.9 J2 | < 9.2 | < 9.2 | < 9.2 | 3.3 J2 | < 9.2 | < 9.2 | |
| RISB-25 | 9 | 13 | < 1100 | 35 J2 | < 1100 | < 1100 | < 1100 | < 1100 | 110 J2 | < 1100 | 280 J2 | 310 J2 | < 1100 | < 1100 | 310 J2 | < 1100 | < 1100 | |
| RISB-25 | 17 | 20 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | 160 J2 | < 610 | 300 J2 | < 610 | < 610 | < 610 | 470 J2 | < 610 | 170 J2 | |
| RISB-26 | 0 | 1 | < 9.1 | 1.7 J2 | 0.87 J2 | < 9.1 | < 9.1 | 21 | < 9.1 | < 9.1 | < 9.1 | 8.6 J2 | 5.1 J2 | < 9.1 | 6.1 J2 | < 9.1 | 12 | |
| RISB-26 | 1 | 5 | < 11 | < 11 | < 11 | < 11 | < 11 | 1.8 J2 | < 11 | < 11 | 6.5 J2 | 0.55 J2 | 2 J2 | < 11 | 130 | < 11 | 12 | |
| RISB-27 | 0 | 1 | < 9.6 | 0.45 J2 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | 0.45 J2 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | |
| RISB-27 | 5 | 9 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | 1.1 J2 | < 8.6 | |
| RISB-28 | 0 | 1 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | < 13 | 2.2 J2 | 1 J2 | < 13 | < 13 | 4.4 J2 | 1.5 J2 | < 13 | |
| RISB-28 | 5 | 9 | < 8.3 | 80 | 2.2 J2 | < 8.3 | < 8.3 | 20 | 37 | < 8.3 | 26 | 580 J | < 8.3 | < 8.3 | 37 | 130 J | < 8.3 | |
| RISB-28 | 9 | 13 | < 8.2 | 2 J2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | 1.1 J2 | < 8.2 | < 8.2 | 24 | < 8.2 | < 8.2 | < 8.2 | 0.6 J2 | < 8.2 | |
| RISB-29 | 0 | 1 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | < 580 | |
| RISB-29 | 1 | 5 | < 540 | 70000 | 4400 J2 | < 540 | < 540 | 8300 | < 540 | < 540 | < 540 | 220000 | < 540 | < 540 | < 540 | < 540 | 300000 | |
| RISB-29 | 9 | 13 | < 8.6 | 16 | 0.36 J2 | < 8.6 | < 8.6 | < 8.6 | 9.1 | < 8.6 | < 8.6 | 250 J2 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | 76 | |
| RISB-30 | 0 | 1 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | 7.68 J2 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | |
| RISB-30 | 9 | 13 | < 8.9 | 0.75 J2 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | 1100 | 2.63 J2 | < 8.9 | < 8.9 | 15.9 | < 8.9 | 0.84 J2 | |
| RISB-31 | 0 | 1 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | |
| RISB-31 | 9 | 13 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | |
| RISB-32 | 0 | 1 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | |
| RISB-33 | 5 | 9 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | |
| RISB-33 | 17 | 20 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | |
| RISB-33-DUP | 17 | 20 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | |
| RISB-34 | 11 | 13 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | 170 J1M | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | 2.1 J1MJ2 | |
| RISB-35 | 0 | 1 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | |
| RISB-35 | 5 | 9 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | 2.6 J2 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | |
| RISB-35-DUP | 5 | 9 | < 11 | < 11 | < 11 | < 11 | < 11 | 1.47 J2 | < 11 | < 11 | < 11 | 0.48 J2 | < 11 | < 11 | < 11 | < 11 | < 11 | |
| RISB-36 | 0 | 1 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | |
| RISB-36 | 13 | 16 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | |
| RISB-37 | 0 | 1 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | |
| RISB-37 | 9 | 13 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | |
| RISB-38 | 0 | 1 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | |
| RISB-38 | 17 | 21 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | 48 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | 3.24 J2 | < 9.6 | 4.02 J2 | |
| RISB-39 | 0 | 1 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | |
| RISB-39 | 13 | 17 | < 13 | 62 | 9.1 J2 | < 13 | < 13 | 42 | < 13 | < 13 | < 13 | 17 | < 13 | < 13 | < 13 | < 13 | 530 | |
| RISB-40 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | |
| RISB-40 | 9 | 13 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | |
| RISB-41 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | |
| RISB-42 | 0 | 1 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | |
| RISB-43 | 0 | 1 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | 1.4 J2 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | |
| RISB-44 | 0 | 1 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|--------------------------|--------------|------------------|----------------|-------------------------|-------------------|--------------------|---------|-------------------|---------|--------------------------|---------------------------|-----------------|------------------------|----------------|-----------------|---------|
| | | | Dichloro-difluoromethane | Ethylbenzene | Isopropylbenzene | Methyl acetate | Methyl tert butyl ether | Methylcyclohexane | Methylene chloride | Styrene | Tetrachloroethene | Toluene | trans-1,2-Dichloroethene | trans-1,3-Dichloropropene | Trichloroethene | Trichlorofluoromethane | Vinyl chloride | Xylenes (Total) | |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | |
| RISB-44 | 5 | 8.5 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | | |
| RISB-45 | 0 | 1 | < 460 | 36 J2 | < 460 | < 460 | < 460 | < 460 | < 460 | 54 J2 | < 460 | 93 J2 | 2100 | < 460 | < 460 | 200 J2 | < 460 | < 460 | 230 J2 |
| RISB-45 | 1 | 5 | < 420 | 50 J2 | 15 J2 | < 420 | < 420 | < 420 | < 420 | 110 J2 | < 420 | 120 J2 | 3200 | < 420 | < 420 | 330 J2 | < 420 | < 420 | 320 J2 |
| RISB-46 | 0 | 1 | < 670 | 590 J2 | < 670 | < 670 | < 670 | < 670 | 170 J2 | < 670 | < 670 | < 670 | 7700 | < 670 | < 670 | < 670 | < 670 | < 670 | 2500 |
| RISB-46-DUP | 0 | 1 | < 600 | 2300 | < 600 | < 600 | < 600 | < 600 | 620 | < 600 | < 600 | < 600 | 21000 | < 600 | < 600 | < 600 | < 600 | < 600 | 9800 |
| RISB-46 | 1 | 5 | < 13 | 32 | < 13 | < 13 | < 13 | < 13 | 21 | < 13 | < 13 | 6.1 J2 | 74 | < 13 | < 13 | 0.96 J2 | < 13 | < 13 | 130 |
| RISB-47 | 0 | 1 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 |
| RISB-47 | 9 | 13 | < 13 | 33 | 3.12 J2 | < 13 | < 13 | 4.19 J2 | < 13 | < 13 | 3.22 J2 | 0.57 J2 | < 13 | < 13 | 22 | < 13 | < 13 | 16 | 44.8 J2 |
| RISB-48 | 0 | 1 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISB-48 | 13 | 15 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 |
| RISB-49 | 0 | 1 | < 7.9 | < 7.9 | 8.5 | < 7.9 | < 7.9 | 34 | < 7.9 | < 7.9 | 0.66 J2 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 | < 7.9 |
| RISB-49 | 13 | 17 | < 1100 | 6300 | 4200 | < 1100 | < 1100 | 5700 | < 1100 | < 1100 | < 1100 | 7700 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | 22000 |
| RISB-50 | 9 | 13 | < 9.7 | 58 | 1.8 J2 | < 9.7 | < 9.7 | 2.9 J2 | 21 | < 9.7 | 1.5 J2 | 130 J2 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | 240 |
| RISB-51 | 9 | 13 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 3 J2 | < 10 | < 10 | < 10 | 3.4 J2 | < 10 | < 10 | < 10 | < 10 |
| RISB-51-DUP | 9 | 13 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RISB-52 | 0 | 1 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | 3.8 J2 | 0.45 J2 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | 1.1 J2 | < 8.6 |
| RISB-52 | 9 | 13 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 |
| RI-BCK1 | 0 | 1 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 |
| RI-BCK1 | 3 | 4 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 |
| RI-BCK2 | 0 | 1 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RI-BCK2 | 3 | 4 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | 250 J | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISS-1 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-2 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-3 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-4 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-5 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-6 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-7 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-8 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-9 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-10 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISS-10-DUP | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | SVOCs | | | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|----------------------------|-----------------------|-----------------------|--------------------|--------------------|-------------------|--------------------|--------------------|---------------------|----------------|---------------------|----------------|----------------|---------------|------------------------|------------------|----------------|--------|
| | | | 1,2,4,5-Tetrachlorobenzene | 2,4,5-Trichlorophenol | 2,4,6-Trichlorophenol | 2,4-Dichlorophenol | 2,4-Dimethylphenol | 2,4-Dinitrophenol | 2,4-Dinitrotoluene | 2,6-Dinitrotoluene | 2-Chloronaphthalene | 2-Chlorophenol | 2-Methylnaphthalene | 2-Methylphenol | 2-Nitroaniline | 2-Nitrophenol | 3,3'-Dichlorobenzidine | 3+4-Methylphenol | 3-Nitroaniline | |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | |
| RISB-1 | 0 | 1 | < 390 | < 990 | < 390 | < 390 | < 390 | < 990 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 990 | |
| RISB-2 | 0 | 1 | < 350 | < 870 | < 350 | < 350 | < 350 | < 870 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 870 | < 350 | < 350 | < 350 | < 870 |
| RISB-2-DUP | 0 | 1 | < 340 | < 860 | < 340 | < 340 | < 340 | < 860 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 860 | < 340 | < 340 | < 340 | < 860 |
| RISB-2 | 9 | 13 | < 460 | < 1200 | < 460 | < 460 | < 460 | < 1200 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 1200 | < 460 | < 460 | < 460 | < 1200 |
| RISB-2 | 17 | 21 | < 370 | < 930 | < 370 | < 370 | < 370 | < 930 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 930 | < 370 | < 370 | < 370 | < 930 | |
| RISB-3 | 0 | 1 | < 380 | < 970 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 | < 970 | |
| RISB-3 | 9 | 13 | < 350 | < 870 | < 350 | < 350 | < 350 | < 870 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 870 | < 350 | < 350 | < 350 | < 870 | |
| RISB-4 | 0 | 1 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | |
| RISB-4 | 5 | 9 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 1000 | |
| RISB-5 | 0 | 1 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 1000 | |
| RISB-5 | 5 | 9 | < 380 | < 950 | < 380 | < 380 | < 380 | < 950 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 950 | < 380 | < 380 | < 380 | < 950 | |
| RISB-6 | 0 | 1 | < 370 | < 920 | < 370 | < 370 | < 370 | < 920 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 920 | < 370 | < 370 | < 370 | < 920 | |
| RISB-6 | 13 | 15 | < 390 | < 980 | < 390 | < 390 | < 390 | < 980 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 980 | < 390 | < 390 | < 390 | < 980 | |
| RISB-7 | 0 | 1 | < 450 | < 1100 | < 450 | < 450 | < 450 | < 1100 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 1100 | < 450 | < 450 | < 450 | < 1100 | |
| RISB-7 | 1 | 5 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 1000 | |
| RISB-8 | 0 | 1 | < 380 | < 970 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 | < 970 | |
| RISB-8 | 5 | 8 | < 350 | < 890 | < 350 | < 350 | < 350 | < 890 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 890 | < 350 | < 350 | < 350 | < 890 | |
| RISB-9 | 0 | 1 | < 380 | < 950 | < 380 | < 380 | < 380 | < 950 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 950 | < 380 | < 380 | < 380 | < 950 | |
| RISB-9 | 5 | 9 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 1000 | |
| RISB-10 | 5 | 9 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 1000 | |
| RISB-11 | 0 | 1 | < 350 | < 890 | < 350 | < 350 | < 350 | < 890 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 890 | < 350 | < 350 | < 350 | < 890 | |
| RISB-11 | 1 | 5 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 1000 | |
| RISB-11 | 5 | 9 | < 390 | < 980 | < 390 | < 390 | < 390 | < 980 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 980 | < 390 | < 390 | < 390 | < 980 | |
| RISB-12 | 0 | 1 | < 380 | < 940 | < 380 | < 380 | < 380 | < 940 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 940 | < 380 | < 380 | < 380 | < 940 | |
| RISB-12 | 1 | 5 | < 440 | < 1100 | < 440 | < 440 | < 440 | < 1100 | < 440 | < 440 | < 440 | < 440 | < 440 | 1000 | 170 J2 | < 1100 | < 440 | < 440 | < 440 | < 1100 |
| RISB-12 | 17 | 21 | < 390 | < 980 | < 390 | < 390 | < 390 | < 980 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 980 | < 390 | < 390 | < 390 | < 980 | |
| RISB-13 | 0 | 1 | < 390 | < 990 | < 390 | < 390 | < 390 | < 990 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 990 | < 390 | < 390 | < 390 | < 990 | |
| RISB-13 | 5 | 9 | < 450 | < 1100 | < 450 | < 450 | < 450 | < 1100 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 1100 | < 450 | < 450 | < 450 | < 1100 | |
| RISB-13-DUP | 5 | 9 | < 440 | < 1100 | < 440 | < 440 | < 440 | < 1100 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 1100 | < 440 | < 440 | < 440 | < 1100 | |
| RISB-14 | 0 | 1 | < 390 | < 980 | < 390 | < 390 | < 390 | < 980 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 980 | < 390 | < 390 | < 390 | < 980 | |
| RISB-14 | 5 | 9 | < 380 | < 940 | < 380 | < 380 | < 380 | < 940 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 940 | < 380 | < 380 | < 380 | < 940 | |
| RISB-14-DUP | 5 | 9 | < 380 | < 970 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 | < 970 | |
| RISB-14 | 9 | 13 | < 380 | < 970 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 | < 970 | |
| RISB-15 | 0 | 1 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | |
| RISB-15 | 9 | 13 | < 380 | < 950 | < 380 | < 380 | < 380 | < 950 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 950 | < 380 | < 380 | < 380 | < 950 | |
| RISB-16 | 0 | 1 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 1100 | |
| RISB-16 | 1 | 5 | < 360 | < 910 | < 360 | < 360 | < 360 | < 910 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 910 | < 360 | < 360 | < 360 | < 910 | |
| RISB-17 | 0 | 1 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 1100 | |
| RISB-17 | 9 | 13 | < 440 | < 1100 | < 440 | < 440 | < 440 | < 1100 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 1100 | < 440 | < 440 | < 440 | < 1100 | |
| RISB-18 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-18 | 1 | 5 | < 380 | < 950 | < 380 | < 380 | < 380 | < 950 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 950 | < 380 | < 380 | < 380 | < 950 | |
| RISB-19 | 0 | 1 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 1000 | |
| RISB-20 | 5 | 9 | < 380 | < 940 | < 380 | < 380 | < 380 | < 940 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 940 | < 380 | < 380 | < 380 | < 940 | |
| RISB-21 | 0 | 1 | < 440 | < 1100 | < 440 | < 440 | < 440 | < 1100 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 1100 | < 440 | < 440 | < 440 | < 1100 | |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | SVOCs | | | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|----------------------------|-----------------------|-----------------------|--------------------|--------------------|-------------------|--------------------|--------------------|---------------------|----------------|---------------------|----------------|----------------|---------------|------------------------|------------------|----------------|--------|
| | | | 1,2,4,5-Tetrachlorobenzene | 2,4,5-Trichlorophenol | 2,4,6-Trichlorophenol | 2,4-Dichlorophenol | 2,4-Dimethylphenol | 2,4-Dinitrophenol | 2,4-Dinitrotoluene | 2,6-Dinitrotoluene | 2-Chloronaphthalene | 2-Chlorophenol | 2-Methylnaphthalene | 2-Methylphenol | 2-Nitroaniline | 2-Nitrophenol | 3,3'-Dichlorobenzidine | 3+4-Methylphenol | 3-Nitroaniline | |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-21 | 5 | 9 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 |
| RISB-22 | 0 | 1 | < 370 | < 930 | < 370 | < 370 | < 370 | < 930 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 930 | < 370 | < 370 | < 370 | < 930 | |
| RISB-23 | 0 | 1 | < 340 | < 850 | < 340 | < 340 | < 340 | < 850 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 850 | < 340 | < 340 | < 340 | < 850 | |
| RISB-23 | 9 | 11 | < 380 | < 970 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 | < 970 | |
| RISB-24 | 0 | 1 | < 500 | < 1300 | < 500 | < 500 | < 500 | < 1300 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 1300 | < 500 | < 500 | < 500 | < 1300 | |
| RISB-25 | 0 | 1 | < 340 | < 850 | < 340 | < 340 | < 340 | < 850 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 850 | < 340 | < 340 | < 340 | < 850 | |
| RISB-25 | 9 | 13 | < 450 | < 1100 | < 450 | < 450 | < 450 | < 1100 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 1100 | < 450 | < 450 | < 450 | < 1100 | |
| RISB-25 | 17 | 20 | < 450 | < 1100 | < 450 | < 450 | < 450 | < 1100 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 1100 | < 450 | < 450 | < 450 | < 1100 | |
| RISB-26 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-26 | 1 | 5 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | |
| RISB-27 | 0 | 1 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 1000 | |
| RISB-27 | 5 | 9 | < 380 | < 970 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 | < 970 | | |
| RISB-28 | 0 | 1 | < 470 | < 1200 | < 470 | < 470 | < 470 | < 1200 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 1200 | < 470 | < 470 | < 470 | < 1200 | |
| RISB-28 | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-28 | 9 | 13 | < 350 | < 870 | < 350 | < 350 | < 350 | < 870 | < 350 | < 350 | < 350 | < 350 | < 350 | < 870 | < 350 | < 350 | < 350 | < 870 | | |
| RISB-29 | 0 | 1 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 1100 | | |
| RISB-29 | 1 | 5 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 410 | < 410 | 800 MJ | < 410 | < 1000 | < 410 | < 410 | < 1000 | |
| RISB-29 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-30 | 0 | 1 | < 340 | < 850 | < 340 | < 340 | < 340 | < 850 | < 340 | < 340 | < 340 | < 340 | < 340 | < 850 | < 340 | < 340 | < 340 | < 850 | | |
| RISB-30 | 9 | 13 | < 380 | < 940 | < 380 | < 380 | < 380 | < 940 | < 380 | < 380 | < 380 | < 380 | < 380 | < 940 | < 380 | < 380 | < 380 | < 940 | | |
| RISB-31 | 0 | 1 | < 360 | < 910 | < 360 | < 360 | < 360 | < 910 | < 360 | < 360 | < 360 | < 360 | < 360 | < 910 | < 360 | < 360 | < 360 | < 910 | | |
| RISB-31 | 9 | 13 | < 370 | < 930 | < 370 | < 370 | < 370 | < 930 | < 370 | < 370 | < 370 | < 370 | < 370 | < 930 | < 370 | < 370 | < 370 | < 930 | | |
| RISB-32 | 0 | 1 | < 360 | < 910 | < 360 | < 360 | < 360 | < 910 | < 360 | < 360 | < 360 | < 360 | < 360 | < 910 | < 360 | < 360 | < 360 | < 910 | | |
| RISB-33 | 5 | 9 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 1000 | | |
| RISB-33 | 17 | 20 | < 380 | < 940 | < 380 | < 380 | < 380 | < 940 | < 380 | < 380 | < 380 | < 380 | < 380 | < 940 | < 380 | < 380 | < 380 | < 940 | | |
| RISB-33-DUP | 17 | 20 | < 380 | < 950 | < 380 | < 380 | < 380 | < 950 | < 380 | < 380 | < 380 | < 380 | < 380 | < 950 | < 380 | < 380 | < 380 | < 950 | | |
| RISB-34 | 11 | 13 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | | |
| RISB-35 | 0 | 1 | < 350 | < 890 | < 350 | < 350 | < 350 | < 890 | < 350 | < 350 | < 350 | < 350 | < 350 | < 890 | < 350 | < 350 | < 350 | < 890 | | |
| RISB-35 | 5 | 9 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 1000 | | |
| RISB-35-DUP | 5 | 9 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | | |
| RISB-36 | 0 | 1 | < 350 | < 880 | < 350 | < 350 | < 350 | < 880 | < 350 | < 350 | < 350 | < 350 | < 350 | < 880 | < 350 | < 350 | < 350 | < 880 | | |
| RISB-36 | 13 | 16 | < 380 | < 950 | < 380 | < 380 | < 380 | < 950 | < 380 | < 380 | < 380 | < 380 | < 380 | < 950 | < 380 | < 380 | < 380 | < 950 | | |
| RISB-37 | 0 | 1 | < 380 | < 970 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 | < 970 | | |
| RISB-37 | 9 | 13 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 1100 | | |
| RISB-38 | 0 | 1 | < 330 | < 840 | < 330 | < 330 | < 330 | < 840 | < 330 | < 330 | < 330 | < 330 | < 330 | < 840 | < 330 | < 330 | < 330 | < 840 | | |
| RISB-38 | 17 | 21 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | | |
| RISB-39 | 0 | 1 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 1000 | | |
| RISB-39 | 13 | 17 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 1100 | | |
| RISB-40 | 0 | 1 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 1000 | | |
| RISB-40 | 9 | 13 | < 370 | < 930 | < 370 | < 370 | < 370 | < 930 | < 370 | < 370 | < 370 | < 370 | < 370 | < 930 | < 370 | < 370 | < 370 | < 930 | | |
| RISB-41 | 0 | 1 | < 380 | < 970 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 | < 970 | | |
| RISB-42 | 0 | 1 | < 380 | < 970 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 | < 970 | | |
| RISB-43 | 0 | 1 | < 350 | < 880 | < 350 | < 350 | < 350 | < 880 | < 350 | < 350 | < 350 | < 350 | < 350 | < 880 | < 350 | < 350 | < 350 | < 880 | | |
| RISB-44 | 0 | 1 | < 390 | < 980 | < 390 | < 390 | < 390 | < 980 | < 390 | < 390 | < 390 | < 390 | < 390 | < 980 | < 390 | < 390 | < 390 | < 980 | | |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | SVOCs | | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|----------------------------|-----------------------|-----------------------|--------------------|--------------------|-------------------|--------------------|--------------------|---------------------|----------------|---------------------|----------------|----------------|---------------|------------------------|------------------|----------------|
| | | | 1,2,4,5-Tetrachlorobenzene | 2,4,5-Trichlorophenol | 2,4,6-Trichlorophenol | 2,4-Dichlorophenol | 2,4-Dimethylphenol | 2,4-Dinitrophenol | 2,4-Dinitrotoluene | 2,6-Dinitrotoluene | 2-Chloronaphthalene | 2-Chlorophenol | 2-Methylnaphthalene | 2-Methylphenol | 2-Nitroaniline | 2-Nitrophenol | 3,3'-Dichlorobenzidine | 3+4-Methylphenol | 3-Nitroaniline |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-44 | 5 | 8.5 | < 480 | < 1200 | < 480 | < 480 | < 480 | < 1200 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 1200 | < 480 | < 480 | < 480 | < 1200 |
| RISB-45 | 0 | 1 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 |
| RISB-45 | 1 | 5 | < 390 | < 990 | < 390 | < 390 | < 390 | < 990 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 990 | < 390 | < 390 | < 390 | < 990 |
| RISB-46 | 0 | 1 | < 470 | < 1200 | < 470 | < 470 | < 470 | < 1200 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 1200 | < 470 | < 470 | < 470 | < 1200 |
| RISB-46-DUP | 0 | 1 | < 450 | < 1100 | < 450 | < 450 | < 450 | < 1100 | < 450 | < 450 | < 450 | < 450 | < 450 | 350 J | < 450 | < 1100 | < 450 | < 450 | < 1100 |
| RISB-46 | 1 | 5 | < 460 | < 1200 | < 460 | < 460 | < 460 | < 1200 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 1200 | < 460 | < 460 | < 460 | < 1200 |
| RISB-47 | 0 | 1 | < 350 | < 880 | < 350 | < 350 | < 350 | < 880 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 880 | < 350 | < 350 | < 350 | < 880 |
| RISB-47 | 9 | 13 | < 490 | < 1200 | < 490 | < 490 | < 490 | < 1200 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 1200 | < 490 | < 490 | < 490 | < 1200 |
| RISB-48 | 0 | 1 | < 390 | < 990 | < 390 | < 390 | < 390 | < 990 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 990 | < 390 | < 390 | < 390 | < 990 |
| RISB-48 | 13 | 15 | < 350 | < 890 | < 350 | < 350 | < 350 | < 890 | < 350 | < 350 | < 350 | < 350 | < 350 | < 890 | < 350 | < 350 | < 350 | < 890 | |
| RISB-49 | 0 | 1 | < 350 | < 870 | < 350 | < 350 | < 350 | < 870 | < 350 | < 350 | < 350 | < 350 | < 350 | < 870 | < 350 | < 350 | < 350 | < 870 | |
| RISB-49 | 13 | 17 | < 480 | < 1200 | < 480 | < 480 | < 480 | < 1200 | < 480 | < 480 | < 480 | < 480 | < 480 | 1100000 | < 480 | < 1200 | < 480 | < 480 | < 1200 |
| RISB-50 | 9 | 13 | < 350 | < 890 | < 350 | < 350 | < 350 | < 890 | < 350 | < 350 | < 350 | < 350 | < 350 | < 890 | < 350 | < 890 | < 350 | < 350 | < 890 |
| RISB-51 | 9 | 13 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 1000 |
| RISB-51-DUP | 9 | 13 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 1000 |
| RISB-52 | 0 | 1 | < 350 | < 890 | < 350 | < 350 | < 350 | < 890 | < 350 | < 350 | < 350 | < 350 | < 350 | < 890 | < 350 | < 890 | < 350 | < 350 | < 890 |
| RISB-52 | 9 | 13 | < 380 | < 950 | < 380 | < 380 | < 380 | < 950 | < 380 | < 380 | < 380 | < 380 | < 380 | < 950 | < 380 | < 950 | < 380 | < 380 | < 950 |
| RI-BCK1 | 0 | 1 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 1000 | < 400 | < 400 | < 1000 |
| RI-BCK1 | 3 | 4 | < 390 | < 990 | < 390 | < 390 | < 390 | < 990 | < 390 | < 390 | < 390 | < 390 | < 390 | < 990 | < 390 | < 990 | < 390 | < 390 | < 990 |
| RI-BCK2 | 0 | 1 | < 350 | < 870 | < 350 | < 350 | < 350 | < 870 | < 350 | < 350 | < 350 | < 350 | < 350 | < 870 | < 350 | < 870 | < 350 | < 350 | < 870 |
| RI-BCK2 | 3 | 4 | < 370 | < 920 | < 370 | < 370 | < 370 | < 920 | < 370 | < 370 | < 370 | < 370 | < 370 | < 920 | < 370 | < 920 | < 370 | < 370 | < 920 |
| RISS-1 | 0 | 1 | < 490 | < 1200 | < 490 | < 490 | < 490 | < 1200 | < 490 | < 490 | < 490 | < 490 | < 490 | < 1200 | < 490 | < 1200 | < 490 | < 490 | < 1200 |
| RISS-2 | 0 | 1 | < 360 | < 910 | < 360 | < 360 | < 360 | < 910 | < 360 | < 360 | < 360 | < 360 | < 360 | < 910 | < 360 | < 910 | < 360 | < 360 | < 910 |
| RISS-3 | 0 | 1 | < 1900 | < 4800 | < 1900 | < 1900 | < 1900 | < 4800 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 4800 | < 1900 | < 4800 | < 1900 | < 1900 | < 4800 |
| RISS-4 | 0 | 1 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 1100 | < 420 | < 420 | < 1100 |
| RISS-5 | 0 | 1 | < 360 | < 910 | < 360 | < 360 | < 360 | < 910 | < 360 | < 360 | < 360 | < 360 | < 360 | < 910 | < 360 | < 910 | < 360 | < 360 | < 910 |
| RISS-6 | 0 | 1 | < 370 | < 930 | < 370 | < 370 | < 370 | < 930 | < 370 | < 370 | < 370 | < 370 | < 370 | < 930 | < 370 | < 930 | < 370 | < 370 | < 930 |
| RISS-7 | 0 | 1 | < 390 | < 980 | < 390 | < 390 | < 390 | < 980 | < 390 | < 390 | < 390 | < 390 | < 390 | < 980 | < 390 | < 980 | < 390 | < 390 | < 980 |
| RISS-8 | 0 | 1 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 1000 | < 410 | < 410 | < 1000 |
| RISS-9 | 0 | 1 | < 370 | < 920 | < 370 | < 370 | < 370 | < 920 | < 370 | < 370 | < 370 | < 370 | < 370 | < 920 | < 370 | < 920 | < 370 | < 370 | < 920 |
| RISS-10 | 0 | 1 | < 370 | < 920 | < 370 | < 370 | < 370 | < 920 | < 370 | < 370 | < 370 | < 370 | < 370 | < 920 | < 370 | < 920 | < 370 | < 370 | < 920 |
| RISS-10-DUP | 0 | 1 | < 360 | < 910 | < 360 | < 360 | < 360 | < 910 | < 360 | < 360 | < 360 | < 360 | < 360 | < 910 | < 360 | < 910 | < 360 | < 360 | < 910 |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | SVOCs | | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|----------------------|----------------------------|-----------------|-----------------------------|----------------|---------------|--------------|----------------|--------------|------------|----------|--------------|--------------------|----------------|----------------------|--------------------|----------------------|
| | | | 4,6-Dinitro-o-cresol | 4-Bromophenyl phenyl ether | 4-Chloroaniline | 4-Chlorophenyl phenyl ether | 4-Nitroaniline | 4-Nitrophenol | Acenaphthene | Acenaphthylene | Acetophenone | Anthracene | Atrazine | Benzaldehyde | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(ghi)perylene | Benzo(k)fluoranthene |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-44 | 5 | 8.5 | < 1200 | < 480 | < 480 | < 480 | < 1200 | < 1200 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 |
| RISB-45 | 0 | 1 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 1100 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 |
| RISB-45 | 1 | 5 | < 990 | < 390 | < 390 | < 390 | < 990 | < 990 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RISB-46 | 0 | 1 | < 1200 | < 470 | < 470 | < 470 | < 1200 | < 1200 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 |
| RISB-46-DUP | 0 | 1 | < 1100 | < 450 | < 450 | < 450 | < 1100 | < 1100 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 |
| RISB-46 | 1 | 5 | < 1200 | < 460 | < 460 | < 460 | < 1200 | < 1200 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 |
| RISB-47 | 0 | 1 | < 880 | < 350 | < 350 | < 350 | < 880 | < 880 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-47 | 9 | 13 | < 1200 | < 490 | < 490 | < 490 | < 1200 | < 1200 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 |
| RISB-48 | 0 | 1 | < 990 | < 390 | < 390 | < 390 | < 990 | < 990 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RISB-48 | 13 | 15 | < 890 | < 350 | < 350 | < 350 | < 890 | < 890 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-49 | 0 | 1 | < 870 | < 350 | < 350 | < 350 | < 870 | < 870 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-49 | 13 | 17 | < 1200 | < 480 | < 480 | < 480 | < 1200 | < 1200 | 9200 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 |
| RISB-50 | 9 | 13 | < 890 | < 350 | < 350 | < 350 | < 890 | < 890 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-51 | 9 | 13 | < 1000 | < 410 | < 410 | < 410 | < 1000 | < 1000 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 |
| RISB-51-DUP | 9 | 13 | < 1000 | < 410 | < 410 | < 410 | < 1000 | < 1000 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 |
| RISB-52 | 0 | 1 | < 890 | < 350 | < 350 | < 350 | < 890 | < 890 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-52 | 9 | 13 | < 950 | < 380 | < 380 | < 380 | < 950 | < 950 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RI-BCK1 | 0 | 1 | < 1000 | < 400 | < 400 | < 400 | < 1000 | < 1000 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 |
| RI-BCK1 | 3 | 4 | < 990 | < 390 | < 390 | < 390 | < 990 | < 990 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RI-BCK2 | 0 | 1 | < 870 | < 350 | < 350 | < 350 | < 870 | < 870 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RI-BCK2 | 3 | 4 | < 920 | < 370 | < 370 | < 370 | < 920 | < 920 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 |
| RISS-1 | 0 | 1 | < 1200 | < 490 | < 490 | < 490 | < 1200 | < 1200 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 |
| RISS-2 | 0 | 1 | < 910 | < 360 | < 360 | < 360 | < 910 | < 910 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 |
| RISS-3 | 0 | 1 | < 4800 | < 1900 | < 1900 | < 1900 | < 4800 | < 4800 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 |
| RISS-4 | 0 | 1 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 1100 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 |
| RISS-5 | 0 | 1 | < 910 | < 360 | < 360 | < 360 | < 910 | < 910 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 |
| RISS-6 | 0 | 1 | < 930 | < 370 | < 370 | < 370 | < 930 | < 930 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 |
| RISS-7 | 0 | 1 | < 980 | < 390 | < 390 | < 390 | < 980 | < 980 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RISS-8 | 0 | 1 | < 1000 | < 410 | < 410 | < 410 | < 1000 | < 1000 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 |
| RISS-9 | 0 | 1 | < 920 | < 370 | < 370 | < 370 | < 920 | < 920 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 |
| RISS-10 | 0 | 1 | < 920 | < 370 | < 370 | < 370 | < 920 | < 920 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 |
| RISS-10-DUP | 0 | 1 | < 910 | < 360 | < 360 | < 360 | < 910 | < 910 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | SVOCs | | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|----------|----------------------------|-------------------------|-----------------------------|----------------------------|------------------------|-------------|-----------|----------|-------------------------|--------------|-------------------|--------------------|---------------------|---------------------|--------------|----------|
| | | | Biphenyl | Bis(2-chloroethoxy)methane | Bis(2-chloroethyl)ether | Bis(2-chloroisopropyl)ether | Bis(2-ethylhexyl)phthalate | Butyl benzyl phthalate | Caprolactam | Carbazole | Chrysene | Dibenzo(a,h)-anthracene | Dibenzofuran | Diethyl phthalate | Dimethyl phthalate | Di-n-butylphthalate | Di-n-octylphthalate | Fluoranthene | Fluorene |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-1 | 0 | 1 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RISB-2 | 0 | 1 | < 350 | < 350 | < 350 | < 350 | 2100 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-2-DUP | 0 | 1 | < 340 | < 340 | < 340 | < 340 | 2500 | 450 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 |
| RISB-2 | 9 | 13 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 |
| RISB-2 | 17 | 21 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 |
| RISB-3 | 0 | 1 | < 380 | < 380 | < 380 | < 380 | 370 J2 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | 240 J2 | < 380 | < 380 | < 380 | < 380 |
| RISB-3 | 9 | 13 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-4 | 0 | 1 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 |
| RISB-4 | 5 | 9 | < 400 | < 400 | < 400 | < 400 | 640 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 |
| RISB-5 | 0 | 1 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 |
| RISB-5 | 5 | 9 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-6 | 0 | 1 | < 370 | < 370 | < 370 | < 370 | 1500 | 360 J2 | 220 J2 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 |
| RISB-6 | 13 | 15 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RISB-7 | 0 | 1 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 |
| RISB-7 | 1 | 5 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 |
| RISB-8 | 0 | 1 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-8 | 5 | 8 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-9 | 0 | 1 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-9 | 5 | 9 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 |
| RISB-10 | 5 | 9 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 |
| RISB-11 | 0 | 1 | < 350 | < 350 | < 350 | < 350 | 410 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-11 | 1 | 5 | < 410 | < 410 | < 410 | < 410 | 850 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 |
| RISB-11 | 5 | 9 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RISB-12 | 0 | 1 | < 380 | < 380 | < 380 | < 380 | 950 | 360 J2 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-12 | 1 | 5 | < 440 | < 440 | < 440 | < 440 | 8900 | 1400 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | 920 | < 440 | < 440 | < 440 |
| RISB-12 | 17 | 21 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RISB-13 | 0 | 1 | < 390 | < 390 | < 390 | < 390 | 29000 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | 240 J2 | < 390 | < 390 | < 390 |
| RISB-13 | 5 | 9 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 |
| RISB-13-DUP | 5 | 9 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 |
| RISB-14 | 0 | 1 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RISB-14 | 5 | 9 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-14-DUP | 5 | 9 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-14 | 9 | 13 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-15 | 0 | 1 | 2700 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 |
| RISB-15 | 9 | 13 | < 380 | < 380 | < 380 | < 380 | 410 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-16 | 0 | 1 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 |
| RISB-16 | 1 | 5 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 |
| RISB-17 | 0 | 1 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 |
| RISB-17 | 9 | 13 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 |
| RISB-18 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-18 | 1 | 5 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | 260 MJ | < 380 | < 380 | < 380 |
| RISB-19 | 0 | 1 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 |
| RISB-20 | 5 | 9 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-21 | 0 | 1 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | SVOCs | | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|----------|----------------------------|-------------------------|-----------------------------|----------------------------|------------------------|-------------|-----------|----------|-------------------------|--------------|-------------------|--------------------|---------------------|---------------------|--------------|----------|
| | | | Biphenyl | Bis(2-chloroethoxy)methane | Bis(2-chloroethyl)ether | Bis(2-chloroisopropyl)ether | Bis(2-ethylhexyl)phthalate | Butyl benzyl phthalate | Caprolactam | Carbazole | Chrysene | Dibenzo(a,h)-anthracene | Dibenzofuran | Diethyl phthalate | Dimethyl phthalate | Di-n-butylphthalate | Di-n-octylphthalate | Fluoranthene | Fluorene |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-21 | 5 | 9 | < 420 | < 420 | < 420 | < 420 | < 420 | 530 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 |
| RISB-22 | 0 | 1 | < 370 | < 370 | < 370 | < 370 | 260 J | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | 230 J | < 370 | < 370 | < 370 |
| RISB-23 | 0 | 1 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 |
| RISB-23 | 9 | 11 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-24 | 0 | 1 | < 500 | < 500 | < 500 | < 500 | 3100 | 550 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| RISB-25 | 0 | 1 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 |
| RISB-25 | 9 | 13 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | 310 J | < 450 | < 450 | < 450 |
| RISB-25 | 17 | 20 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 |
| RISB-26 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-26 | 1 | 5 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | 270 J | < 420 | < 420 | < 420 |
| RISB-27 | 0 | 1 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 |
| RISB-27 | 5 | 9 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-28 | 0 | 1 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 |
| RISB-28 | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-28 | 9 | 13 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-29 | 0 | 1 | < 430 | < 430 | < 430 | < 430 | 370 J | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 |
| RISB-29 | 1 | 5 | < 410 | < 410 | < 410 | < 410 | 6300 MJ | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | 260 MJ | < 410 | < 410 | < 410 |
| RISB-29 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-30 | 0 | 1 | < 340 | < 340 | < 340 | < 340 | 270 J2 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 |
| RISB-30 | 9 | 13 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-31 | 0 | 1 | < 360 | < 360 | < 360 | < 360 | 340 J2 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 |
| RISB-31 | 9 | 13 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 |
| RISB-32 | 0 | 1 | < 360 | < 360 | < 360 | < 360 | 1900 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 |
| RISB-33 | 5 | 9 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 |
| RISB-33 | 17 | 20 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-33-DUP | 17 | 20 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-34 | 11 | 13 | < 420 | < 420 | < 420 | < 420 | 1400 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 |
| RISB-35 | 0 | 1 | < 350 | < 350 | < 350 | < 350 | 600 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-35 | 5 | 9 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 |
| RISB-35-DUP | 5 | 9 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 |
| RISB-36 | 0 | 1 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-36 | 13 | 16 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-37 | 0 | 1 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-37 | 9 | 13 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 |
| RISB-38 | 0 | 1 | < 330 | < 330 | < 330 | < 330 | 540 | < 330 | < 330 | < 330 | < 330 | < 330 | < 330 | < 330 | < 330 | < 330 | < 330 | < 330 | < 330 |
| RISB-38 | 17 | 21 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 |
| RISB-39 | 0 | 1 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 |
| RISB-39 | 13 | 17 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 |
| RISB-40 | 0 | 1 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 |
| RISB-40 | 9 | 13 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 |
| RISB-41 | 0 | 1 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-42 | 0 | 1 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-43 | 0 | 1 | < 350 | < 350 | < 350 | < 350 | 400 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-44 | 0 | 1 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | SVOCs | | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|----------|----------------------------|--------------------------|-----------------------------|----------------------------|------------------------|-------------|-----------|----------|-------------------------|--------------|-------------------|--------------------|---------------------|---------------------|--------------|----------|
| | | | Biphenyl | Bis(2-chloroethoxy)methane | Bis(2-chloroethoxy)ether | Bis(2-chloroisopropyl)ether | Bis(2-ethylhexyl)phthalate | Butyl benzyl phthalate | Caprolactam | Carbazole | Chrysene | Dibenzo(a,h)-anthracene | Dibenzofuran | Diethyl phthalate | Dimethyl phthalate | Di-n-butylphthalate | Di-n-octylphthalate | Fluoranthene | Fluorene |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-44 | 5 | 8.5 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 |
| RISB-45 | 0 | 1 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 |
| RISB-45 | 1 | 5 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RISB-46 | 0 | 1 | 310 J | < 470 | < 470 | < 470 | < 470 | 1900 | 610 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | 2000 | < 470 | < 470 | < 470 |
| RISB-46-DUP | 0 | 1 | 610 | < 450 | < 450 | < 450 | 4500 | 830 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | 2800 | < 450 | < 450 | < 450 |
| RISB-46 | 1 | 5 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 |
| RISB-47 | 0 | 1 | < 350 | < 350 | < 350 | < 350 | 920 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | 230 J2 | < 350 | < 350 | < 350 |
| RISB-47 | 9 | 13 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 |
| RISB-48 | 0 | 1 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RISB-48 | 13 | 15 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-49 | 0 | 1 | < 350 | < 350 | < 350 | < 350 | 670 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-49 | 13 | 17 | 15000 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | 1200 | 15000 |
| RISB-50 | 9 | 13 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-51 | 9 | 13 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 |
| RISB-51-DUP | 9 | 13 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 |
| RISB-52 | 0 | 1 | < 350 | < 350 | < 350 | < 350 | 1000 | 320 J2 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-52 | 9 | 13 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RI-BCK1 | 0 | 1 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 |
| RI-BCK1 | 3 | 4 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RI-BCK2 | 0 | 1 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RI-BCK2 | 3 | 4 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 |
| RISS-1 | 0 | 1 | < 490 | < 490 | < 490 | < 490 | 320 J2 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 |
| RISS-2 | 0 | 1 | < 360 | < 360 | < 360 | < 360 | 230 J2 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 |
| RISS-3 | 0 | 1 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 |
| RISS-4 | 0 | 1 | < 420 | < 420 | < 420 | < 420 | 270 J2 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 |
| RISS-5 | 0 | 1 | < 360 | < 360 | < 360 | < 360 | 230 J2 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 |
| RISS-6 | 0 | 1 | < 370 | < 370 | < 370 | < 370 | 240 J2 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 |
| RISS-7 | 0 | 1 | < 390 | < 390 | < 390 | < 390 | 250 J2 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RISS-8 | 0 | 1 | < 410 | < 410 | < 410 | < 410 | 260 J2 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 |
| RISS-9 | 0 | 1 | < 370 | < 370 | < 370 | < 370 | 230 J2 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 |
| RISS-10 | 0 | 1 | < 370 | < 370 | < 370 | < 370 | 240 J2 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 |
| RISS-10-DUP | 0 | 1 | < 360 | < 360 | < 360 | < 360 | 230 J2 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | SVOCs | | | | | | | | | | | | | | |
|-------------|------------------|----------------|-------------------|---------------------|---------------------------|------------------|------------------------|------------|-------------|----------|--------------|---------------------------|-------------------|-------------------|--------------|--------|--------|
| | | | Hexachlorobenzene | Hexachlorobutadiene | Hexachlorocyclopentadiene | Hexachloroethane | Indeno(1,2,3-cd)pyrene | Isophorone | Naphthalene | NDPA/DPA | Nitrobenzene | n-Nitrosodi-n-propylamine | p-Chloro-m-cresol | Pentachlorophenol | Phenanthrene | Phenol | Pyrene |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-1 | 0 | 1 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RISB-2 | 0 | 1 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-2-DUP | 0 | 1 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 |
| RISB-2 | 9 | 13 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 |
| RISB-2 | 17 | 21 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 |
| RISB-3 | 0 | 1 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-3 | 9 | 13 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-4 | 0 | 1 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 |
| RISB-4 | 5 | 9 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 |
| RISB-5 | 0 | 1 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 |
| RISB-5 | 5 | 9 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-6 | 0 | 1 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 |
| RISB-6 | 13 | 15 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RISB-7 | 0 | 1 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 |
| RISB-7 | 1 | 5 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 |
| RISB-8 | 0 | 1 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-8 | 5 | 8 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-9 | 0 | 1 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-9 | 5 | 9 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 |
| RISB-10 | 5 | 9 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 |
| RISB-11 | 0 | 1 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 |
| RISB-11 | 1 | 5 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 |
| RISB-11 | 5 | 9 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RISB-12 | 0 | 1 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-12 | 1 | 5 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | 570 | < 440 | < 440 | < 440 | < 440 | < 1100 | < 440 | < 440 | < 440 |
| RISB-12 | 17 | 21 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RISB-13 | 0 | 1 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RISB-13 | 5 | 9 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | 830 | < 450 | < 450 | < 450 | < 450 | < 1100 | < 450 | < 450 | < 450 |
| RISB-13-DUP | 5 | 9 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | 510 | < 440 | < 440 | < 440 | < 1100 | < 440 | < 440 | < 440 |
| RISB-14 | 0 | 1 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RISB-14 | 5 | 9 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-14-DUP | 5 | 9 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-14 | 9 | 13 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-15 | 0 | 1 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 |
| RISB-15 | 9 | 13 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 |
| RISB-16 | 0 | 1 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | < 430 |
| RISB-16 | 1 | 5 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 910 | < 360 | < 360 | < 360 |
| RISB-17 | 0 | 1 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | < 430 |
| RISB-17 | 9 | 13 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 1100 | < 440 | < 440 | < 440 |
| RISB-18 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-18 | 1 | 5 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | 940 | < 380 | < 380 |
| RISB-19 | 0 | 1 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 |
| RISB-20 | 5 | 9 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 940 | < 380 | < 380 | < 380 |
| RISB-21 | 0 | 1 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 440 | < 1100 | < 440 | < 440 | < 440 |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | SVOCs | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|-------------------|---------------------|---------------------------|------------------|------------------------|------------|-------------|----------|--------------|---------------------------|-------------------|-------------------|--------------|--------|--------|-------|
| | | | Hexachlorobenzene | Hexachlorobutadiene | Hexachlorocyclopentadiene | Hexachloroethane | Indeno(1,2,3-cd)pyrene | Isophorone | Naphthalene | NDPA/DPA | Nitrobenzene | n-Nitrosodi-n-propylamine | p-Chloro-m-cresol | Pentachlorophenol | Phenanthrene | Phenol | Pyrene | |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-21 | 5 | 9 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 |
| RISB-22 | 0 | 1 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 930 | < 370 | < 370 | < 370 |
| RISB-23 | 0 | 1 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 850 | < 340 | < 340 | < 340 |
| RISB-23 | 9 | 11 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 |
| RISB-24 | 0 | 1 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 1300 | < 500 | < 500 | < 500 |
| RISB-25 | 0 | 1 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 850 | < 340 | < 340 | < 340 |
| RISB-25 | 9 | 13 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 1100 | < 450 | < 450 | < 450 |
| RISB-25 | 17 | 20 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 1100 | < 450 | < 450 | < 450 |
| RISB-26 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-26 | 1 | 5 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 |
| RISB-27 | 0 | 1 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 |
| RISB-27 | 5 | 9 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 |
| RISB-28 | 0 | 1 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 1200 | < 470 | < 470 | < 470 |
| RISB-28 | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-28 | 9 | 13 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 870 | < 350 | < 350 | < 350 |
| RISB-29 | 0 | 1 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | < 430 |
| RISB-29 | 1 | 5 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | 3500 MJ | < 410 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 |
| RISB-29 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-30 | 0 | 1 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 340 | < 850 | < 340 | < 340 | < 340 |
| RISB-30 | 9 | 13 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 940 | < 380 | < 380 | < 380 |
| RISB-31 | 0 | 1 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 910 | < 360 | < 360 | < 360 |
| RISB-31 | 9 | 13 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 930 | < 370 | < 370 | < 370 |
| RISB-32 | 0 | 1 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 910 | < 360 | < 360 | < 360 |
| RISB-33 | 5 | 9 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 |
| RISB-33 | 17 | 20 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 940 | < 380 | < 380 | < 380 |
| RISB-33-DUP | 17 | 20 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 950 | < 380 | < 380 | < 380 |
| RISB-34 | 11 | 13 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 |
| RISB-35 | 0 | 1 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 890 | < 350 | < 350 | < 350 |
| RISB-35 | 5 | 9 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 |
| RISB-35-DUP | 5 | 9 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 |
| RISB-36 | 0 | 1 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 880 | < 350 | < 350 | < 350 |
| RISB-36 | 13 | 16 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 950 | < 380 | < 380 | < 380 |
| RISB-37 | 0 | 1 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 |
| RISB-37 | 9 | 13 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | < 430 |
| RISB-38 | 0 | 1 | < 330 | < 330 | < 330 | < 330 | < 330 | < 330 | < 330 | < 330 | < 330 | < 330 | < 330 | < 330 | < 840 | < 330 | < 330 | < 330 |
| RISB-38 | 17 | 21 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 |
| RISB-39 | 0 | 1 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 |
| RISB-39 | 13 | 17 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | < 430 |
| RISB-40 | 0 | 1 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 |
| RISB-40 | 9 | 13 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 930 | < 370 | < 370 | < 370 |
| RISB-41 | 0 | 1 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 |
| RISB-42 | 0 | 1 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 970 | < 380 | < 380 | < 380 |
| RISB-43 | 0 | 1 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 880 | < 350 | < 350 | < 350 |
| RISB-44 | 0 | 1 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 980 | < 390 | < 390 | < 390 |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | SVOCs | | | | | | | | | | | | | | |
|-------------|------------------|----------------|-------------------|---------------------|---------------------------|------------------|------------------------|------------|-------------|----------|--------------|---------------------------|-------------------|-------------------|--------------|--------|--------|
| | | | Hexachlorobenzene | Hexachlorobutadiene | Hexachlorocyclopentadiene | Hexachloroethane | Indeno(1,2,3-cd)pyrene | Isophorone | Naphthalene | NDPA/DPA | Nitrobenzene | n-Nitrosodi-n-propylamine | p-Chloro-m-cresol | Pentachlorophenol | Phenanthrene | Phenol | Pyrene |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-44 | 5 | 8.5 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 |
| RISB-45 | 0 | 1 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 |
| RISB-45 | 1 | 5 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 |
| RISB-46 | 0 | 1 | 330 J | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 |
| RISB-46-DUP | 0 | 1 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | 230 J | < 450 | < 450 | < 450 | < 450 | < 1100 | < 450 | < 450 | < 450 |
| RISB-46 | 1 | 5 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 460 | < 1200 | < 460 | < 460 | < 460 |
| RISB-47 | 0 | 1 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 880 | < 350 | < 350 | < 350 |
| RISB-47 | 9 | 13 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 1200 | < 490 | < 490 | < 490 |
| RISB-48 | 0 | 1 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 990 | < 390 | < 390 | < 390 |
| RISB-48 | 13 | 15 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 890 | < 350 | < 350 | < 350 |
| RISB-49 | 0 | 1 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 870 | < 350 | < 350 | < 350 |
| RISB-49 | 13 | 17 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | 27000 | 13000 | < 480 | < 480 | < 480 | < 1200 | 31000 | < 480 | 4200 |
| RISB-50 | 9 | 13 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 890 | < 350 | < 350 | < 350 |
| RISB-51 | 9 | 13 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 |
| RISB-51-DUP | 9 | 13 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 |
| RISB-52 | 0 | 1 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 890 | < 350 | < 350 | < 350 |
| RISB-52 | 9 | 13 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 380 | < 950 | < 380 | < 380 | < 380 |
| RI-BCK1 | 0 | 1 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 400 | < 1000 | < 400 | < 400 | < 400 |
| RI-BCK1 | 3 | 4 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 990 | < 390 | < 390 | < 390 |
| RI-BCK2 | 0 | 1 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 350 | < 870 | < 350 | < 350 | < 350 |
| RI-BCK2 | 3 | 4 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 920 | < 370 | < 370 | < 370 |
| RISS-1 | 0 | 1 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 1200 | < 490 | < 490 | < 490 |
| RISS-2 | 0 | 1 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 910 | < 360 | < 360 | < 360 |
| RISS-3 | 0 | 1 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 1900 | < 4800 | < 1900 | < 1900 | < 1900 |
| RISS-4 | 0 | 1 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 |
| RISS-5 | 0 | 1 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 910 | < 360 | < 360 | < 360 |
| RISS-6 | 0 | 1 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 930 | < 370 | < 370 | < 370 |
| RISS-7 | 0 | 1 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 980 | < 390 | < 390 | < 390 |
| RISS-8 | 0 | 1 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 |
| RISS-9 | 0 | 1 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 920 | < 370 | < 370 | < 370 |
| RISS-10 | 0 | 1 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 370 | < 920 | < 370 | < 370 | < 370 |
| RISS-10-DUP | 0 | 1 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 360 | < 910 | < 360 | < 360 | < 360 |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | PCBs | | | | | | | | Metals | | | | | | | | | | | |
|-------------|------------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------|----------|---------|--------|-----------|---------|---------|----------|--------|--------|-------|-------|-------|
| | | | Aroclor 1016 | Aroclor 1221 | Aroclor 1232 | Aroclor 1242 | Aroclor 1248 | Aroclor 1254 | Aroclor 1260 | Aluminum | Antimony | Arsenic | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Iron | Lead | |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg |
| RISB-1 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 23000 | < 7.1 | 1.7 | 76 | 1 | < 0.59 | 2400 | 15 | 46 | 96 | 58000 | 7.7 | |
| RISB-2 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 32000 | < 6.3 | 1.5 | 56 | 0.21 J2 | 0.75 | 24000 | 45 | 24 | 52 | 20000 | 40 | |
| RISB-2-DUP | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 26000 | < 6.3 | 1.8 | 53 | 0.29 J2 | 0.53 | 17000 | 35 | 30 | 86 | 20000 | 40 | |
| RISB-2 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | 24000 | < 8.5 | 2 | 280 | 1.4 | < 0.7 | 2700 | 77 | 51 | 110 | 28000 | 5.9 | |
| RISB-2 | 17 | 21 | NA | NA | NA | NA | NA | NA | NA | 10000 | < 6.8 | < 1.1 | 160 | 0.32 J2 | < 0.56 | 5100 | 98 | 19 | 120 | 16000 | 1.8 | |
| RISB-3 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 20000 | < 6.9 | 1.2 | 150 | 1.1 | < 0.58 | 3700 | 27 | 38 | 49 | 42000 | 10 | |
| RISB-3 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | 9300 | < 6.3 | < 1.1 | 83 | 0.41 J2 | < 0.53 | 4500 | 16 | 18 | 76 | 17000 | 1.5 | |
| RISB-4 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 32000 | < 7.7 | 1.4 | 92 | 1.4 | 0.4 J2 | 3200 | 73 | 40 | 77 | 52000 | 9 | |
| RISB-4 | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | 16000 | < 7.3 | 2.8 | 120 | 1 | < 0.61 | 1700 | 26 | 21 | 23 | 29000 | 20 | |
| RISB-5 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 25000 | < 7.5 | 1.4 | 93 | 1.1 | < 0.63 | 1500 | 33 | 18 | 44 | 50000 | 10 | |
| RISB-5 | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | 13000 | < 6.9 | 0.95 J2 | 130 | 1.1 | < 0.57 | 9100 | 26 | 22 | 31 | 25000 | 3.7 | |
| RISB-6 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 20000 | < 6.6 | 1 J2 | 83 | 0.33 J2 | 0.14 J2 | 15000 | 20 | 24 | 34 | 20000 | 29 | |
| RISB-6 | 13 | 15 | NA | NA | NA | NA | NA | NA | NA | 10000 | < 7 | < 1.2 | 100 | 0.48 J2 | < 0.59 | 4800 | 2.8 | 41 | 130 | 34000 | 1.4 | |
| RISB-7 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 35000 | < 8.2 | 1.3 J2 | 96 | 1.3 | 0.52 J2 | 7600 | 23 | 31 | 92 | 86000 | 18 | |
| RISB-7 | 1 | 5 | NA | NA | NA | NA | NA | NA | NA | 29000 | < 7.3 | 1.6 | 130 | 0.66 | < 0.61 | 23000 | 5.2 | 38 | 150 | 39000 | 4.7 | |
| RISB-8 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 29000 | < 7 | < 1.2 | 94 | 0.27 J2 | 0.56 J2 | 20000 | 30 | 29 | 69 | 30000 | 7.1 | |
| RISB-8 | 5 | 8 | NA | NA | NA | NA | NA | NA | NA | 11000 | < 6.5 | < 1.1 | 190 | 0.33 J2 | 0.48 J2 | 7700 | 11 | 39 | 190 | 43000 | 1.3 | |
| RISB-9 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 11000 | < 6.9 | < 1.2 | 110 | 0.47 J2 | 0.28 J2 | 7200 | 14 | 23 | 84 | 29000 | 3.6 | |
| RISB-9 | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | 16000 | < 7.2 | < 1.2 | 230 | 0.63 | 0.32 J2 | 9600 | 24 | 31 | 110 | 34000 | 4.5 | |
| RISB-10 | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | 7100 | < 7.3 | 0.9 J2 | 660 | 0.61 | < 0.61 | 3200 | 16 | 56 | 20 | 13000 | 6.4 | |
| RISB-11 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 28000 | < 6.5 | 1.2 | 100 | 0.86 | < 0.54 | 7600 | 34 | 17 | 40 | 32000 | 6.9 | |
| RISB-11 | 1 | 5 | NA | NA | NA | NA | NA | NA | NA | 18000 | < 7.4 | 1.3 | 87 | 1.4 | < 0.62 | 2000 | 48 | 41 | 36 | 66000 | 11 | |
| RISB-11 | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | 18000 | < 7 | 1.5 | 100 | 0.78 | < 0.59 | 11000 | 12 | 27 | 67 | 35000 | 3.3 | |
| RISB-12 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 28000 | < 6.8 | 1.7 | 670 | 0.67 | 0.34 J2 | 16000 | 38 | 300 | 47 | 39000 | 52 | |
| RISB-12 | 1 | 5 | NA | NA | NA | NA | NA | NA | NA | 16000 | < 8 | 1.5 | 98 | 0.98 | < 0.66 | 1600 | 43 | 56 | 37 | 49000 | 9.2 | |
| RISB-12 | 17 | 21 | NA | NA | NA | NA | NA | NA | NA | 14000 | < 7 | < 1.2 | 60 | 0.23 J2 | 0.12 J2 | 6100 | 61 | 11 | 87 | 15000 | 2.1 | |
| RISB-13 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 37000 | < 7.1 | 1.4 | 170 | 0.83 | < 0.59 | 2300 | 49 | 26 | 82 | 39000 | 14 | |
| RISB-13 | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | 21000 | < 8.2 | < 1.4 | 98 | 0.63 J2 | < 0.68 | 3000 | 34 | 30 | 98 | 30000 | 3.4 | |
| RISB-13-DUP | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | 20000 | < 8 | 0.72 J2 | 100 | 0.54 J2 | < 0.67 | 2900 | 36 | 32 | 110 | 33000 | 3.2 | |
| RISB-14 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 23000 | < 7 | 1.3 | 110 | 0.9 | < 0.58 | 8500 | 18 | 48 | 82 | 47000 | 10 | |
| RISB-14 | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | 11000 | < 6.8 | < 1.1 | 110 | 0.61 | < 0.57 | 4700 | 1.1 | 31 | 160 | 48000 | 1.8 | |
| RISB-14-DUP | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | 12000 | < 7 | < 1.2 | 160 | 0.57 J2 | < 0.58 | 5300 | 2 | 46 | 150 | 46000 | 2 | |
| RISB-14 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | 13000 | < 7 | < 1.2 | 130 | 0.54 J2 | < 0.58 | 6800 | 2.8 | 34 | 160 | 43000 | 2.2 | |
| RISB-15 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 23000 | < 7.7 | 2.6 | 140 | 1.3 | < 0.64 | 1200 | 26 | 13 | 22 | 39000 | 9.5 | |
| RISB-15 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | 9800 | < 6.9 | < 1.2 | 140 | 0.45 J2 | < 0.58 | 5500 | 0.63 J2 | 55 | 150 | 33000 | 2.1 | |
| RISB-16 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 21000 | < 7.8 | 1.8 | 90 | 1.6 | < 0.65 | 1600 | 30 | 130 | 85 | 99000 | 14 | |
| RISB-16 | 1 | 5 | NA | NA | NA | NA | NA | NA | NA | 10000 | < 6.6 | 0.55 J2 | 190 | 0.59 | < 0.55 | 3300 | 14 | 7.9 | 75 | 33000 | 2 | |
| RISB-17 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 17000 | < 7.8 | 1.7 | 79 | 1.6 | < 0.65 | 3100 | 23 | 21 | 6.8 | 51000 | 7.9 | |
| RISB-17 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | 9100 | < 8 | 1.2 J2 | 72 | 0.91 | < 0.67 | 1900 | 47 | 29 | 19 | 47000 | 9 | |
| RISB-18 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-18 | 1 | 5 | < 38 | < 38 | < 38 | < 38 | < 38 | < 38 | < 38 | 15000 | < 6.9 | 0.92 J2 | 79 | 0.56 J2 | < 0.58 | 3800 | 32 | 31 | 57 | 21000 | 4.2 | |
| RISB-19 | 0 | 1 | < 40 | < 40 | < 40 | < 40 | < 40 | < 40 | < 40 | 17000 | < 7.3 | 1.5 | 100 | 0.91 | 0.13 J2 | 3500 | 37 | 81 | 59 | 29000 | 9.2 | |
| RISB-20 | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | 21000 | < 6.8 | 1.4 | 130 | 0.72 | < 0.57 | 11000 | 4.1 | 42 | 82 | 37000 | 3.5 | |
| RISB-21 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 16000 | < 8 | 1.1 J2 | 200 | 1.5 | < 0.67 | 500 J2 | 5.6 | 23 | 25 | 42000 | 7.2 | |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | PCBs | | | | | | | | Metals | | | | | | | | | | | |
|-------------|------------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------|----------|---------|--------|-----------|---------|---------|----------|--------|--------|-------|-------|-------|
| | | | Aroclor 1016 | Aroclor 1221 | Aroclor 1232 | Aroclor 1242 | Aroclor 1248 | Aroclor 1254 | Aroclor 1260 | Aluminum | Antimony | Arsenic | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Iron | Lead | |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg |
| RISB-21 | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | 7900 | < 7.6 | 0.7 J2 | 22 J2 | 0.35 J2 | < 0.64 | 1000 | 8.4 | 11 | 14 | 23000 | 4.2 | |
| RISB-22 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 21000 | < 6.7 | 1.5 | 110 | 0.58 | 0.78 | 10000 | 27 | 30 | 50 | 31000 | 20 | |
| RISB-23 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 26000 | < 6.1 | 1.8 | 53 | 0.08 J2 | 1.7 | 19000 | 35 | 19 | 44 | 16000 | 28 | |
| RISB-23 | 9 | 11 | NA | NA | NA | NA | NA | NA | NA | 14000 | < 7 | < 1.2 | 100 | 0.26 J2 | 0.2 J2 | 4300 | 56 | 16 | 99 | 21000 | 1.4 | |
| RISB-24 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 44000 | < 9.1 | 6.1 | 290 | 0.56 J2 | 2.6 | 27000 | 74 | 58 | 96 | 39000 | 170 | |
| RISB-25 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 30000 | < 6.1 | 2.1 | 62 | 0.14 J2 | 0.77 | 20000 | 25 | 30 | 52 | 19000 | 20 | |
| RISB-25 | 9 | 13 | < 45 | < 45 | < 45 | < 45 | < 45 | < 45 | < 45 | 19000 | < 8.1 | 2.8 | 100 | 0.99 | < 0.67 | 2300 | 31 | 46 | 38 | 22000 | 6.1 | |
| RISB-25 | 17 | 20 | NA | NA | NA | NA | NA | NA | NA | 18000 | < 8.3 | < 1.4 | 130 | 0.54 J2 | < 0.69 | 6300 | 34 | 21 | 70 | 22000 | 2.8 | |
| RISB-26 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-26 | 1 | 5 | < 42 | < 42 | < 42 | < 42 | < 42 | < 42 | < 42 | 33000 | < 7.7 | 1.9 | 110 | 1.5 | < 0.64 | 3300 | 50 | 14 | 91 | 45000 | 5.6 | |
| RISB-27 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 17000 | < 7.4 | 0.74 J2 | 170 | 0.68 | 0.23 J2 | 1800 | 6.4 | 18 | 84 | 31000 | 2.9 | |
| RISB-27 | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | 7700 | < 7 | 0.59 J2 | 64 | 0.17 J2 | < 0.58 | 4500 | 29 | 8.5 | 92 | 8500 | < 1.2 | |
| RISB-28 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 43000 | < 8.6 | 1.3 J2 | 200 | 1.2 | 0.49 J2 | 2000 | 100 | 23 | 130 | 49000 | 5 | |
| RISB-28 | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | 14000 | < 6.5 | < 1.1 | 160 | 0.59 | < 0.54 | 5900 | 7.8 | 120 | 130 | 37000 | 2.5 | |
| RISB-28 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | 20000 | < 6.3 | < 1.1 | 160 | 0.58 | 0.45 J2 | 6800 | 10 | 38 | 150 | 47000 | 2 | |
| RISB-29 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 37000 | < 7.9 | 8.9 | 150 | 1.3 | 0.58 J2 | 1700 | 54 | 85 | 120 | 72000 | 9.1 | |
| RISB-29 | 1 | 5 | NA | NA | NA | NA | NA | NA | NA | 42000 | < 7.4 | 1.9 | 160 | 0.81 | 0.44 J2 | 3000 | 68 | 16 | 140 | 40000 | 4.2 | |
| RISB-29 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-30 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 58000 | < 6.1 | 0.97 J2 | 53 | 0.13 J2 | 0.47 J2 | 38000 | 61 | 27 | 37 | 24000 | 12 | |
| RISB-30 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | 7600 | < 6.8 | < 1.1 | 75 | 0.8 | 0.19 J2 | 2300 | 9.1 | 10 | 16 | 22000 | 6.3 | |
| RISB-31 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 9800 | < 6.6 | 2.7 | 110 | 0.89 | 0.51 J2 | 990 | 43 | 42 | 25 | 43000 | 22 | |
| RISB-31 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | 9700 | < 6.7 | 0.69 J2 | 170 | 0.29 J2 | 0.25 J2 | 7400 | 15 | 12 | 51 | 22000 | 1.7 | |
| RISB-32 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 8900 | < 6.6 | 1.8 | 170 | 0.45 J2 | 0.29 J2 | 2800 | 42 | 19 | 25 | 18000 | 130 | |
| RISB-33 | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | 12000 | < 7.3 | 0.74 J2 | 82 | 0.68 | 0.35 J2 | 910 | 29 | 6.7 | 12 | 50000 | 9 | |
| RISB-33 | 17 | 20 | NA | NA | NA | NA | NA | NA | NA | 9100 | < 6.8 | < 1.1 | 150 | 0.37 J2 | 0.2 J2 | 9100 | 16 | 23 | 58 | 20000 | 3.1 | |
| RISB-33-DUP | 17 | 20 | NA | NA | NA | NA | NA | NA | NA | 11000 | < 6.9 | < 1.1 | 150 | 0.38 J2 | 0.18 J2 | 8500 | 13 | 24 | 58 | 18000 | 3.5 | |
| RISB-34 | 11 | 13 | NA | NA | NA | NA | NA | NA | NA | 15000 | < 7.7 | 1.7 | 130 | 1.4 | 0.29 J2 | 18000 | 3.2 | 39 | 60 | 42000 | 4 | |
| RISB-35 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 31000 | < 6.5 | 1.3 | 49 | 0.46 J2 | < 0.54 | 13000 | 28 | 11 | 18 | 20000 | 6.8 | |
| RISB-35 | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | 15000 | < 7.5 | 0.67 J2 | 140 | 1.1 | < 0.62 | 8100 | 6.5 | 29 | 89 | 50000 | 3.5 | |
| RISB-35-DUP | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | 15000 | < 7.6 | 0.76 J2 | 150 | 0.99 | < 0.63 | 8300 | 6 | 31 | 87 | 49000 | 3.4 | |
| RISB-36 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 18000 | < 6.4 | 1.5 | 150 | 0.42 | 0.1 | 9000 | 12 | 14 | 28 | 29000 | 2.3 | |
| RISB-36 | 13 | 16 | NA | NA | NA | NA | NA | NA | NA | 13000 | < 6.9 | 0.78 J2 | 110 | 0.67 | < 0.57 | 14000 | 0.76 J2 | 36 | 130 | 54000 | 2.6 | |
| RISB-37 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 15000 | < 7 | 2.9 | 130 | 1 | 0.4 J2 | 1300 | 16 | 20 | 15 | 30000 | 19 | |
| RISB-37 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | 11000 | < 7.8 | 1.2 J2 | 110 | 0.92 | < 0.65 | 2300 | 22 | 3.9 J2 | 19 | 8700 | 9.3 | |
| RISB-38 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 40000 | < 6.1 | 0.82 J2 | 53 | 0.12 J2 | 0.43 J2 | 24000 | 37 | 21 | 34 | 19000 | 32 | |
| RISB-38 | 17 | 21 | NA | NA | NA | NA | NA | NA | NA | 12000 | < 7.6 | < 1.3 | 110 | 0.41 J2 | 0.48 J2 | 6000 | 6.6 | 41 | 150 | 48000 | 2 | |
| RISB-39 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 29000 | < 7.3 | 1.8 | 120 | 1 | 0.48 J2 | 7900 | 40 | 27 | 40 | 46000 | 10 | |
| RISB-39 | 13 | 17 | NA | NA | NA | NA | NA | NA | NA | 8700 | < 7.8 | 0.93 J2 | 170 | 0.66 | 0.16 J2 | 1200 | 18 | 17 | 7.2 | 17000 | 6.6 | |
| RISB-40 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 21000 | < 7.2 | 2.1 | 130 | 1.1 | < 0.6 | 2700 | 27 | 24 | 43 | 39000 | 12 | |
| RISB-40 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | 12000 | < 6.7 | 0.68 J2 | 100 | 0.22 J2 | < 0.56 | 4500 | 17 | 9.4 | 55 | 9000 | 1.7 | |
| RISB-41 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 20000 | < 7 | 1.5 | 79 | 1.2 | < 0.58 | 3900 | 25 | 86 | 75 | 78000 | 12 | |
| RISB-42 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 21000 | < 7 | 2.1 | 96 | 1.2 | < 0.58 | 2300 | 13 | 44 | 45 | 37000 | 7.1 | |
| RISB-43 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 32000 | < 6.4 | 1.2 | 70 | 0.25 J2 | 0.91 | 19000 | 71 | 25 | 41 | 24000 | 11 | |
| RISB-44 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | 19000 | < 7 | 2.6 | 50 | 0.71 | 0.49 J2 | 1000 | 53 | 5.1 J2 | 21 | 57000 | 7.6 | |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | PCBs | | | | | | | | Metals | | | | | | | | | | | |
|-------------|------------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------|----------|---------|---------|-----------|---------|---------|----------|--------|--------|--------|-------|-----|
| | | | Aroclor 1016 | Aroclor 1221 | Aroclor 1232 | Aroclor 1242 | Aroclor 1248 | Aroclor 1254 | Aroclor 1260 | Aluminum | Antimony | Arsenic | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Iron | Lead | |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | |
| RISB-44 | 5 | 8.5 | NA | NA | NA | NA | NA | NA | NA | NA | 35000 | < 8.7 | 1.2 J2 | 130 | 0.96 | 0.2 J2 | 1700 | 20 | 60 | 44 | 32000 | 5.7 |
| RISB-45 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 15000 | < 7.6 | 1.6 | 58 | 1.1 | < 0.63 | 4200 | 5.8 | 30 | 71 | 54000 | 4.2 |
| RISB-45 | 1 | 5 | NA | NA | NA | NA | NA | NA | NA | NA | 14000 | < 7.1 | 1.4 | 130 | 0.65 | < 0.59 | 14000 | 2.1 | 40 | 70 | 37000 | 2.8 |
| RISB-46 | 0 | 1 | < 47 | < 47 | < 47 | < 47 | < 47 | < 47 | < 47 | < 47 | 34000 | < 8.5 | 2 | 210 | 0.59 J2 | < 0.71 | 7000 | 99 | 54 | 110 | 55000 | 3.4 |
| RISB-46-DUP | 0 | 1 | < 45 | < 45 | < 45 | < 45 | < 45 | < 45 | < 45 | < 45 | 33000 | < 8.2 | 1.8 | 260 | 0.56 J2 | < 0.68 | 3100 | 68 | 64 | 120 | 54000 | 3.3 |
| RISB-46 | 1 | 5 | < 46 | < 46 | < 46 | < 46 | < 46 | < 46 | < 46 | < 46 | 13000 | < 8.4 | 0.85 J2 | 140 | 0.68 J2 | 0.1 J2 | 4900 | 31 | 38 | 73 | 20000 | 6.9 |
| RISB-47 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 31000 | < 6.4 | 3.1 | 180 | 0.3 J2 | 1.2 | 20000 | 40 | 35 | 92 | 23000 | 4.6 |
| RISB-47 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | NA | 35000 | < 8.8 | < 1.5 | 110 | 0.87 | < 0.74 | 5000 | 96 | 74 | 110 | 56000 | 3.5 |
| RISB-48 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 18000 | < 7.1 | 0.93 J2 | 64 | 0.57 J2 | 0.32 J2 | 7700 | 18 | 13 | 24 | 27000 | 9.7 |
| RISB-48 | 13 | 15 | NA | NA | NA | NA | NA | NA | NA | NA | 11000 | < 6.5 | < 1.1 | 92 | 0.18 J2 | 0.13 J2 | 6200 | 44 | 13 | 87 | 14000 | 1.2 |
| RISB-49 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 25000 | < 6.3 | 2.1 | 71 | 0.4 J2 | 0.48 J2 | 16000 | 33 | 32 | 44 | 25000 | 25 |
| RISB-49 | 13 | 17 | NA | NA | NA | NA | NA | NA | NA | NA | 8000 | < 8.7 | < 1.4 | 71 | 0.21 J2 | < 0.72 | 6200 | 33 | 10 | 84 | 11000 | 2 |
| RISB-50 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | NA | 7300 | < 6.5 | < 1.1 | 60 | 0.17 J2 | < 0.54 | 5100 | 32 | 12 | 84 | 13000 | 1.1 |
| RISB-51 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | NA | 33000 | < 7.5 | < 1.3 | 140 | 0.32 J2 | 0.23 J2 | 18000 | 20 | 31 | 130 | 24000 | 3 |
| RISB-51-DUP | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | NA | 33000 | < 7.4 | < 1.2 | 150 | 0.44 J2 | < 0.62 | 17000 | 36 | 31 | 150 | 31000 | 3.3 |
| RISB-52 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 36000 | < 6.4 | 0.79 J2 | 76 | 0.37 J2 | < 0.54 | 24000 | 41 | 32 | 39 | 25000 | 19 |
| RISB-52 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | NA | 12000 | < 6.9 | < 1.2 | 69 | 0.16 J2 | < 0.58 | 5700 | 28 | 15 | 55 | 11000 | 2.7 |
| RI-BCK1 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 25000 | < 7.4 | 1.3 | 99 | 1.9 | < 0.61 | 1400 | 4 | 9.7 | 7 | 52000 | 8.4 |
| RI-BCK1 | 3 | 4 | NA | NA | NA | NA | NA | NA | NA | NA | 10000 | < 7.1 | 1.6 | 50 | 0.46 J2 | < 0.59 | 260 J2 | 22 | 5.6 J2 | 13 | 29000 | 7.2 |
| RI-BCK2 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 7600 | < 6.3 | 1.2 | 52 | 0.58 | < 0.53 | 150 J2 | 15 | 18 | 19 | 23000 | 14 |
| RI-BCK2 | 3 | 4 | NA | NA | NA | NA | NA | NA | NA | NA | 26000 | < 6.7 | 0.84 J2 | 460 | 1.2 | < 0.56 | 1200 | 7.2 | 12 | 1.3 J2 | 29000 | 11 |
| RISS-1 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 5000 | < 9 | 2 | 33 | 0.38 J2 | < 0.75 | 290 J2 | 20 | 7.7 | 3 J2 | 9800 | 30 |
| RISS-2 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 5900 | < 6.6 | 0.99 J2 | 58 | 0.51 J2 | < 0.55 | 640 | 9.9 | 5.8 | 6.4 | 8700 | 8.5 |
| RISS-3 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 9800 | < 7 | 2.3 | 27 | 0.4 J2 | < 0.58 | 1100 | 20 | 1.9 J2 | 12 | 27000 | 17 |
| RISS-4 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 11500 | < 6 | 2.5 | 120 | 0.95 | < 0.65 | 950 | 26 | 8.8 | 18 | 19000 | 35 |
| RISS-5 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 8200 | < 6.6 | 2.2 | 56 | 0.41 J2 | < 0.55 | 440 J2 | 23 | 8.6 | 7.5 | 14000 | 19 |
| RISS-6 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 9900 | < 6.7 | 1.7 | 44 | 0.42 J2 | < 0.56 | 400 J2 | 17 | 5.2 J2 | 8 | 24000 | 25 |
| RISS-7 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 11000 | < 7 | 2.1 | 83 | 0.69 | < 0.59 | 1100 | 19 | 11 | 13 | 16000 | 25 |
| RISS-8 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 18000 | < 7.5 | 1.9 | 59 | 1.2 | < 0.63 | 590 J2 | 28 | 8.9 | 16 | 53000 | 23 |
| RISS-9 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 8100 | < 6.6 | 2.2 | 87 | 0.6 | < 0.55 | 610 | 37 | 13 | 7.6 | 13000 | 20 |
| RISS-10 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 5400 | < 6.6 | 1.8 | 62 | 0.51 J2 | < 0.55 | 200 J2 | 11 | 5.7 | 5.4 | 8000 | 18 |
| RISS-10-DUP | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | 4600 | < 6.6 | 1.4 | 58 | 0.45 J2 | < 0.55 | 170 J2 | 6.6 | 5.2 J2 | 4.8 | 6800 | 16 |

Table D-1
Phase I Soil Sampling Results
Remedial Investigation Report
September 2008
Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | Metals | | | | | | | | | | |
|-------------|------------------|----------------|-----------|-----------|----------|--------|-----------|----------|--------|--------|----------|----------|-------|
| | | | Magnesium | Manganese | Mercury | Nickel | Potassium | Selenium | Silver | Sodium | Thallium | Vanadium | Zinc |
| | | | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg |
| RISB-1 | 0 | 1 | 3700 | 290 | < 0.12 | 27 | 450 J2 | 3 J2 | < 1.2 | 150 J2 | 65 | 270 | 32 |
| RISB-2 | 0 | 1 | 17000 | 440 | 0.18 J2 | 96 | 320 J2 | 1.9 J2 | < 1.1 | 3300 | 22 | 32 | 43 |
| RISB-2-DUP | 0 | 1 | 17000 | 460 | < 0.1 | 96 | 290 J2 | 1.6 J2 | < 1 | 2700 | 20 | 32 | 47 |
| RISB-2 | 9 | 13 | 6500 | 1100 | < 0.14 | 80 | 300 J2 | < 4.9 | < 1.4 | 150 J2 | 32 | 59 | 41 |
| RISB-2 | 17 | 21 | 5600 | 540 | < 0.11 | 61 | 1600 | 2 J2 | < 1.1 | 170 J2 | 17 | 33 | 25 |
| RISB-3 | 0 | 1 | 4300 | 1200 | < 0.12 | 19 | 1200 | 2.4 J2 | < 1.2 | 500 J2 | 42 | 160 | 39 |
| RISB-3 | 9 | 13 | 8500 | 250 | < 0.11 | 41 | 1300 | 1.8 J2 | < 1.1 | 390 J2 | 17 | 46 | 32 |
| RISB-4 | 0 | 1 | 4500 | 670 | < 0.13 | 46 | 770 | 2.8 J2 | < 1.3 | 260 J2 | 55 | 220 | 28 |
| RISB-4 | 5 | 9 | 1800 | 700 | 0.17 | 11 | 600 J2 | < 4.3 | < 1.2 | 270 J2 | 29 | 94 | 38 |
| RISB-5 | 0 | 1 | 2900 | 520 | 0.083 J2 | 12 | 1200 | < 4.4 | < 1.3 | 190 J2 | 48 | 180 | 28 |
| RISB-5 | 5 | 9 | 6400 | 630 | < 0.11 | 34 | 350 J2 | 2.7 J2 | < 1.1 | 170 J2 | 26 | 55 | 36 |
| RISB-6 | 0 | 1 | 12000 | 490 | < 0.11 | 60 | 590 | 2.3 J2 | < 1.1 | 2000 | 21 | 60 | 32 |
| RISB-6 | 13 | 15 | 2000 | 310 | < 0.12 | 20 | 96 J2 | 2.6 J2 | < 1.2 | 280 J2 | 36 | 180 | 19 |
| RISB-7 | 0 | 1 | 6300 | 520 | < 0.14 | 39 | 180 J2 | 4.9 | < 1.4 | 820 | 91 | 390 | 30 |
| RISB-7 | 1 | 5 | 8500 | 280 | < 0.12 | 8.6 | 98 J2 | 2.3 J2 | < 1.2 | 520 J2 | 41 | 150 | 68 |
| RISB-8 | 0 | 1 | 13000 | 300 | < 0.12 | 86 | 280 J2 | 1.9 J2 | < 1.2 | 2800 | 33 | 100 | 100 |
| RISB-8 | 5 | 8 | 4600 | 390 | < 0.11 | 67 | 350 J2 | 3.2 J2 | < 1.1 | 540 | 49 | 190 | 37 |
| RISB-9 | 0 | 1 | 4300 | 290 | < 0.12 | 39 | 360 J2 | 2.9 J2 | < 1.2 | 240 J2 | 32 | 110 | 29 |
| RISB-9 | 5 | 9 | 5100 | 460 | < 0.12 | 69 | 460 J2 | 2.8 J2 | < 1.2 | 290 J2 | 36 | 110 | 45 |
| RISB-10 | 5 | 9 | 3300 | 3300 | < 0.12 | 60 | 53 J2 | < 4.3 | < 1.2 | 79 J2 | 15 | 72 | 12 |
| RISB-11 | 0 | 1 | 4800 | 380 | < 0.11 | 43 | 500 J2 | 3.1 J2 | < 1.1 | 1400 | 38 | 100 | 18 |
| RISB-11 | 1 | 5 | 1600 | 820 | < 0.12 | 17 | 210 J2 | 2.6 J2 | < 1.2 | 170 J2 | 68 | 270 | 15 |
| RISB-11 | 5 | 9 | 5200 | 530 | < 0.12 | 29 | 56 J2 | 2.4 J2 | < 1.2 | 140 J2 | 36 | 110 | 30 |
| RISB-12 | 0 | 1 | 7500 | 7300 | < 0.11 | 53 | 690 | 3.6 J2 | < 1.1 | 2500 | 35 | 160 | 35 |
| RISB-12 | 1 | 5 | 1300 | 920 | < 0.13 | 23 | 68 J2 | 2.1 J2 | < 1.3 | 90 J2 | 52 | 210 | 11 |
| RISB-12 | 17 | 21 | 5500 | 280 | < 0.12 | 32 | 660 | 2.2 | < 1.2 | 720 | 16 | 32 | 20 |
| RISB-13 | 0 | 1 | 4800 | 630 | < 0.12 | 65 | 87 J2 | 2.5 J2 | < 1.2 | 140 J2 | 45 | 120 | 26 |
| RISB-13 | 5 | 9 | 6600 | 670 | < 0.14 | 60 | 51 J2 | 2.5 J2 | < 1.4 | 150 J2 | 31 | 68 | 40 |
| RISB-13-DUP | 5 | 9 | 6800 | 660 | < 0.13 | 63 | 77 J2 | 1.6 J2 | < 1.3 | 170 J2 | 35 | 72 | 40 |
| RISB-14 | 0 | 1 | 7000 | 360 | < 0.12 | 51 | 690 | 3.1 J2 | < 1.2 | 1300 | 55 | 200 | 36 |
| RISB-14 | 5 | 9 | 3300 | 230 | < 0.11 | 26 | 300 J2 | < 4 | < 1.1 | 300 J2 | 47 | 250 | 31 |
| RISB-14-DUP | 5 | 9 | 3300 | 500 | < 0.12 | 33 | 170 J2 | 2.2 J2 | < 1.2 | 300 J2 | 48 | 220 | 32 |
| RISB-14 | 9 | 13 | 4500 | 280 | < 0.12 | 31 | 460 J2 | 2.7 J2 | < 1.2 | 370 J2 | 45 | 200 | 40 |
| RISB-15 | 0 | 1 | 6300 | 310 | < 0.13 | 15 | 3500 | < 4.5 | < 1.3 | 170 J2 | 41 | 120 | 41 |
| RISB-15 | 9 | 13 | 3800 | 610 | < 0.12 | 27 | 360 J2 | 2.4 J2 | < 1.2 | 330 J2 | 35 | 140 | 37 |
| RISB-16 | 0 | 1 | 1300 | 2200 | < 0.13 | 33 | 85 J2 | 3 J2 | < 1.3 | 110 J2 | 99 | 510 | 24 |
| RISB-16 | 1 | 5 | 2600 | 60 | < 0.11 | 30 | 65 J2 | < 3.8 | < 1.1 | 150 J2 | 32 | 180 | 20 |
| RISB-17 | 0 | 1 | 2300 | 700 | 0.09 J2 | 6.5 | 440 J2 | 3.1 J2 | < 1.3 | 340 J2 | 53 | 180 | 33 |
| RISB-17 | 9 | 13 | 1700 | 990 | < 0.13 | 15 | 32 J2 | < 4.7 | < 1.3 | 180 J2 | 49 | 240 | 12 |
| RISB-18 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-18 | 1 | 5 | 13000 | 830 | < 0.12 | 66 | 150 J2 | < 4 | < 1.2 | 200 J2 | 22 | 42 | 58 |
| RISB-19 | 0 | 1 | 5100 | 1700 | < 0.12 | 48 | 750 | 1.9 J2 | < 1.2 | 830 | 29 | 82 | 34 |
| RISB-20 | 5 | 9 | 4800 | 380 | < 0.11 | 4.5 J2 | 65 J2 | 2.5 J2 | < 1.1 | 130 J2 | 37 | 160 | 54 |
| RISB-21 | 0 | 1 | 4800 | 520 | < 0.13 | 8.3 | 3600 | < 4.7 | < 1.3 | 36 J2 | 43 | 150 | 54 |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | Metals | | | | | | | | | | |
|-------------|------------------|----------------|-----------|-----------|----------|--------|-----------|----------|---------|--------|----------|----------|--------|
| | | | Magnesium | Manganese | Mercury | Nickel | Potassium | Selenium | Silver | Sodium | Thallium | Vanadium | Zinc |
| | | | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg |
| RISB-21 | 5 | 9 | 1400 | 280 | < 0.13 | 2.4 J2 | 35 J2 | < 4.4 | < 1.3 | 57 J2 | 25 | 110 | 5.8 J2 |
| RISB-22 | 0 | 1 | 7700 | 550 | 0.074 J2 | 46 | 720 | 3.2 J2 | < 1.1 | 1500 | 38 | 110 | 55 |
| RISB-23 | 0 | 1 | 15000 | 250 | 0.076 J2 | 90 | 380 J2 | 2.5 J2 | 0.42 J2 | 2900 | 21 | 16 | 70 |
| RISB-23 | 9 | 11 | 2900 | 470 | < 0.12 | 53 | 120 J2 | 2.1 J2 | < 1.2 | 410 J2 | 28 | 60 | 20 |
| RISB-24 | 0 | 1 | 23000 | 1100 | 0.16 J2 | 150 | 850 | 3.3 J2 | < 1.5 | 4400 | 47 | 97 | 230 |
| RISB-25 | 0 | 1 | 25000 | 370 | < 0.1 | 130 | 330 J2 | 1.8 J2 | < 1 | 3400 | 19 | 13 | 63 |
| RISB-25 | 9 | 13 | 5400 | 340 | < 0.13 | 32 | 130 J2 | < 4.7 | < 1.3 | 110 J2 | 20 | 63 | 27 |
| RISB-25 | 17 | 20 | 8500 | 340 | < 0.14 | 52 | 250 J2 | 3 J2 | < 1.4 | 230 J2 | 25 | 26 | 29 |
| RISB-26 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-26 | 1 | 5 | 6300 | 640 | < 0.13 | 64 | 140 J2 | < 4.5 | < 1.3 | 380 J2 | 42 | 130 | 33 |
| RISB-27 | 0 | 1 | 2200 | 110 | < 0.12 | 16 | 67 J2 | 2 J2 | < 1.2 | 190 J2 | 39 | 160 | 25 |
| RISB-27 | 5 | 9 | 2400 | 210 | < 0.12 | 21 | 470 J2 | 1.9 J2 | < 1.2 | 260 J2 | 9.3 | 19 | 11 |
| RISB-28 | 0 | 1 | 3000 | 370 | < 0.14 | 43 | 150 J2 | 3.1 J2 | < 1.4 | 140 J2 | 66 | 200 | 29 |
| RISB-28 | 5 | 9 | 4900 | 830 | < 0.11 | 32 | 160 J2 | 2 J2 | < 1.1 | 250 J2 | 37 | 160 | 47 |
| RISB-28 | 9 | 13 | 5400 | 380 | < 0.11 | 27 | 250 J2 | 3.1 J2 | < 1.1 | 320 J2 | 61 | 220 | 50 |
| RISB-29 | 0 | 1 | 2000 | 540 | 0.1 J2 | 32 | 230 J2 | 3.8 J2 | < 1.3 | 87 J2 | 87 | 290 | 33 |
| RISB-29 | 1 | 5 | 4800 | 870 | < 0.12 | 43 | 250 J2 | 2.9 J2 | < 1.2 | 230 J2 | 51 | 120 | 36 |
| RISB-29 | 9 | 13 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-30 | 0 | 1 | 28000 | 400 | < 0.1 | 140 | 496 J2 | < 3.6 | < 1 | 6800 | 33 | 23 | 39 |
| RISB-30 | 9 | 13 | 2800 | 77 | < 0.11 | 11 | 92 J2 | 1.9 J2 | < 1.1 | 130 J2 | 31 | 62 | 17 |
| RISB-31 | 0 | 1 | 640 | 1500 | 0.087 J2 | 11 | 230 J2 | 2.7 J2 | < 1.1 | 42 J2 | 57 | 210 | 27 |
| RISB-31 | 9 | 13 | 3800 | 120 | < 0.11 | 37 | 980 | 2.5 J2 | < 1.1 | 200 J2 | 29 | 83 | 28 |
| RISB-32 | 0 | 1 | 1900 | 890 | < 0.11 | 9.1 | 280 J2 | 1.8 J2 | < 1.1 | 280 J2 | 25 | 64 | 33 |
| RISB-33 | 5 | 9 | 620 | 480 | < 0.12 | 3.4 J2 | 99 J2 | 2.7 J2 | < 1.2 | 19 J2 | 56 | 170 | 8.4 |
| RISB-33 | 17 | 20 | 4300 | 340 | < 0.11 | 45 | 800 | 2.5 J2 | < 1.1 | 150 J2 | 23 | 78 | 30 |
| RISB-33-DUP | 17 | 20 | 4500 | 380 | < 0.11 | 41 | 680 | 2.2 J2 | < 1.1 | 160 J2 | 19 | 64 | 29 |
| RISB-34 | 11 | 13 | 4200 | 190 | < 0.13 | 6.5 | 430 J2 | 2.3 J2 | < 1.3 | 110 J2 | 42 | 180 | 51 |
| RISB-35 | 0 | 1 | 8400 | 250 | < 0.11 | 34 | 960 | 1.9 J2 | < 1.1 | 2700 | 22 | 40 | 25 |
| RISB-35 | 5 | 9 | 8300 | 250 | < 0.12 | 20 | 990 | 2.7 J2 | < 1.2 | 160 J2 | 47 | 240 | 52 |
| RISB-35-DUP | 5 | 9 | 8800 | 300 | < 0.13 | 21 | 1100 | 3.2 J2 | < 1.3 | 160 J2 | 50 | 240 | 54 |
| RISB-36 | 0 | 1 | 13000 | 470 | < 0.11 | 34 | 5000 | 2.3 J2 | < 1.1 | 1000 | 32 | 66 | 53 |
| RISB-36 | 13 | 16 | 4700 | 170 | < 0.11 | 9.8 | 430 J2 | 3.1 J2 | < 1.1 | 280 J2 | 51 | 260 | 46 |
| RISB-37 | 0 | 1 | 1300 | 1000 | 0.088 J2 | 8.7 | 470 J2 | 2 J2 | < 1.2 | 76 J2 | 42 | 100 | 40 |
| RISB-37 | 9 | 13 | 2300 | 110 | < 0.13 | 9.6 | 540 J2 | < 4.5 | < 1.3 | 72 J2 | 13 | 61 | 39 |
| RISB-38 | 0 | 1 | 18000 | 400 | 0.094 J2 | 87 | 360 J2 | 1.9 J2 | < 1 | 4800 | 24 | 29 | 58 |
| RISB-38 | 17 | 21 | 4600 | 300 | < 0.13 | 30 | 380 J2 | 3.4 J2 | < 1.3 | 270 J2 | 65 | 230 | 39 |
| RISB-39 | 0 | 1 | 9900 | 600 | < 0.12 | 51 | 1500 | 3.6 J2 | < 1.2 | 1200 | 60 | 150 | 52 |
| RISB-39 | 13 | 17 | 1200 | 1100 | < 0.13 | 7.6 | 170 J2 | < 4.5 | < 1.3 | 220 J2 | 23 | 54 | 26 |
| RISB-40 | 0 | 1 | 4100 | 460 | < 0.12 | 19 | 1400 | 2.5 J2 | < 1.2 | 240 J2 | 46 | 130 | 31 |
| RISB-40 | 9 | 13 | 4300 | 190 | < 0.11 | 24 | 100 J2 | 1.8 J2 | < 1.1 | 720 | 9.5 | 12 | 13 |
| RISB-41 | 0 | 1 | 3200 | 1200 | < 0.12 | 30 | 140 J2 | 2.5 J2 | < 1.2 | 510 J2 | 74 | 400 | 20 |
| RISB-42 | 0 | 1 | 3100 | 670 | < 0.12 | 22 | 93 J2 | 2.1 J2 | < 1.2 | 130 J2 | 43 | 150 | 21 |
| RISB-43 | 0 | 1 | 17000 | 440 | < 0.11 | 100 | 520 J2 | 2.2 J2 | < 1.1 | 3500 | 26 | 47 | 29 |
| RISB-44 | 0 | 1 | < 590 | 80 | < 0.12 | 6.3 | 110 J2 | 3.4 J2 | < 1.2 | 15 J2 | 66 | 250 | 9 |

Table D-1
Phase I Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | Metals | | | | | | | | | | |
|-------------|------------------|----------------|--------------------|--------------------|------------------|-----------------|--------------------|-------------------|-----------------|-----------------|-------------------|-------------------|---------------|
| | | | Magnesium mg/kg | Manganese mg/kg | Mercury mg/kg | Nickel mg/kg | Potassium mg/kg | Selenium mg/kg | Silver mg/kg | Sodium mg/kg | Thallium mg/kg | Vanadium mg/kg | Zinc mg/kg |
| RISB-44 | 5 | 8.5 | 5400 | 610 | 0.089 J2 | 48 | 180 J2 | < 5.1 | < 1.5 | 130 J2 | 32 | 100 | 23 |
| RISB-45 | 0 | 1 | 5500 | 200 | < 0.13 | 9.2 | 860 | 2.8 J2 | < 1.3 | 150 J2 | 58 | 260 | 47 |
| RISB-45 | 1 | 5 | 4300 | 250 | < 0.12 | 6.2 | 110 J2 | 2.7 J2 | < 1.2 | 190 J2 | 39 | 170 | 38 |
| RISB-46 | 0 | 1 | 17000 | 1200 | < 0.14 | 180 | 750 | 3 J2 | < 1.4 | 630 J2 | 54 | 100 | 54 |
| RISB-46-DUP | 0 | 1 | 19000 | 200 | < 0.14 | 180 | 380 J2 | < 4.8 | < 1.4 | 600 J2 | 52 | 93 | 46 |
| RISB-46 | 1 | 5 | 6200 | 840 | < 0.14 | 59 | 160 J2 | 2.2 J2 | < 1.4 | 620 J2 | 21 | 37 | 37 |
| RISB-47 | 0 | 1 | 17000 | 870 | 0.14 J2 | 100 | 420 J2 | 2.2 J2 | < 1.1 | 3300 | 26 | 38 | 77 |
| RISB-47 | 9 | 13 | 12000 | 620 | < 0.15 | 140 | 140 J2 | 3.4 J2 | < 1.5 | 160 J2 | 62 | 63 | 41 |
| RISB-48 | 0 | 1 | 6400 | 280 | < 0.12 | 28 | 920 | 2.8 J2 | < 1.2 | 650 | 32 | 88 | 28 |
| RISB-48 | 13 | 15 | 4700 | 170 | < 0.11 | 40 | 380 J2 | 1.9 J2 | < 1.1 | 1100 | 16 | 20 | 14 |
| RISB-49 | 0 | 1 | 13000 | 990 | 0.41 | 72 | 400 J2 | 1.9 J2 | < 1.1 | 2700 | 24 | 69 | 57 |
| RISB-49 | 13 | 17 | 3500 | 93 | < 0.14 | 22 | 330 J2 | 2.6 J2 | < 1.4 | 450 J2 | 12 | 19 | 16 |
| RISB-50 | 9 | 13 | 3200 | 230 | < 0.11 | 26 | 200 J2 | 1.8 J2 | < 1.1 | 380 J2 | 15 | 28 | 16 |
| RISB-51 | 9 | 13 | 9400 | 820 | < 0.13 | 70 | 220 J2 | 2.4 J2 | < 1.3 | 1400 | 26 | 35 | 35 |
| RISB-51-DUP | 9 | 13 | 10000 | 740 | < 0.12 | 77 | 220 J2 | 2 J2 | < 1.2 | 1400 | 30 | 62 | 43 |
| RISB-52 | 0 | 1 | 18000 | 660 | 0.071 J2 | 91 | 660 | < 3.7 | < 1.1 | 4100 | 22 | 52 | 42 |
| RISB-52 | 9 | 13 | 3600 | 360 | < 0.12 | 29 | 150 J2 | 1.8 J2 | < 1.2 | 1100 | 12 | 17 | 15 |
| RI-BCK1 | 0 | 1 | 3500 | 240 | < 0.12 | 1.8 J2 | 2000 | 2 J2 | < 1.2 | 47 J2 | 55 | 170 | 50 |
| RI-BCK1 | 3 | 4 | 560 J2 | 170 | < 0.12 | 6.5 | 230 J2 | < 4.2 | < 1.2 | 20 J2 | 31 | 77 | 9.9 |
| RI-BCK2 | 0 | 1 | 650 | 840 | < 0.11 | 6 | 320 J2 | < 3.7 | < 1.1 | 14 J2 | 23 | 77 | 15 |
| RI-BCK2 | 3 | 4 | 7200 | 1000 | < 0.11 | 6.3 | 4300 | < 3.9 | < 1.1 | 42 J2 | 30 | 78 | 88 |
| RISS-1 | 0 | 1 | 180 J2 | 440 | < 0.15 | 3.6 J2 | 200 J2 | < 5.3 | < 1.5 | 16 J2 | 9.5 | 24 | 11 |
| RISS-2 | 0 | 1 | 480 J2 | 410 | < 0.11 | 3.4 J2 | 280 J2 | < 3.8 | < 1.1 | 14 J2 | 8.7 | 27 | 12 |
| RISS-3 | 0 | 1 | 520 J2 | 140 | 0.078 J2 | 4.2 J2 | 300 J2 | < 4.1 | < 1.2 | 41 J2 | 27 | 72 | 28 |
| RISS-4 | 0 | 1 | 1300 | 220 | 0.12 J2 | 8.6 | 270 J2 | < 4.5 | < 1.3 | 40 J2 | 18 | 74 | 40 |
| RISS-5 | 0 | 1 | 260 J2 | 890 | 0.085 J2 | 4.4 J2 | 260 J2 | < 3.9 | < 1.1 | 13 J2 | 14 | 39 | 14 |
| RISS-6 | 0 | 1 | 1200 | 390 | 0.084 J2 | 3.6 J2 | 1200 | < 3.9 | < 1.1 | 17 J2 | 24 | 61 | 18 |
| RISS-7 | 0 | 1 | 890 | 560 | 0.1 J2 | 5.7 | 440 J2 | < 4.1 | < 1.2 | 24 J2 | 16 | 56 | 29 |
| RISS-8 | 0 | 1 | 880 | 350 | 0.1 J2 | 4.8 J2 | 460 J2 | < 4.4 | < 1.3 | 25 J2 | 50 | 160 | 26 |
| RISS-9 | 0 | 1 | 350 J2 | 800 | 0.071 J2 | 5.3 | 310 J2 | < 3.9 | < 1.1 | 11 J2 | 13 | 34 | 17 |
| RISS-10 | 0 | 1 | 290 J2 | 210 | < 0.11 | 5 | 190 J2 | < 3.9 | < 1.1 | 16 J2 | 8.6 | 23 | 14 |
| RISS-10-DUP | 0 | 1 | 260 J2 | 180 | < 0.11 | 4.5 | 170 J2 | < 3.8 | < 1.1 | 13 J2 | 6.9 | 20 | 12 |

D-2 Phase I Sediment

Table D-2
Phase I Sediment Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | VOCs | | | | | | | | | | | | | | | | | |
|------------|-----------------------|---------------------------|---------------------------------------|-----------------------|--------------------|--------------------|------------------------|------------------------|-----------------------------|-------------------|---------------------|--------------------|---------------------|---------------------|---------------------|------------|------------|----------------------|
| | 1,1,1-Trichloroethane | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloro-1,2,2-trifluoroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethane | 1,1-Dichloroethene | 1,2,3-Trichlorobenzene | 1,2,4-Trichlorobenzene | 1,2-Dibromo-3-chloropropane | 1,2-Dibromoethane | 1,2-Dichlorobenzene | 1,2-Dichloroethane | 1,2-Dichloropropane | 1,3-Dichlorobenzene | 1,4-Dichlorobenzene | 2-Butanone | 2-Hexanone | 4-Methyl-2-pentanone |
| | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISD-1 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 |
| RISD-2 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 |
| RISD-3 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | 5.7 J2 | < 15 | < 15 |
| RISD-4 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 |
| RISD-4-DUP | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 |
| RISD-5 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 |
| RICB-3 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 |
| RISD-FCBK | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 |
| RISD-WCBK | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 |
| RI-WASTE | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | 640 J2 | < 1600 | < 1600 | < 1600 | < 1600 | 230 J2 | < 1600 | 820 J2 |

Table D-2
Phase I Sediment Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | VOCs | | | | | | | | | | | | | | | | | |
|------------|---------|---------|--------------------|----------------------|-----------|--------------|------------------|----------------------|---------------|--------------|------------|---------------|------------------------|-------------------------|-------------|----------------------|-------------------------|--------------|
| | Acetone | Benzene | Bromochloromethane | Bromodichloromethane | Bromoform | Bromomethane | Carbon disulfide | Carbon tetrachloride | Chlorobenzene | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | cis-1,3-Dichloropropene | Cyclohexane | Dibromochloromethane | Dichlorodifluoromethane | Ethylbenzene |
| | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISD-1 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 |
| RISD-2 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | 0.76 J2 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 |
| RISD-3 | 230 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 |
| RISD-4 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 |
| RISD-4-DUP | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 |
| RISD-5 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 |
| RICB-3 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 |
| RISD-FCBK | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 |
| RISD-WCBK | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 |
| RI-WASTE | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | 3600 |

Table D-2
Phase I Sediment Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | VOCs | | | | | | | | | | | | | |
|------------|------------------|----------------|-------------------------|-------------------|--------------------|---------|-------------------|---------|--------------------------|---------------------------|-----------------|------------------------|----------------|-----------------|
| | Isopropylbenzene | Methyl acetate | Methyl tert butyl ether | Methylcyclohexane | Methylene chloride | Styrene | Tetrachloroethene | Toluene | trans-1,2-Dichloroethene | trans-1,3-Dichloropropene | Trichloroethene | Trichlorofluoromethane | Vinyl chloride | Xylenes (Total) |
| | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISD-1 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 | < 19 |
| RISD-2 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 | < 12 |
| RISD-3 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 |
| RISD-4 | < 940 | 1400 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 | < 940 |
| RISD-4-DUP | < 1100 | 1300 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 | < 1100 |
| RISD-5 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 | < 21 |
| RICB-3 | < 740 | 630 J2 | < 740 | < 740 | < 740 | < 740 | < 740 | 71 J2 | < 740 | < 740 | < 740 | < 740 | < 740 | < 740 |
| RISD-FCBK | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 | < 14 |
| RISD-WCBK | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 | < 17 |
| RI-WASTE | 730 J2 | 920 J2 | < 1600 | < 1600 | < 1600 | < 1600 | 370 J2 | 270 J2 | < 1600 | < 1600 | < 1600 | < 1600 | < 1600 | 20000 |

Table D-2
Phase I Sediment Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | SVOCs | | | | | | | | | | | | | | | | | |
|------------|----------------------------|-----------------------|-----------------------|--------------------|--------------------|-------------------|--------------------|--------------------|---------------------|----------------|---------------------|----------------|----------------|---------------|------------------------|------------------|----------------|----------------------|
| | 1,2,4,5-Tetrachlorobenzene | 2,4,5-Trichlorophenol | 2,4,6-Trichlorophenol | 2,4-Dichlorophenol | 2,4-Dimethylphenol | 2,4-Dinitrophenol | 2,4-Dinitrotoluene | 2,6-Dinitrotoluene | 2-Chloronaphthalene | 2-Chlorophenol | 2-Methylnaphthalene | 2-Methylphenol | 2-Nitroaniline | 2-Nitrophenol | 3,3'-Dichlorobenzidine | 3+4-Methylphenol | 3-Nitroaniline | 4,6-Dinitro-o-cresol |
| | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISD-1 | < 530 | < 1300 | < 530 | < 530 | < 530 | < 1300 | < 530 | < 530 | < 530 | < 530 | < 530 | < 530 | < 1300 | < 530 | < 530 | < 530 | < 1300 | < 1300 |
| RISD-2 | < 450 | < 1100 | < 450 | < 450 | < 450 | < 1100 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 1100 | < 450 | < 450 | < 450 | < 1100 | < 1100 |
| RISD-3 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 1100 |
| RISD-4 | < 630 | < 1600 | < 630 | < 630 | < 630 | < 1600 | < 630 | < 630 | < 630 | < 630 | < 630 | < 630 | < 1600 | < 630 | < 630 | < 630 | < 1600 | < 1600 |
| RISD-4-DUP | < 600 | < 1500 | < 600 | < 600 | < 600 | < 1500 | < 600 | < 600 | < 600 | < 600 | < 600 | < 600 | < 1500 | < 600 | < 600 | < 600 | < 1500 | < 1500 |
| RISD-5 | < 610 | < 1500 | < 610 | < 610 | < 610 | < 1500 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 1500 | < 610 | < 610 | < 610 | < 1500 | < 1500 |
| RICB-3 | < 470 | < 1200 | < 470 | < 470 | < 470 | < 1200 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 1200 | < 470 | < 470 | < 470 | < 1200 | < 1200 |
| RISD-FCBK | < 480 | < 1200 | < 480 | < 480 | < 480 | < 1200 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 1200 | < 480 | < 480 | < 480 | < 1200 | < 1200 |
| RISD-WCBK | < 490 | < 1200 | < 490 | < 490 | < 490 | < 1200 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 1200 | < 490 | < 490 | < 490 | < 1200 | < 1200 |
| RI-WASTE | < 3100 | < 7800 | < 3100 | < 3100 | < 3100 | < 7800 | < 3100 | < 3100 | < 3100 | < 3100 | 15000 | < 3100 | < 7800 | < 3100 | < 3100 | < 3100 | < 7800 | < 7800 |

Table D-2
Phase I Sediment Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | SVOCs | | | | | | | | | | | | | | | | | |
|------------|----------------------------|-----------------|-----------------------------|----------------|---------------|--------------|----------------|--------------|------------|----------|--------------|--------------------|----------------|----------------------|--------------------|----------------------|----------|----------------------------|
| | 4-Bromophenyl phenyl ether | 4-Chloroaniline | 4-Chlorophenyl phenyl ether | 4-Nitroaniline | 4-Nitrophenol | Acenaphthene | Acenaphthylene | Acetophenone | Anthracene | Atrazine | Benzaldehyde | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(ghi)perylene | Benzo(k)fluoranthene | Biphenyl | Bis(2-chloroethoxy)methane |
| | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISD-1 | < 530 | < 530 | < 530 | < 1300 | < 1300 | < 530 | < 530 | < 530 | < 530 | < 530 | < 530 | 430 J2 | < 530 | 380 J2 | < 530 | < 530 | < 530 | < 530 |
| RISD-2 | < 450 | < 450 | < 450 | < 1100 | < 1100 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | 260 J2 | 280 J2 | < 450 | < 450 | < 450 | < 450 | < 450 |
| RISD-3 | < 420 | < 420 | < 420 | < 1100 | < 1100 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | 480 | 540 | 510 | 300 J2 | < 420 | < 420 | < 420 |
| RISD-4 | < 630 | < 630 | < 630 | < 1600 | < 1600 | < 630 | < 630 | < 630 | < 630 | < 630 | < 630 | < 630 | 420 J2 | < 630 | < 630 | < 630 | < 630 | < 630 |
| RISD-4-DUP | < 600 | < 600 | < 600 | < 1500 | < 1500 | < 600 | < 600 | < 600 | < 600 | < 600 | < 600 | < 600 | 360 J2 | < 600 | < 600 | < 600 | < 600 | < 600 |
| RISD-5 | < 610 | < 610 | < 610 | < 1500 | < 1500 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 |
| RICB-3 | < 470 | < 470 | < 470 | < 1200 | < 1200 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 |
| RISD-FCBK | < 480 | < 480 | < 480 | < 1200 | < 1200 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 |
| RISD-WCBK | < 490 | < 490 | < 490 | < 1200 | < 1200 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | 720 | 740 | 610 | 390 J2 | < 490 | < 490 | < 490 |
| RI-WASTE | < 3100 | < 3100 | < 3100 | < 7800 | < 7800 | < 3100 | < 3100 | < 3100 | < 3100 | < 3100 | < 3100 | < 3100 | < 3100 | < 3100 | < 3100 | < 3100 | 2200 J2 | < 3100 |

Table D-2
Phase I Sediment Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | SVOCs | | | | | | | | | | | | | | | | | |
|------------|-------------------------|-----------------------------|----------------------------|------------------------|-------------|-----------|----------|-------------------------|--------------|-------------------|--------------------|---------------------|---------------------|--------------|----------|-------------------|---------------------|---------------------------|
| | Bis(2-chloroethyl)ether | Bis(2-chloroisopropyl)ether | Bis(2-ethylhexyl)phthalate | Butyl benzyl phthalate | Caprolactam | Carbazole | Chrysene | Dibenzo(a,h)-anthracene | Dibenzofuran | Diethyl phthalate | Dimethyl phthalate | Di-n-butylphthalate | Di-n-octylphthalate | Fluoranthene | Fluorene | Hexachlorobenzene | Hexachlorobutadiene | Hexachlorocyclopentadiene |
| | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISD-1 | < 530 | < 530 | 380 J2 | < 530 | < 530 | < 530 | 390 J2 | < 530 | < 530 | < 530 | < 530 | < 530 | < 530 | 720 | < 530 | < 530 | < 530 | < 530 |
| RISD-2 | < 450 | < 450 | 320 J2 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | 340 J2 | < 450 | < 450 | < 450 | < 450 |
| RISD-3 | < 420 | < 420 | 360 J2 | < 420 | < 420 | < 420 | 460 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | 670 | < 420 | < 420 | < 420 | < 420 |
| RISD-4 | < 630 | < 630 | < 630 | < 630 | < 630 | < 630 | 350 J2 | < 630 | < 630 | < 630 | < 630 | < 630 | < 630 | 450 J2 | < 630 | < 630 | < 630 | < 630 |
| RISD-4-DUP | < 600 | < 600 | < 600 | < 600 | < 600 | < 600 | 300 J2 | < 600 | < 600 | < 600 | < 600 | < 600 | < 600 | 390 J2 | < 600 | < 600 | < 600 | < 600 |
| RISD-5 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 |
| RICB-3 | < 470 | < 470 | 700 | 330 J2 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | 260 J2 | < 470 | < 470 | < 470 | < 470 | 630 | < 470 | < 470 |
| RISD-FCBK | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 |
| RISD-WCBK | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | 650 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | 1100 | < 490 | < 490 | < 490 | < 490 |
| RI-WASTE | < 3100 | < 3100 | 21000 | 3400 | < 3100 | < 3100 | < 3100 | < 3100 | < 3100 | < 3100 | < 3100 | < 3100 | < 3100 | < 3100 | 2100 J2 | < 3100 | < 3100 | < 3100 |

Table D-2
Phase I Sediment Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | SVOCs | | | | | | | | | | | |
|------------|------------------|------------------------|------------|-------------|----------|--------------|---------------------------|-------------------|-------------------|--------------|--------|--------|
| | Hexachloroethane | Indeno(1,2,3-cd)pyrene | Isophorone | Naphthalene | NDPA/DPA | Nitrobenzene | n-Nitrosodi-n-propylamine | p-Chloro-m-cresol | Pentachlorophenol | Phenanthrene | Phenol | Pyrene |
| | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISD-1 | < 530 | < 530 | < 530 | < 530 | < 530 | < 530 | < 530 | < 530 | < 1300 | 470 J2 | < 530 | 940 |
| RISD-2 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 450 | < 1100 | < 450 | < 450 | 420 J2 |
| RISD-3 | < 420 | 260 J2 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | 230 J2 | < 420 | 870 |
| RISD-4 | < 630 | < 630 | < 630 | < 630 | < 630 | < 630 | < 630 | < 630 | < 1600 | < 630 | < 630 | 610 J2 |
| RISD-4-DUP | < 600 | < 600 | < 600 | < 600 | < 600 | < 600 | < 600 | < 600 | < 1500 | < 600 | < 600 | 510 J2 |
| RISD-5 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 610 | < 1500 | < 610 | < 610 | < 610 |
| RICB-3 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 470 | < 1200 | < 470 | < 470 | < 470 |
| RISD-FCBK | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 480 | < 1200 | < 480 | < 480 | < 480 |
| RISD-WCBK | < 490 | 330 J2 | < 490 | < 490 | < 490 | < 490 | < 490 | < 490 | < 1200 | 550 | < 490 | 1500 |
| RI-WASTE | < 3100 | < 3100 | < 3100 | 3300 | < 3100 | < 3100 | < 3100 | < 3100 | < 7800 | 4900 | < 3100 | < 3100 |

Table D-2
Phase I Sediment Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Metals | | | | | | | | | | | | | | | | | |
|------------|----------|----------|---------|--------|-----------|---------|---------|----------|--------|--------|--------|-------|-----------|-----------|---------|--------|-----------|----------|
| | Aluminum | Antimony | Arsenic | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Iron | Lead | Magnesium | Manganese | Mercury | Nickel | Potassium | Selenium |
| | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg |
| RISD-1 | 7900 | < 9.7 | 2.6 | 98 | 0.69 J2 | < 0.81 | 1800 | 21 | 12 | 16 | 21000 | 18 | 1400 | 730 | < 0.16 | 8.1 | 450 J2 | < 5.6 |
| RISD-2 | 10000 | < 8.2 | 2.3 | 90 | 0.73 | < 0.68 | 1800 | 34 | 15 | 18 | 23000 | 29 | 1800 | 1100 | 0.13 J2 | 9.9 | 600 J2 | < 4.8 |
| RISD-3 | 14000 | < 7.7 | 3.2 | 170 | 0.91 | < 0.64 | 2200 | 33 | 22 | 27 | 29000 | 32 | 2300 | 2900 | 0.12 J2 | 13 | 820 | < 4.5 |
| RISD-4 | 10000 | < 12 | 2.9 | 190 | 0.83 J2 | < 0.97 | 7900 | 27 | 19 | 25 | 25000 | 27 | 1800 | 2900 | 0.21 | 10 | 760 J2 | < 6.8 |
| RISD-4-DUP | 11000 | < 11 | 3.3 | 190 | 0.87 J2 | 0.2 J2 | 3100 | 30 | 20 | 26 | 27000 | 28 | 1900 | 2700 | 0.25 | 11 | 810 J2 | < 6.3 |
| RISD-5 | 11000 | < 11 | 1.3 J2 | 110 | 0.68 J2 | < 0.93 | 1500 | 18 | 13 | 16 | 20000 | 8 | 1500 | 710 | < 0.19 | 8.4 | 560 J2 | < 6.5 |
| RICB-3 | 53000 | < 8.5 | 16 | 240 | 0.65 J2 | 23 | 31000 | 95 | 48 | 270 | 45000 | 540 | 26000 | 750 | 2.3 | 170 | 920 | 3 J2 |
| RISD-FCBK | 1600 | < 8.7 | 0.95 J2 | 92 | 0.39 J2 | < 0.72 | 280 J2 | 18 | 7.9 | 2 J2 | 13000 | 3.3 | 190 J2 | 910 | < 0.14 | 2.2 J2 | 97 J2 | < 5.1 |
| RISD-WCBK | 4300 | < 9 | 1.5 J2 | 52 | 0.55 J2 | < 0.75 | 970 | 49 | 7.7 | 7.8 | 20000 | 14 | 780 | 630 | < 0.15 | 4.3 J2 | 340 J2 | < 5.3 |
| RI-WASTE | 7000 | 32 | 10 | 180 | 0.19 J2 | 4 | 11000 | 180 | 23 | 600 | 160000 | 140 | 3500 | 1100 | 1.5 | 140 | 1400 | 4.9 J2 |

Table D-2
Phase I Sediment Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Metals | | | | |
|------------|--------|--------|----------|----------|-------|
| | Silver | Sodium | Thallium | Vanadium | Zinc |
| | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg |
| RISD-1 | < 1.6 | 100 J2 | 23 | 53 | 61 |
| RISD-2 | < 1.4 | 110 J2 | 25 | 71 | 81 |
| RISD-3 | < 1.3 | 140 J2 | 27 | 82 | 100 |
| RISD-4 | < 1.9 | 120 J2 | 25 | 69 | 95 |
| RISD-4-DUP | < 1.8 | 120 J2 | 28 | 78 | 100 |
| RISD-5 | < 1.9 | 86 J2 | 20 | 65 | 32 |
| RICB-3 | 4.8 | 5400 | 43 | 71 | 1400 |
| RISD-FCBK | < 1.4 | 15 J2 | 14 | 43 | 10 |
| RISD-WCBK | < 1.5 | 46 J2 | 22 | 62 | 42 |
| RI-WASTE | 4.2 | 1900 | 160 | 16 | 1800 |

D-3 Phase I Groundwater

Table D-3
Phase I Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | VOCs | | | | | | | | | | | | | | | | |
|----------|-----------------------|---------------------------|---------------------------------------|-----------------------|--------------------|--------------------|------------------------|------------------------|-----------------------------|-------------------|---------------------|--------------------|---------------------|---------------------|---------------------|------------|------------|
| | 1,1,1-Trichloroethane | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloro-1,2,2-trifluoroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethane | 1,1-Dichloroethene | 1,2,3-Trichlorobenzene | 1,2,4-Trichlorobenzene | 1,2-Dibromo-3-chloropropane | 1,2-Dibromoethane | 1,2-Dichlorobenzene | 1,2-Dichloroethane | 1,2-Dichloropropane | 1,3-Dichlorobenzene | 1,4-Dichlorobenzene | 2-Butanone | 2-Hexanone |
| | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| RITW-12 | < 1000 | < 1000 | < 1000 | < 1000 | 1000 | 89 J2 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | 2500 | < 1000 |
| RITW-28 | 51000 | < 1000 | 333 J2 | 154 J2 | 1600 | 6600 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | 15000 | < 1000 | < 1000 | < 1000 | 444 J2 | 478 J2 |
| RITW-34 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RITW-38 | < 10 | < 10 | < 10 | < 10 | 460 | 130 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.14 J2 | < 10 | < 10 | < 10 | < 10 | < 10 |

Table D-3
Phase I Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | VOCs | | | | | | | | | | | | | | | | |
|----------|----------------------|---------|---------|--------------------|----------------------|-----------|--------------|------------------|----------------------|---------------|--------------|------------|---------------|------------------------|-------------------------|-------------|----------------------|
| | 4-Methyl-2-pentanone | Acetone | Benzene | Bromochloromethane | Bromodichloromethane | Bromoform | Bromomethane | Carbon disulfide | Carbon tetrachloride | Chlorobenzene | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | cis-1,3-Dichloropropene | Cyclohexane | Dibromochloromethane |
| | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| RITW-12 | 7100 | 3000 | 410 J2 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | 1200 | < 1000 | < 1000 | < 1000 |
| RITW-28 | 11000 | < 1000 | 69 J2 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | 11000 | 123 J2 | < 1000 | 882 J2 | < 1000 | 235 J2 | < 1000 | < 1000 | < 1000 |
| RITW-34 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 24 | < 10 | < 10 | < 10 |
| RITW-38 | < 10 | < 10 | 2.39 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.39 J2 | < 10 | < 10 | 490 | < 10 | 1.1 J2 | < 10 |

Table D-3
Phase I Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | VOCs | | | | | | | | | | | | | | | |
|----------|--------------------------|--------------|------------------|----------------|-------------------------|-------------------|--------------------|---------|-------------------|---------|--------------------------|---------------------------|-----------------|------------------------|----------------|-----------------|
| | Dichloro-difluoromethane | Ethylbenzene | Isopropylbenzene | Methyl acetate | Methyl tert butyl ether | Methylcyclohexane | Methylene chloride | Styrene | Tetrachloroethene | Toluene | trans-1,2-Dichloroethene | trans-1,3-Dichloropropene | Trichloroethene | Trichlorofluoromethane | Vinyl chloride | Xylenes (Total) |
| | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| RITW-12 | < 1000 | 710 J2 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | 1400 | 28000 | < 1000 | < 1000 | 82 J2 | < 1000 | 40 J2 | 2700 |
| RITW-28 | < 1000 | 3000 | 34 J2 | < 1000 | < 1000 | 223 J2 | 7900 | < 1000 | 428 J2 | 51000 | < 1000 | < 1000 | 1200 | 987 J2 | < 1000 | 10000 |
| RITW-34 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 0.96 J2 | < 10 | < 10 | 3.45 J2 | < 10 | 1.8 J2 | 0.41 J2 |
| RITW-38 | < 10 | < 10 | 1.21 J2 | < 10 | < 10 | 2.59 J2 | < 10 | < 10 | 190 | 0.89 J2 | 0.86 J2 | < 10 | 34 | < 10 | 43 | 1.02 J2 |

D-4 ColorTec

Table D-4

ColorTec Results

Remedial Investigation Report

September 2008

Rock Hill, South Carolina

| Vertical Profile ID | Depth (ft bls) | PID Reading | Corrected Result* (unitless) | Approximate GC/MS Correlated Values** | | Laboratory Results*** (ppb) |
|---------------------|----------------|-------------|------------------------------|---------------------------------------|------------|-----------------------------|
| | | | | Min (ug/L) | Max (ug/L) | |
| Phase I | | | | | | |
| TW-28 | | | 10 | 239 | 2,990 | 1,628 |
| TW-38 | | | >6.0 | 176 | 1,110 | 267 |
| TW-12 | | | 14 | 129 | 3,240 | 1,522 |
| TW-34 | | | 0.3 | 2 | 46 | 5.25 |
| TW-15 | | | 0.3 | 2 | 46 | NA |
| RISB-1 | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | |
| | 7-9 | 0 | 0 | 0 | 0 | |
| RISB-2 | 0-1 | 2 | 0 | 0 | 0 | 61 |
| | 1-3 | 4 | 0 | 0 | 0 | |
| | 3-5 | 4 | 0 | 0 | 0 | |
| | 5-7 | 3 | 0.1 | 1 | 5 | |
| | 7-9 | 3 | 0.15 | 2 | 20 | |
| | 9-11 | 13 | 0.2 | 2 | 34 | 87 |
| | 11-13 | 13 | 1.1 | 9 | 229 | |
| | 13-15 | 10 | 1.2 | 10 | 223 | |
| | 13-15 (Dup) | 10 | 1.4 | 12 | 212 | |
| | 15-17 | 10 | 1 | 8 | 234 | |
| | 17-19 | 60 | 0.25 | 2 | 40 | BDL |
| | 19-21 | 60 | 0.2 | 2 | 34 | |
| 21-23 | 60 | 0.05 | 1 | 3 | | |
| 23-24 | 60 | 0.35 | 2 | 53 | | |
| RISB-3 | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | BDL |
| | 11-13 | 0 | 0 | 0 | 0 | |
| | 13-15 | 0 | 0 | 0 | 0 | |
| 15-17 | 0 | 0 | 0 | 0 | | |
| RISB-4 | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 14 | 0 | 0 | 0 | 2 |
| | 7-9 | 3 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | |
| | 11-13 | 0 | 0 | 0 | 0 | |
| | 13-15 | 0 | 0 | 0 | 0 | |
| | 15-17 | 0 | 0 | 0 | 0 | |
| | 17-19 | 0 | 0 | 0 | 0 | |
| | 19-21 | 0 | 0 | 0 | 0 | |
| | 21-23 | 0 | 0 | 0 | 0 | |
| | 23-25 | 0 | 0 | 0 | 0 | |

Table D-4

ColorTec Results

Remedial Investigation Report

September 2008

Rock Hill, South Carolina

| Vertical Profile ID | Depth (ft bls) | PID Reading | Corrected Result* (unitless) | Approximate GC/MS Correlated Values** | | Laboratory Results*** (ppb) |
|---------------------|----------------|-------------|------------------------------|---------------------------------------|------------|-----------------------------|
| | | | | Min (ug/L) | Max (ug/L) | |
| RISB-5 | 0-1 | 2 | 0 | 0 | 0 | BDL |
| | 1-3 | 1.5 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | BDL |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | |
| | 11-13 | 0 | 0 | 0 | 0 | |
| | 13-15 | 0 | 0 | 0 | 0 | |
| RISB-6 | 0-1 | 2.9 | 0.35 | 2 | 53 | 3,000 |
| | 1-3 | 9 | >3.0 | 15 | 400 | |
| | 3-5 | 13 | 3 | 15 | 400 | |
| | 5-7 | 3 | 0.25 | 2 | 40 | |
| | 7-9 | 1 | 3.6 | 59 | 471 | |
| | 9-11 | 3 | 3.4 | 44 | 447 | |
| | 11-13 | 12 | 3 | 15 | 400 | |
| | 13-15 | 38 | 1.5 | 13 | 207 | 1,039 |
| RISB-7 | 0-1 | 0.8 | 0 | 0 | 0 | 37.8 |
| | 1-3 | 0.5 | 0.05 | 0.5 | 2.5 | 52 |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | |
| | 7-9 | 0.3 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | |
| | 11-12 | 0 | 0 | 0 | 0 | |
| RISB-8 | 0-1 | 0 | 0 | 0 | 0 | 1.6 |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | BDL |
| | 7-8 | 0 | 0 | 0 | 0 | |
| RISB-9 | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | 4 |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | |
| | 11-13 | 0 | 0 | 0 | 0 | |
| | 13-15 | 0 | 0 | 0 | 0 | |
| RISB-10 | 5-7 | 0.1 | 0 | 0 | 0 | 2 |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | |
| | 11-13 | 0 | 0 | 0 | 0 | |
| | 13-15 | 0 | 0 | 0 | 0 | |
| RISB-11 | 0-1 | 0 | 0 | 0 | 0 | 6.6 |
| | 1-3 | 0 | 1 | 8 | 234 | 5 |
| | 3-5 | 0 | 10 | 239 | 2,990 | |
| | 5-7 | 0 | 6 | 176 | 1,108 | |
| | 7-9 | 0 | 2 | 18 | 180 | 1,022 |
| | 7-9 (Dup) | 0 | 1 | 8 | 234 | |
| | 9-11 | 0.5 | 0 | 0 | 0 | |
| | 11-13 | 0.5 | 0 | 0 | 0 | |
| | 13-14 | 0.5 | 0 | 0 | 0 | |

Table D-4

ColorTec Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Vertical Profile ID | Depth (ft bls) | PID Reading | Corrected Result* (unitless) | Approximate GC/MS Correlated Values** | | Laboratory Results*** (ppb) |
|---------------------|----------------|-------------|------------------------------|---------------------------------------|------------|-----------------------------|
| | | | | Min (ug/L) | Max (ug/L) | |
| RISB-12 | 0-1 | 12 | 0 | 0 | 0 | BDL |
| | 1-3 | 533 | 0 | 0 | 0 | 540 |
| | 3-5 | 498 | 0 | 0 | 0 | |
| | 5-7 | 563 | 0 | 0 | 0 | |
| | 7-9 | 441 | 0 | 0 | 0 | 0 |
| | 9-11 | 253 | 0 | 0 | 0 | 0 |
| | 11-13 | 319 | 0.3 | 2 | 46 | |
| | 13-15 | 140 | 0.3 | 2 | 46 | |
| | 15-17 | 78 | 0.1 | 1 | 5 | |
| | 17-19 | 18 | 0.3 | 2 | 46 | 60 |
| 19-21 | 11 | 1.6 | 14 | 202 | | |
| RISB-13 | 1-3 | 12 | 0.05 | 1 | 3 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 12 | 0 | 0 | 0 | 5 |
| | 7-9 | 4 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | |
| | 11-13 | 0 | 0.3 | 2 | 46 | |
| | 13-14.5 | 0 | 0.15 | 2 | 20 | |
| RISB-14 | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | 2 |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0.15 | 2 | 20 | 3 |
| | 11-13 | 0 | 0.2 | 2 | 34 | |
| | 13-15 | 0 | 0 | 0 | 0 | |
| | 15-17 | 0 | 0 | 0 | 0 | |
| RISB-15 | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | |
| | 7-9 | 0 | 0.05 | 0.5 | 2.5 | |
| | 9-11 | 0 | 0.1 | 1 | 5 | 1 |
| | 11-13 | 0 | 0 | 0 | 0 | |
| | 13-15 | 0 | 0 | 0 | 0 | |
| | 15-17 | 0 | 0.15 | 2 | 20 | |
| | 17-19 | 0 | 0 | 0 | 0 | |
| 19-21 | 0 | 0.25 | 2 | 40 | | |
| RISB-16 | 1-3 | 0 | 7 | 192 | 1,578 | 891 |
| | 3-5 | 0 | 0.1 | 1 | 5 | |
| | 5-7 | 0 | 0 | 0 | 0 | |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | |
| | 11-13 | 0 | 0.05 | 0.5 | 2.5 | |
| | 13-15 | 0 | 0.1 | 1 | 5 | |

Table D-4

ColorTec Results

Remedial Investigation Report

September 2008

Rock Hill, South Carolina

| Vertical Profile ID | Depth (ft bls) | PID Reading | Corrected Result* (unitless) | Approximate GC/MS Correlated Values** | | Laboratory Results*** (ppb) |
|---------------------|----------------|-------------|------------------------------|---------------------------------------|------------|-----------------------------|
| | | | | Min (ug/L) | Max (ug/L) | |
| RISB-17 | 0-1 | 2 | 0 | 0 | 0 | BDL |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0.1 | 1 | 5 | |
| | 5-7 | 0 | 0.2 | 2 | 34 | |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | BDL |
| | 11-13 | 0 | 0.05 | 0.5 | 2.5 | |
| | 13-15 | 1.5 | 0.1 | 1 | 5 | |
| | 15-17 | 1.5 | 0 | 0 | 0 | |
| | 17-19 | 0 | 0 | 0 | 0 | |
| RISB-18 | 0-1 | 0 | 3.4 | 44 | 447 | 29.94 |
| | 1-3 | 0 | 10 | 239 | 2,990 | 483 |
| | 3-5 | 0 | 10 | 239 | 2,990 | |
| | 5-7 | 3 | 1.3 | 11 | 218 | |
| | 7-9 | 14 | 1.2 | 10 | 223 | |
| | 9-11 | 10.3 | 1 | 8 | 234 | |
| | 9-11 (Dup) | 10.3 | 0.9 | 8 | 193 | |
| | 11-13 | 14.2 | 0.2 | 2 | 34 | |
| | 13-15 | 3 | 0 | 0 | 0 | |
| | 15-17 | 0.5 | 0 | 0 | 0 | |
| RISB-19 | 0-1 | 0 | 0.5 | 2 | 71 | 65 |
| | 1-3 | 0 | 0.2 | 2 | 34 | |
| | 3-5 | 10 | 1 | 8 | 234 | |
| | 5-7 | 6 | 0 | 0 | 0 | |
| | 7-9 | 8 | 0 | 0 | 0 | |
| | 9-11 | 11 | 0 | 0 | 0 | |
| | 11-13 | 7 | 0.5 | 2 | 71 | |
| | 13-15 | 10 | 0 | 0 | 0 | |
| | 15-17 | 30 | 0.05 | 0.5 | 2.5 | |
| | 17-19 | 10 | 0 | 0 | 0 | |
| RISB-20 | 5-7 | 23 | 20 | 196 | 23,150 | 2,440 |
| | 7-9 | 23 | 14 | 129 | 3,238 | |
| | 9-11 | 3.2 | 0.15 | 2 | 20 | |
| | 11-13 | 3.2 | 0.5 | 2 | 71 | |
| | 13-15 | 8 | 0.5 | 2 | 71 | |
| | 15-17 | 8 | 0.4 | 2 | 59 | |
| RISB-21 | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 110 | 0 | 0 | 0 | BDL |
| | 7-9 | 110 | 0 | 0 | 0 | |
| | 9-11 | 40 | 0 | 0 | 0 | |
| | 11-13 | 40 | 0 | 0 | 0 | |
| | 13-15 | 1 | 0 | 0 | 0 | |
| | 15-17 | 1 | 0 | 0 | 0 | |
| 17-19 | 0 | 0 | 0 | 0 | | |

Table D-4

ColorTec Results

Remedial Investigation Report

September 2008

Rock Hill, South Carolina

| Vertical Profile ID | Depth (ft bls) | PID Reading | Corrected Result* (unitless) | Approximate GC/MS Correlated Values** | | Laboratory Results*** (ppb) |
|---------------------|----------------|-------------|------------------------------|---------------------------------------|------------|-----------------------------|
| | | | | Min (ug/L) | Max (ug/L) | |
| RISB-22 | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0.2 | 0 | 0 | 0 | |
| | 7-9 | 0 | 0 | 0 | 0 | |
| RISB-23 | 9-10 | 0 | 0 | 0 | 0 | |
| | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0.25 | 2 | 40 | |
| | 5-7 | 0 | 0.4 | 2 | 59 | |
| | 7-9 | 0 | 0 | 0 | 0 | |
| RISB-24 | 9-11 | 0 | 1.2 | 10 | 223 | 358.6 |
| | 9-11 (Dup) | 0 | 1.5 | 13 | 207 | |
| | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | |
| RISB-25 | 11-13 | 0 | 0 | 0 | 0 | |
| | 13-15 | 0 | 0 | 0 | 0 | |
| | 15-17 | 0 | 0 | 0 | 0 | |
| | 0-1 | 0 | 0.1 | 1 | 5 | 12.2 |
| | 1-3 | 0 | 0.1 | 1 | 5 | |
| | 3-5 | 0 | 4.8 | 146 | 613 | |
| | 5-7 | 2 | 0.3 | 2 | 46 | |
| | 7-9 | 2 | 1.9 | 17 | 185 | |
| | 9-11 | 3 | 12 | 184 | 3,114 | 590 |
| | 11-13 | 3 | 25 | 290 | 43,000 | |
| RISB-26 | 13-15 | 7 | 8 | 207 | 2,049 | |
| | 15-17 | 7 | 24 | 271 | 39,030 | |
| | 17-19 | 10 | 11 | 211 | 3,052 | |
| | 17-19 (Dup) | 10 | 10 | 239 | 2,990 | 770 |
| | 19-20 | 10 | 22 | 233 | 31,090 | |
| | 0-1 | 0 | 0.1 | 1 | 5 | 18.1 |
| | 1-3 | 0 | 3.2 | 30 | 424 | 149 |
| | 3-5 | 0 | 0.15 | 2 | 20 | |
| | 5-7 | 0 | 0.9 | 8 | 193 | |
| | 7-9 | 0 | 3 | 15 | 400 | |
| 9-11 | 0 | 0.1 | 1 | 5 | | |
| 11-13 | 0 | 2.3 | 17 | 246 | | |
| 13-15 | 0 | 0.05 | 0.5 | 2.5 | | |
| 15-17 | 0 | 0.1 | 1 | 5 | | |
| 17-19 | 0 | 0.1 | 1 | 5 | | |

Table D-4

ColorTec Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Vertical Profile ID | Depth (ft bls) | PID Reading | Corrected Result* (unitless) | Approximate GC/MS Correlated Values** | | Laboratory Results*** (ppb) |
|---------------------|----------------|-------------|------------------------------|---------------------------------------|------------|-----------------------------|
| | | | | Min (ug/L) | Max (ug/L) | |
| RISB-27 | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | BDL |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | |
| | 11-13 | 0 | 0 | 0 | 0 | |
| RISB-28 | 0-1 | 0 | 0.1 | 1 | 5 | 6.6 |
| | 1-3 | 2 | 0.15 | 2 | 20 | |
| | 3-5 | 2 | 0.25 | 2 | 40 | |
| | 5-7 | 0 | 0.4 | 2 | 59 | 63 |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | BDL |
| | 11-13 | 0 | 0 | 0 | 0 | |
| | 13-15 | 0 | 0 | 0 | 0 | |
| RISB-29 | 0-1 | 2 | 0 | 0 | 0 | BDL |
| | 1-3 | 4 | 0 | 0 | 0 | BDL |
| | 3-5 | 0 | 0.3 | 2 | 46 | |
| | 5-7 | 15 | 0 | 0 | 0 | |
| | 7-9 | 10 | 0 | 0 | 0 | |
| | 9-11 | 5 | 0 | 0 | 0 | BDL |
| | 11-13 | 30 | 0.15 | 2 | 20 | |
| | 13-15 | 0 | 0 | 0 | 0 | |
| RISB-30 | 0-1 | 5 | 0 | 0 | 0 | 7.68 |
| | 1-3 | 0 | 0.6 | 6 | 91 | |
| | 3-5 | 0 | 1.05 | 9 | 231 | |
| | 5-7 | 0 | 1.6 | 14 | 202 | |
| | 7-9 | 0 | 4 | 88 | 519 | |
| | 9-11 | 0 | 8 | 207 | 2,050 | 1,117 |
| | 11-13 | 0 | 0.3 | 2 | 46 | |
| | 13-15 | 2 | 1.6 | 14 | 202 | |
| | 15-17 | 0 | 2 | 18 | 180 | |
| | 17-19 | 0 | 2.3 | 17 | 246 | |
| 19-20 | 0 | 0 | 0 | 0 | | |
| 9-11 (Dup) | 0 | 7.5 | 200 | 1,814 | | |
| RISB-31 | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | BDL |
| | 11-13 | 0 | 0 | 0 | 0 | |
| | 13-15 | 0 | 0 | 0 | 0 | |
| | 15-17 | 0 | 0 | 0 | 0 | |
| 17-19 | 0 | 0 | 0 | 0 | | |

Table D-4

ColorTec Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Vertical Profile ID | Depth (ft bls) | PID Reading | Corrected Result* (unitless) | Approximate GC/MS Correlated Values** | | Laboratory Results*** (ppb) |
|---------------------|----------------|-------------|------------------------------|---------------------------------------|------------|-----------------------------|
| | | | | Min (ug/L) | Max (ug/L) | |
| RISB-32 | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 0.5 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | |
| RISB-33 | 11-14 | 0 | 0 | 0 | 0 | |
| | 0-1 | 0 | 0 | 0 | 0 | |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | BDL |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | |
| | 11-13 | 0 | 0 | 0 | 0 | |
| | 13-15 | 0 | 0 | 0 | 0 | |
| | 15-17 | 0 | 0 | 0 | 0 | |
| RISB-34 | 17-19 | 0 | 0 | 0 | 0 | BDL |
| | 19-20 | 0 | 0 | 0 | 0 | |
| | 0-1 | 0 | 0 | 0 | 0 | |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | |
| | 11-13 | 68 | 0 | 0 | 0 | 2.1 |
| | 13-15 | 94 | 0 | 0 | 0 | |
| RISB-35 | 15-17 | 2 | 0 | 0 | 0 | |
| | 17-19 | 0 | 0 | 0 | 0 | |
| | 19-20 | 0 | 0 | 0 | 0 | |
| | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | BDL |
| RISB-36 | 7-9 | 0 | 0.05 | 0.5 | 2.5 | |
| | 9-11 | | 0.15 | 2 | 20 | |
| | 11-13 | | 0 | 0 | 0 | |
| | 13-14.4 | | 0.2 | 2 | 34 | |
| | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0.15 | 2 | 20 | |
| RISB-36 | 5-7 | 0 | 0 | 0 | 0 | |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | |
| | 11-13 | 0 | 0 | 0 | 0 | |
| | 13-15 | 0 | 0 | 0 | 0 | BDL |
| | 15-16 | 0 | 0.25 | 2 | 41 | |

Table D-4

ColorTec Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Vertical Profile ID | Depth (ft bls) | PID Reading | Corrected Result* (unitless) | Approximate GC/MS Correlated Values** | | Laboratory Results*** (ppb) |
|---------------------|----------------|-------------|------------------------------|---------------------------------------|------------|-----------------------------|
| | | | | Min (ug/L) | Max (ug/L) | |
| RISB-37 | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | BDL |
| | 11-13 | 0 | 0 | 0 | 0 | |
| | 13-15 | 0 | 0 | 0 | 0 | |
| | 15-17 | 0 | 0 | 0 | 0 | |
| | 17-19 | 0 | 0 | 0 | 0 | |
| | 19-21 | 0 | 0 | 0 | 0 | |
| | 21-23 | 0 | 0 | 0 | 0 | |
| 23-24 | 0 | 0 | 0 | 0 | | |
| RISB-38 | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 1 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | |
| | 7-9 | 1 | 0.1 | 1 | 5 | |
| | 9-11 | 0 | 0 | 0 | 0 | |
| | 11-13 | 0 | 0 | 0 | 0 | |
| | 13-15 | 0 | 0.1 | 1 | 5 | |
| | 15-17 | 0 | 0 | 0 | 0 | |
| | 17-19 | 0 | 0.3 | 2 | 46 | 55 |
| | 17-19 (Dup) | 0 | 0.4 | 2 | 59 | |
| | 19-21 | 0 | 0.15 | 2 | 20 | |
| 21-23 | 0 | 0 | 0 | 0 | | |
| 23-25 | 0 | 0 | 0 | 0 | | |
| RISB-39 | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 2 | 0 | 0 | 0 | |
| | 3-5 | 5 | 0 | 0 | 0 | |
| | 5-7 | 40 | 0 | 0 | 0 | |
| | 7-9 | 159 | 0.4 | 2 | 59 | |
| | 9-11 | 13 | 0.2 | 2 | 34 | |
| | 11-13 | 2 | 0.8 | 9 | 152 | |
| | 13-15 | 4 | 0.8 | 9 | 152 | BDL |
| | 15-17 | 0 | 1.2 | 10 | 223 | |
| | 17-19 | 4 | 0.3 | 2 | 46 | |
| | 19-21 | 8 | 0 | 0 | 0 | |
| 21-23 | 12 | 0 | 0 | 0 | | |
| RISB-40 | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | BDL |
| | 11-13 | 0 | 0 | 0 | 0 | |

Table D-4

ColorTec Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Vertical Profile ID | Depth (ft bls) | PID Reading | Corrected Result* (unitless) | Approximate GC/MS Correlated Values** | | Laboratory Results*** (ppb) |
|---------------------|----------------|-------------|------------------------------|---------------------------------------|------------|-----------------------------|
| | | | | Min (ug/L) | Max (ug/L) | |
| RISB-41 | 0-1 | 2 | 0 | 0 | 0 | BDL |
| | 1-3 | 2 | 0 | 0 | 0 | |
| | 3-4 | 2 | 0 | 0 | 0 | |
| | 4-6 | 2 | 0 | 0 | 0 | |
| | 6-8 | 2 | 0 | 0 | 0 | |
| RISB-42 | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | |
| | 7-8.5 | 0 | 0 | 0 | 0 | |
| RISB-43 | 0-1 | 0 | 0 | 0 | 0 | 1.4 |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | |
| | 11-13 | 0 | 0 | 0 | 0 | |
| RISB-44 | 0-1 | 1.6 | 0 | 0 | 0 | BDL |
| | 1-3 | 0.3 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | BDL |
| | 7-8.5 | 0 | 0 | 0 | 0 | |
| RISB-45 | 0-1 | 120 | 1.8 | 16 | 191 | 293 |
| | 1-3 | 120 | 1.5 | 13 | 207 | 450 |
| | 3-5 | 116 | 0.5 | 2 | 71 | |
| | 5-7 | 23 | 0.6 | 6 | 91 | |
| | 7-9 | 38 | 1 | 8 | 234 | |
| | 9-11 | 57 | 0.9 | 8 | 193 | |
| | 11-13 | 27 | 0.8 | 9 | 152 | |
| | 13-15 | 12 | 0.1 | 1 | 5 | |
| RISB-46 | 0-1 | 9 | 0.5 | 2 | 71 | BDL |
| | 1-3 | 5 | 1 | 8 | 234 | BDL |
| | 3-5 | 10 | 0 | 0 | 0 | |
| | 5-7 | 3 | 0.05 | 0.5 | 2.5 | |
| | 7-9 | 5 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0.05 | 0.5 | 2.5 | |
| | 11-13 | 0 | 0.05 | 0.5 | 2.5 | |
| | 13-15 | 0 | 0.05 | 0.5 | 2.5 | |
| | 15-17 | 0 | 0.05 | 0.5 | 2.5 | |
| | 17-19 | 0 | 0 | 0 | 0 | |
| | 19-21 | 0 | 0.05 | 0.5 | 2.5 | |
| | 21-23 | 0 | 0.05 | 0.5 | 2.5 | |
| | 23-25 | 0 | 0 | 0 | 0 | |

Table D-4

ColorTec Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Vertical Profile ID | Depth (ft bls) | PID Reading | Corrected Result* (unitless) | Approximate GC/MS Correlated Values** | | Laboratory Results*** (ppb) |
|---------------------|----------------|-------------|------------------------------|---------------------------------------|------------|-----------------------------|
| | | | | Min (ug/L) | Max (ug/L) | |
| RISB-47 | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 0 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0.2 | 2 | 34 | |
| | 7-9 | 0 | 0.35 | 2 | 53 | |
| | 9-11 | 0 | 0.5 | 2 | 71 | 41 |
| | 11-13 | 0 | 1 | 8 | 234 | |
| | 13-15 | 0 | 1.8 | 16 | 191 | |
| 15-17 | 0 | 0.05 | 0.5 | 2.5 | | |
| RISB-48 | 0-1 | 0.6 | 0 | 0 | 0 | BDL |
| | 1-3 | 0.2 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | |
| | 11-13 | 0 | 0 | 0 | 0 | |
| | 13-15 | 0 | 0 | 0 | 0 | BDL |
| RISB-49 | 0-1 | 0 | 0 | 0 | 0 | BDL |
| | 1-3 | 3 | 0 | 0 | 0 | |
| | 3-5 | 2 | 0 | 0 | 0 | |
| | 5-7 | 5 | 0 | 0 | 0 | |
| | 7-9 | 5 | 0 | 0 | 0 | |
| | 9-11 | 3 | 0.25 | 2 | 40 | |
| | 11-13 | 76 | 0.05 | 0.5 | 2.5 | |
| | 13-15 | 110 | 0.5 | 2 | 34 | BDL |
| 15-17 | 110 | 0.5 | 2 | 34 | | |
| RISB 50 | 9-11 | | 0 | 0 | 0 | 2 |
| | 11-13 | | 0 | 0 | 0 | |
| RISB-51 | 0-1 | 1.5 | 0 | 0 | 0 | |
| | 1-3 | 0.3 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0 | 0 | 0 | 0 | |
| | 11-13 | 1.1 | 0.55 | 4 | 81 | BDL |
| | 11-13 (Dup) | 0 | 0 | 0 | 0 | |
| 13-15 | 0 | 0 | 0 | 0 | | |
| RISB-52 | 0-1 | 1 | 0 | 0 | 0 | BDL |
| | 1-3 | 0.1 | 0 | 0 | 0 | |
| | 3-5 | 0 | 0 | 0 | 0 | |
| | 5-7 | 0 | 0 | 0 | 0 | |
| | 7-9 | 0 | 0 | 0 | 0 | |
| | 9-11 | 0.5 | 0 | 0 | 0 | 5 |
| | 11-13 | 0 | 0 | 0 | 0 | |
| | 13-15 | 0 | 0 | 0 | 0 | |
| 15-17 | 0 | 0 | 0 | 0 | | |
| Phase II | | | | | | |
| RIMW-18 | 44-56 | | 2.2 | 17 | 224 | 78 |
| | 56-68 | | 2.4 | 17 | 268 | 101 |
| RIMW-19 | 63-75 | | 5 | 160 | 637 | 223 |
| | 76-88 | | 4.6 | 131 | 590 | 150 |

Table D-4

ColorTec Results

Remedial Investigation Report

September 2008

Rock Hill, South Carolina

| Vertical Profile ID | Depth (ft bls) | PID Reading | Corrected Result* (unitless) | Approximate GC/MS Correlated Values** | | Laboratory Results*** (ppb) |
|---------------------|----------------|-------------|------------------------------|---------------------------------------|------------|-----------------------------|
| | | | | Min (ug/L) | Max (ug/L) | |
| Phase III | | | | | | |
| RIMW-15 | 70-77.5 | | 11 | 211 | 3,050 | 341 |
| | 77.5-85 | | 10 | 239 | 2,990 | |
| | 85-92.5 | | 10 | 239 | 2,990 | |
| | 92.5-100 | | 16 | 120 | 7,270 | 489 |

Notes:

Highlighted rows show samples that were sent to an offsite laboratory for analysis.

* Corrected result based on purge volume used during Color-Tec detection. 1:1 correction for 100 cc purge, 2:1 for 200 cc purge, 0.5:1 for 50 cc purge.

** Approximate **aqueous** GC/MS correlated values obtained from Ecology & Environment, Inc. (2004)

*** Laboratory results include sum of tetrachloroethene, trichloroethene, 1,2-dichloroethene, and vinyl chloride.

"BDL" means that the specified chlorinated VOCs were not detected at this depth interval.

D-5 Phase II Soil

Table D-5
Phase II Soil Sampling Results

Remedial Investigation Report
September 2008
Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | | | | | | | | | | | | | | |
|------------|------------------|----------------|-----------------------|-------------------------|---------------------------------------|-----------------------|--------------------|--------------------|------------------------|------------------------|-----------------------------|-------------------|---------------------|--------------------|---------------------|---------------------|---------------------|------------|------------|----------------------|---------|---------|--------------------|----------------------|-----------|--------------|
| | | | 1,1,1-Trichloroethane | 1,1,2-Tetrachloroethane | 1,1,2-Trichloro-1,2,2-trifluoroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethane | 1,1-Dichloroethene | 1,2,3-Trichlorobenzene | 1,2,4-Trichlorobenzene | 1,2-Dibromo-3-chloropropane | 1,2-Dibromoethane | 1,2-Dichlorobenzene | 1,2-Dichloroethane | 1,2-Dichloropropane | 1,3-Dichlorobenzene | 1,4-Dichlorobenzene | 2-Butanone | 2-Hexanone | 4-Methyl-2-pentanone | Acetone | Benzene | Bromochloromethane | Bromodichloromethane | Bromoform | Bromomethane |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RIMW-1 | 10 | 12 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | 1.81 J2 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | 6.87 J2 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | 26 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | |
| RIMW-1 | 12 | 14 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | 1.26 J2 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | 1.16 J2 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | |
| RIMW-13 | 14 | 16 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-19 | 8 | 10 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | 25 | 2.77 J2 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | 2.11 J2 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | 1.07 J2 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | |
| RIMW-19 | 12 | 14 | < 20 | < 20 | < 20 | < 20 | 4.57 J2 | < 20 | < 20 | < 20 | < 20 | < 20 | < 20 | .59 J2 | < 20 | < 20 | < 20 | < 20 | < 20 | < 20 | 7 J2 | < 20 | < 20 | < 20 | < 20 | |
| RIMW-19 | 16 | 18 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | 6.71 J2 | .67 J2 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | 1.15 J2 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | |
| RIMW-1-DUP | 12 | 14 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | 3.04 J2 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | 4.01 J2 | < 8 | < 8 | < 8 | < 8 | |
| RIMW-5 | 0 | 1 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | .36 J2 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | |
| RIMW-5 | 4 | 6 | < 9.9 | < 9.9 | 33 | < 9.9 | 1.57 J2 | 19 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | 2.52 J2 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | |
| RIMW-5 | 12 | 14 | < 9.1 | < 9.1 | 1.01 J2 | 1.2 J2 | < 9.1 | 1.07 J2 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | 1700 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | |
| RIMW-5 | 18 | 20 | < 8.3 | < 8.3 | < 8.3 | .65 J2 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | 870 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | |
| RIMW-6 | 0 | 1 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | 2.13 J2 | 5.15 J2 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | 22 | < 7.7 | 6.09 J2 | 130 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | |
| RIMW-6 | 4 | 6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | 18 | 79 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | .37 J2 | < 9.6 | < 9.6 | < 9.6 | 11 | < 9.6 | 170 | 160 | 1.01 J2 | < 9.6 | < 9.6 | < 9.6 | |
| RIMW-6 | 8 | 10 | < 10 | < 10 | < 10 | < 10 | 2.22 J2 | 1.81 J1 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 500 | 39 | 5500 | 7100 | < 10 | < 10 | < 10 | < 10 | < 10 | |
| RIMW-6 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-6 | 18 | 19 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-7 | 0 | 1 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | |
| RIMW-7 | 4 | 6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | |
| RIMW-7 | 8 | 10 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | |
| RIMW-8 | 0 | 1 | 4.38 J2 | < 9.7 | < 9.7 | < 9.7 | 9.38 J2 | 1.07 J2 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | 1.57 J2 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | |
| RIMW-8 | 2 | 4 | 110 | < 9.3 | 1.56 J2 | < 9.3 | 1600 | 90 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | 390 | < 9.3 | < 9.3 | < 9.3 | 3.21 J2 | < 9.3 | < 9.3 | 19 | .55 J2 | < 9.3 | < 9.3 | < 9.3 | |
| RIMW-8 | 4 | 6 | 2400 | < 9 | 3.2 J2 | 23 | 170 | 120 | < 9 | < 9 | < 9 | < 9 | 1.36 J2 | 1500 | < 9 | < 9 | < 9 | 130 | < 9 | 55 | 220 | < 9 | < 9 | < 9 | < 9 | |
| RIMW-8 | 6 | 8 | 2600 | < 8.4 | < 8.4 | 6.99 J2 | 48 | 14 | < 8.4 | < 8.4 | < 8.4 | < 8.4 | .78 J2 | 1900 | < 8.4 | < 8.4 | < 8.4 | 1000 | 9 | 240 | 1800 | < 8.4 | < 8.4 | < 8.4 | < 8.4 | |
| RIMW-8 | 8 | 10 | 3600 | < 9.1 | 6.15 J2 | 30 | 100 | 160 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | 1.01 J2 | 1900 | < 9.1 | < 9.1 | < 9.1 | 2100 | 22 | 630 | 3300 | 3.06 J2 | < 9.1 | < 9.1 | < 9.1 | |
| RIMW-8 | 10 | 12 | 240 | < 9 | < 9 | 11 | 12 | 6.77 J2 | < 9 | < 9 | < 9 | < 9 | < 9 | 910 | < 9 | < 9 | < 9 | 1100 | 12 | 440 | 1700 | .49 J2 | < 9 | < 9 | < 9 | |
| RIMW-8 | 12 | 14 | 1100 | < 8.5 | < 8.5 | 42 | 59 | 110 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | 1700 | < 8.5 | < 8.5 | < 8.5 | 890 | 13 | 400 | 1600 | 2.63 J2 | < 8.5 | < 8.5 | < 8.5 | |
| RIMW-8 | 14 | 16 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 25 | 27 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8-DUP | 10 | 12 | 260 J2 | < 8.8 | < 8.8 | 12 | 7.16 J2 | 5.31 J2 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | 610 J2 | < 8.8 | < 8.8 | < 8.8 | 1200 J2 | 13 | 450 J2 | 1700 J2 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | |
| RIPZ-3 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIPZ-3 | 18 | 20 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-56 | 0 | 1 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | .79 J2 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | |
| RISB-56 | 4 | 6 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | 1.66 J2 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | .43 J2 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | |
| RISB-56 | 8 | 10 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | .62 J2 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | 1.31 J2 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | 140 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | |
| RISB-56 | 12 | 14 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | 2.05 J2 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | 5.06 J2 | < 8.7 | < 8.7 | < 8.7 | 6200 | 56 | 910 | 12000 | < 8.7 | < 8.7 | < 8.7 | 1.93 J2 | |

**Table D-5
Phase II Soil Sampling Results**

Remedial Investigation Report
September 2008
Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|-----------------------|---------------------------|---------------------------------------|-----------------------|--------------------|--------------------|------------------------|------------------------|-----------------------------|-------------------|---------------------|--------------------|---------------------|---------------------|---------------------|------------|------------|----------------------|---------|----------|--------------------|----------------------|-----------|--------------|
| | | | 1,1,1-Trichloroethane | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloro-1,2,2-trifluoroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethane | 1,1-Dichloroethene | 1,2,3-Trichlorobenzene | 1,2,4-Trichlorobenzene | 1,2-Dibromo-3-chloropropane | 1,2-Dibromoethane | 1,2-Dichlorobenzene | 1,2-Dichloroethane | 1,2-Dichloropropane | 1,3-Dichlorobenzene | 1,4-Dichlorobenzene | 2-Butanone | 2-Hexanone | 4-Methyl-2-pentanone | Acetone | Benzene | Bromochloromethane | Bromodichloromethane | Bromoform | Bromomethane |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-57 | 0 | 1 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 |
| RISB-57 | 3 | 5 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | 51 J | 2.25 J2J | < 15 | < 15 | < 15 | < 15 |
| RISB-57 | 10 | 14 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | 1.63 J2J | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | 25 J | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 |
| RISB-57 | 14 | 18 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | 1.15 J2J | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | 30 J | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | 3.8 J2J | 9 J | < 8.3 | < 8.3 | < 8.3 | < 8.3 |
| RISB-57 | 18 | 22 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | 4.78 J2 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 |
| RISB-58 | 0 | 1 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 |
| RISB-58 | 4 | 6 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RISB-58 | 10 | 12 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 |
| RISB-58 | 14 | 16 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 |
| RISB-58 | 18 | 20 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.4 | < 9.7 | < 9.7 | < 9.4 | < 9.7 | < 9.7 | < 9.4 | < 9.4 | < 9.7 | < 9.7 | < 9.7 | < 9.4 | < 9.7 | < 9.7 | < 9.7 | < 9.7 |
| RISB-59 | 0 | 1 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 10 | < 9.7 | < 9.7 | < 9.7 | < 10 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 |
| RISB-59 | 4 | 6 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.3 | < 8.2 | < 8.2 | < 8.2 | < 8.3 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 |
| RISB-59 | 10 | 12 | 7.68 J2 | < 8 | 6.43 J2 | < 8 | 1.14 J2 | 12 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 |
| RISB-59 | 12 | 14 | 4.78 J2 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | .99 J2 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | 2.91 J2 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 |
| RISB-59-DUP | 12 | 14 | 1.52 J2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | 1.33 J2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | .3 J2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 |
| RISB-61 | 10 | 12 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | .53 J2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 |
| RISB-61 | 16 | 18 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 8.6 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 |
| RISB-61 | 20 | 22 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 9.7 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RISB-62 | 0 | 1 | < 11 | < 11 | < 11 | 7.42 J2 | < 11 | < 11 | 1.42 J2 | 3.58 J2 | < 11 | < 11 | 7.03 J2 | < 11 | < 11 | < 11 | 4.86 J2 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 |
| RISB-62 | 4 | 6 | < 9.7 | < 9.1 | < 9.1 | 210 | .54 J2 | 5.11 J2 | 2.08 J2 | 8.88 J2 | < 9.1 | < 9.1 | 8200 | 720 | 3.12 J2 | 110 | 1700 | < 9.1 | < 9.1 | < 9.7 | < 9.1 | 4.25 J2 | < 9.1 | < 9.1 | < 9.1 | < 9.1 |
| RISB-62 | 8 | 10 | < 9.2 | < 9.2 | < 9.2 | 280 | < 9.2 | 1.64 J2 | 1.84 J2 | 5.11 J2 | < 9.2 | < 9.2 | 5900 | 880 | 2.35 J2 | 75 | 1200 | < 9.2 | < 9.2 | 4.47 J2 | < 9.2 | 2.56 J2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 |
| RISB-62 | 12 | 14 | < 9.5 | < 9.5 | < 9.5 | 120 | < 9.5 | < 9.5 | < 9.5 | 1.39 J2 | < 9.5 | < 9.5 | 1100 | 610 | .66 J2 | 8.73 J2 | 130 | < 9.5 | < 9.5 | 4.64 J2 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 |
| RISB-62-DUP | 12 | 14 | < 8.5 | < 8.5 | < 8.5 | 210 J2 | .44 J2 | 2.99 J2 | 1.35 J2 | 2.79 J2 | < 8.5 | < 8.5 | 970 J2 | 770 J2 | 1.65 J2 | 30 | 380 J2 | < 8.5 | < 8.5 | 5.66 J2 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 |
| RISB-63 | 0 | 1 | < 10 | < 10 | < 10 | < 10 | < 10 | .6 J2 | 4.81 J2 | 1.95 J2 | 2.96 J2 | < 10 | < 10 | 19 | 8.87 J2 | < 10 | < 10 | 3.23 J2 | 2.81 J2 | < 10 | < 10 | 270 | .64 J2 | < 10 | < 10 | < 10 |
| RISB-63 | 4 | 6 | < 9.3 | < 9.3 | < 9.3 | 1.54 J2 | 4.02 J2 | 6.1 J2 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | 120 | 360 | < 9.3 | 2.23 J2 | 27 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 |
| RISB-63 | 8 | 10 | < 10 | < 10 | < 10 | 4.21 J2 | 3.93 J2 | 3.88 J2 | < 10 | 1.26 J2 | < 10 | < 10 | 360 | 940 | < 10 | 3.31 J2 | 41 | < 10 | < 10 | < 10 | 1.49 J2 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RISB-63 | 14 | 16 | < 8.9 | < 8.9 | < 8.9 | 10 | 3.55 J2 | 1.51 J2 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | 130 | 910 | < 8.9 | 2.38 J2 | 30 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | 1.31 J2 | < 8.9 | < 8.9 | < 8.9 | < 8.9 |
| RISB-63 | 16 | 18 | < 8.7 | < 8.7 | < 8.7 | 2.69 J2 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | 19 | 530 | < 8.7 | < 8.7 | 3.11 J2 | < 8.7 | < 8.7 | < 8.7 | 5.17 J2 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 |
| RISB-64 | 0 | 5 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | 1100 | 930 | < 500 | < 500 | 227 J2 | 510 | < 500 | 1800 | 3900 | 155 J2 | < 500 | < 500 | < 500 | < 500 |
| RISB-64 | 5 | 10 | < 550 | < 550 | < 550 | < 550 | < 550 | 80.3 J2 | < 550 | < 550 | < 550 | < 550 | 3600 | 11000 | < 550 | 55.6 J2 | 640 | 5000 | < 550 | 17000 | 24000 | 2100 | < 550 | < 550 | < 550 | < 550 |
| RISB-64 | 10 | 15 | < 620 | < 620 | < 620 | < 620 | < 620 | < 620 | < 620 | < 620 | < 620 | < 620 | 41.7 J2 | 9300 | < 620 | < 620 | < 620 | 2800 | < 620 | 6700 | 36000 | 281 J2 | < 620 | < 620 | < 620 | < 620 |
| RISB-65 | 0 | 5 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | 8000 | < 540 | 10000 | 9800 | 329 J2 | < 540 | < 540 | < 540 | < 540 | |
| RISB-65 | 5 | 10 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | 23000 | < 550 | 12000 | 31000 | 24.8 J2 | < 550 | < 550 | < 550 | < 550 | |
| RISB-65 | 10 | 15 | < 550 | < 550 | < 550 | < 550 | 155 J2 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | 18000 | < 550 | 16000 | 28000 | 118 J2 | < 550 | < 550 | < 550 | < 550 |
| RISB-65 | 15 | 20 | < 10 | < 10 | < 10 | < 10 | 281 J2 | 12 | < 10 | < 10 | < 10 | < 10 | < 10 | .27 J2 | 5.48 J2 | < 10 | < 10 | < 10 | 520 | 39 | 2000 | 1200 | 91 | < 10 | < 10 | < 10 |
| RISB-66 | 0 | 5 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | 1.62 J2 | 10 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | 17 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | |
| RISB-66 | 5 | 9 | < 10 | < 10 | < 10 | < 10 | 3.83 J2 | 33 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .44 J2 | < 10 | < 10 | < 10 | < 10 |
| RISB-67 | 0 | 5 | < 10 | < 10 | < 10 | < 10 | < 10 | 8.04 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RISB-67 | 5 | 10 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 |

Table D-5
Phase II Soil Sampling Results

Remedial Investigation Report
September 2008
Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|------------------|----------------|------------------|----------------------|---------------|--------------|------------|---------------|------------------------|-------------------------|-------------|----------------------|-------------------------|--------------|------------------|----------------|-------------------------|-------------------|--------------------|---------|-------------------|---------|--------------------------|---------------------------|-----------------|------------------------|-------|
| | | | Carbon disulfide | Carbon tetrachloride | Chlorobenzene | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | cis-1,3-Dichloropropene | Cyclohexane | Dibromochloromethane | Dichlorodifluoromethane | Ethylbenzene | Isopropylbenzene | Methyl acetate | Methyl tert butyl ether | Methylcyclohexane | Methylene chloride | Styrene | Tetrachloroethene | Toluene | trans-1,2-Dichloroethene | trans-1,3-Dichloropropene | Trichloroethene | Trichlorofluoromethane | |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RIMW-1 | 10 | 12 | < 8.5 | < 8.5 | 2.41 J2 | < 8.5 | 1.78 J2 | < 8.5 | 1100 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | 71 | 1.41 J2 | 1.64 J2 | < 8.5 | 83 | < 8.5 | |
| RIMW-1 | 12 | 14 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | 81 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | < 8.1 | 3.16 J2 | < 8.1 | < 8.1 | < 8.1 | 83 | < 8.1 | |
| RIMW-13 | 14 | 16 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-19 | 8 | 10 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | 310 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | 24 | < 9.1 | < 9.1 | < 9.1 | 29 | < 9.1 | |
| RIMW-19 | 12 | 14 | < 20 | < 20 | < 20 | < 20 | < 20 | 140 | < 20 | < 20 | < 20 | < 20 | < 20 | < 20 | < 20 | < 20 | < 20 | < 20 | < 20 | < 20 | 4.92 J2 | < 20 | < 20 | < 20 | 4.55 J2 | < 20 | |
| RIMW-19 | 16 | 18 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | 63 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | 6.81 J2 | < 8.3 | < 8.3 | < 8.3 | 7.23 J2 | < 8.3 | |
| RIMW-1-DUP | 12 | 14 | < 8 | < 8 | < 8 | < 8 | < 8 | 460 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | .99 J2 | < 8 | 7.17 J2 | .52 J2 | < 8 | 590 | < 8 |
| RIMW-5 | 0 | 1 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 | < 8.8 |
| RIMW-5 | 4 | 6 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | 1.44 J2 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | 8.51 J2 | < 9.9 | < 9.9 | < 9.9 | 32 | 27 | |
| RIMW-5 | 12 | 14 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | 2.95 J2 | .91 J2 | |
| RIMW-5 | 18 | 20 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | .69 J2 | < 8.3 |
| RIMW-6 | 0 | 1 | 2.85 J2 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | 3400 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | 1.88 J2 | 1.19 J2 | < 7.7 | < 7.7 | 6.86 J2 | < 7.7 | < 7.7 | 800 | 7.44 J2 | 19 | < 7.7 | 31 | < 7.7 | < 7.7 | |
| RIMW-6 | 4 | 6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | 23000 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | 3.07 J2 | .72 J2 | < 9.6 | < 9.6 | 3.91 J2 | .72 J2 | < 9.6 | 3700 | 91 | 70 | < 9.6 | 3200 | < 9.6 | < 9.6 | |
| RIMW-6 | 8 | 10 | 1.92 J2 | < 10 | < 10 | < 10 | < 10 | 3200 | < 10 | < 10 | < 10 | < 10 | .52 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 4.69 J2 | 7.08 J2 | 3.28 J2 | < 10 | 16 | < 10 | < 10 | |
| RIMW-6 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-6 | 18 | 19 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-7 | 0 | 1 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | 4.78 J2 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | < 9.6 | |
| RIMW-7 | 4 | 6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | .71 J2 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | |
| RIMW-7 | 8 | 10 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | 1.1 J2 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | |
| RIMW-8 | 0 | 1 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | .57 J2 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | 7.05 J2 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 |
| RIMW-8 | 2 | 4 | < 9.3 | < 9.3 | 1.62 J2 | 72 | < 9.3 | < 9.3 | 30 | < 9.3 | .79 J2 | < 9.3 | < 9.3 | 79 | 3.85 J2 | < 9.3 | < 9.3 | 6.3 J2 | 24 | < 9.3 | 15 | 25 | < 9.3 | < 9.3 | 2.54 J2 | < 9.3 | < 9.3 |
| RIMW-8 | 4 | 6 | < 9 | < 9 | 8.83 J2 | 4.83 J2 | 4.06 J2 | < 9 | 11 | < 9 | < 9 | < 9 | 350 | 8.94 J2 | < 9 | < 9 | 13 | 130 | < 9 | 87 | 7100 | < 9 | < 9 | 39 | 3.64 J2 | < 9 | < 9 |
| RIMW-8 | 6 | 8 | < 8.4 | < 8.4 | 4.69 J2 | 1.09 J2 | 2.33 J2 | < 8.4 | 4.91 J2 | < 8.4 | < 8.4 | < 8.4 | 110 | 2.57 J2 | < 8.4 | < 8.4 | < 8.4 | 100 | < 8.4 | 16 | 7700 | < 8.4 | < 8.4 | 12 | < 8.4 | < 8.4 | |
| RIMW-8 | 8 | 10 | < 9.1 | < 9.1 | 7.05 J2 | 2.18 J2 | 6.24 J2 | < 9.1 | 9.01 J2 | < 9.1 | < 9.1 | < 9.1 | 280 | 8.21 J2 | < 9.1 | < 9.1 | 18 | 210 | < 9.1 | 120 | 9000 | < 9.1 | < 9.1 | 57 | 7.37 J2 | < 9.1 | < 9.1 |
| RIMW-8 | 10 | 12 | < 9 | < 9 | 1.09 J2 | < 9 | 1.24 J2 | < 9 | 1.31 J2 | < 9 | < 9 | < 9 | 29 | .7 J2 | < 9 | < 9 | < 9 | 42 | < 9 | 7.54 J2 | 1200 | < 9 | < 9 | 4.59 J2 | < 9 | < 9 | |
| RIMW-8 | 12 | 14 | < 8.5 | < 8.5 | 1.42 J2 | < 8.5 | 8.19 J2 | < 8.5 | 6.17 J2 | < 8.5 | < 8.5 | < 8.5 | 96 | 1.8 J2 | < 8.5 | < 8.5 | 4.23 J2 | < 8.5 | < 8.5 | 49 | 2500 | < 8.5 | < 8.5 | 32 | 2.81 J2 | < 8.5 | < 8.5 |
| RIMW-8 | 14 | 16 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-8 | 25 | 27 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-8-DUP | 10 | 12 | < 8.8 | < 8.8 | .84 J2 | < 8.8 | .88 J2 | < 8.8 | .94 J2 | < 8.8 | < 8.8 | < 8.8 | 23 | .64 J2 | < 8.8 | < 8.8 | .96 J2 | 30 | < 8.8 | 7.2 J2 | 690 J2 | < 8.8 | < 8.8 | 3.15 J2 | < 8.8 | < 8.8 | |
| RIPZ-3 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIPZ-3 | 18 | 20 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-56 | 0 | 1 | < 8.9 | < 8.9 | 2.59 J2 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 |
| RISB-56 | 4 | 6 | < 8.9 | < 8.9 | .51 J2 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 |
| RISB-56 | 8 | 10 | < 9.9 | < 9.9 | < 9.9 | 2.79 J2 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 |
| RISB-56 | 12 | 14 | < 8.7 | < 8.7 | < 8.7 | 6.96 J2 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | 3.3 J2 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | 13 | < 8.7 | < 8.7 | 66 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 |

Table D-5
Phase II Soil Sampling Results

Remedial Investigation Report
September 2008
Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|------------------|----------------------|---------------|--------------|------------|---------------|------------------------|-------------------------|-------------|----------------------|-------------------------|--------------|------------------|----------------|-------------------------|-------------------|--------------------|---------|-------------------|----------|--------------------------|---------------------------|-----------------|------------------------|
| | | | Carbon disulfide | Carbon tetrachloride | Chlorobenzene | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | cis-1,3-Dichloropropene | Cyclohexane | Dibromochloromethane | Dichlorodifluoromethane | Ethylbenzene | Isopropylbenzene | Methyl acetate | Methyl tert butyl ether | Methylcyclohexane | Methylene chloride | Styrene | Tetrachloroethene | Toluene | trans-1,2-Dichloroethene | trans-1,3-Dichloropropene | Trichloroethene | Trichlorofluoromethane |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-57 | 0 | 1 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | 82 J2J | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 |
| RISB-57 | 3 | 5 | 3.8 J2J | < 15 | < 15 | < 15 | < 15 | < 15 | 180 J | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | < 15 | 2.13 J2J | < 15 | < 15 | 2.78 J2J | < 15 | < 15 | < 15 | 25 J | < 15 |
| RISB-57 | 10 | 14 | < 9.8 | < 9.8 | 2.54 J2J | < 9.8 | < 9.8 | < 9.8 | 600 J | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | .91 J2J | < 9.8 | < 9.8 | < 9.8 | < 9.8 | < 9.8 | 220 J | 2.34 J2J | .69 J2J | < 9.8 | 320 J | < 9.8 |
| RISB-57 | 14 | 18 | < 8.3 | < 8.3 | 2.07 J2J | < 8.3 | < 8.3 | < 8.3 | 740 J | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | .8 J2J | < 8.3 | < 8.3 | < 8.3 | < 8.3 | < 8.3 | 260 J | 2.09 J2J | .9 J2J | < 8.3 | 340 J | < 8.3 |
| RISB-57 | 18 | 22 | < 8.9 | < 8.9 | .39 J2 | < 8.9 | < 8.9 | < 8.9 | 68 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | 83 | < 8.9 | < 8.9 | < 8.9 | 47 | < 8.9 | |
| RISB-58 | 0 | 1 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | .85 J2 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 |
| RISB-58 | 4 | 6 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RISB-58 | 10 | 12 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 | < 9.9 |
| RISB-58 | 14 | 16 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 | < 9 |
| RISB-58 | 18 | 20 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 |
| RISB-59 | 0 | 1 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 | < 9.7 |
| RISB-59 | 4 | 6 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 |
| RISB-59 | 10 | 12 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | .57 J2 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | < 8 | 3.3 J2 | < 8 | < 8 | 1.54 J2 | < 8 | < 8 | < 8 | < 8 | 3.67 J2 |
| RISB-59 | 12 | 14 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | .98 J2 | < 8.7 | < 8.7 | 2.12 J2 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 |
| RISB-59-DUP | 12 | 14 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 | < 8.2 |
| RISB-61 | 10 | 12 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | .59 J2 | < 9.2 | < 9.2 | < 9.2 | 1.05 J2 | < 9.2 |
| RISB-61 | 16 | 18 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 | < 7.7 |
| RISB-61 | 20 | 22 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .58 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 5.77 J2 | < 10 |
| RISB-62 | 0 | 1 | < 11 | < 11 | 1.42 J2 | < 11 | 1.23 J2 | < 11 | 3.26 J2 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | < 11 | 5.37 J2 | .87 J2 | < 11 | < 11 | 2.99 J2 | < 11 |
| RISB-62 | 4 | 6 | < 9.1 | < 9.1 | 320 | < 9.1 | 17 | < 9.1 | 27 | < 9.1 | < 9.1 | < 9.1 | .54 J2 | < 9.1 | < 9.1 | < 9.1 | < 9.1 | 1.16 J2 | < 9.1 | 14 | 13 | < 9.1 | < 9.1 | 78 | < 9.1 | |
| RISB-62 | 8 | 10 | < 9.2 | < 9.2 | 310 | < 9.2 | 14 | < 9.2 | 26 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | < 9.2 | 1.33 J2 | < 9.2 | 6.2 J2 | 4.3 J2 | < 9.2 | < 9.2 | 40 | < 9.2 | |
| RISB-62 | 12 | 14 | < 9.5 | < 9.5 | 15 | < 9.5 | 5.24 J2 | < 9.5 | 7.87 J2 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | < 9.5 | .96 J2 | < 9.5 | .83 J2 | .47 J2 | < 9.5 | < 9.5 | 6.35 J2 | < 9.5 | |
| RISB-62-DUP | 12 | 14 | < 8.5 | < 8.5 | 44 | < 8.5 | 15 | < 8.5 | 26 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | < 8.5 | 1.35 J2 | < 8.5 | 7.81 J2 | .9 J2 | < 8.5 | < 8.5 | 38 | < 8.5 | |
| RISB-63 | 0 | 1 | < 10 | < 10 | 4.01 J2 | < 10 | < 10 | 5.71 J2 | < 10 | < 10 | < 10 | < 10 | .54 J2 | < 10 | < 10 | < 10 | 1.29 J2 | < 10 | < 10 | .71 J2 | < 10 | < 10 | < 10 | 1.98 J2 | < 10 | |
| RISB-63 | 4 | 6 | < 9.3 | < 9.3 | 3.39 J2 | < 9.3 | 4.07 J2 | < 9.3 | 93 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | .91 J2 | < 9.3 | .54 J2 | .91 J2 | < 9.3 | < 9.3 | 50 | < 9.3 | |
| RISB-63 | 8 | 10 | < 10 | < 10 | 3.3 J2 | < 10 | 8.28 J2 | < 10 | 81 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.26 J2 | < 10 | < 10 | .56 J2 | < 10 | < 10 | 58 | < 10 | |
| RISB-63 | 14 | 16 | < 8.9 | < 8.9 | 2.2 J2 | < 8.9 | 5.15 J2 | < 8.9 | 39 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | 1.16 J2 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | < 8.9 | 24 | < 8.9 | |
| RISB-63 | 16 | 18 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | 2.32 J2 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | < 8.7 | .61 J2 | < 8.7 | |
| RISB-64 | 0 | 5 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | 11000 | < 500 | < 500 | < 500 | 1100 | 138 J2 | < 500 | < 500 | 3100 | 45.2 J2 | < 500 | 1900 | 17000 | < 500 | < 500 | 2700 | < 500 | |
| RISB-64 | 5 | 10 | < 550 | < 550 | 207 J2 | < 550 | 750 | < 550 | 58000 | < 550 | < 550 | < 550 | 33000 | 4400 | < 550 | < 550 | 85000 | 402 J2 | < 550 | 72000 | 370000 | 39.1 J2 | < 550 | 150000 | < 550 | |
| RISB-64 | 10 | 15 | < 620 | < 620 | 62.2 J2 | < 620 | 150 J2 | < 620 | 5200 | < 620 | < 620 | < 620 | < 620 | < 620 | 62.1 J2 | < 620 | < 620 | < 620 | 237 J2 | < 620 | 1200 | 2500 | < 620 | < 620 | 16000 | < 620 |
| RISB-65 | 0 | 5 | < 540 | < 540 | < 540 | < 540 | < 540 | < 540 | 110 J2 | < 540 | < 540 | < 540 | 3700 | 173 J2 | < 540 | < 540 | 570 | < 540 | < 540 | < 540 | 45000 | < 540 | < 540 | 120 J2 | < 540 | |
| RISB-65 | 5 | 10 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | 39.6 J2 | < 550 | < 550 | < 550 | 112 J2 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | 2800 | < 550 | < 550 | 27 J2 | < 550 | |
| RISB-65 | 10 | 15 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | 302 J2 | < 550 | < 550 | < 550 | 310 J2 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | < 550 | 12000 | < 550 | < 550 | < 550 | < 550 |
| RISB-65 | 15 | 20 | < 10 | < 10 | 1.34 J2 | 15 | < 10 | < 10 | 436 J2 | < 10 | < 10 | < 10 | 46 J2 | 9.22 J2 | < 10 | .86 J2 | < 10 | 3.24 J2 | < 10 | 4.1 J2 | 1500 | 4.06 J2 | < 10 | .56 J2 | < 10 | |
| RISB-66 | 0 | 5 | < 9.3 | < 9.3 | < 9.3 | 7.45 J2 | < 9.3 | < 9.3 | .84 J2 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | < 9.3 | 1.41 J2 | 3.65 J2 | < 9.3 | < 9.3 | .4 J2 | < 9.3 | |
| RISB-66 | 5 | 9 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 4.07 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | .61 J2 | < 10 | < 10 | 1.49 J2 | < 10 | 11 | 1.94 J2 | < 10 | < 10 | 3.02 J2 | < 10 | |
| RISB-67 | 0 | 5 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .73 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 41 | 2.3 J2 | < 10 | < 10 | 12 | < 10 | |
| RISB-67 | 5 | 10 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | < 9.4 | .77 J2 | 1.03 J2 | < 9.4 | < 9.4 | .64 J2 | < 9.4 | |

Table D-5
Phase II Soil Sampling Results

Remedial Investigation Report
September 2008
Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | SVOCs | | | | | | | | | | | | | | | | | |
|------------|------------------|----------------|----------------|-----------------|----------------------------|-------------------------|-----------------------|--------------------|--------------------|-------------------|--------------------|--------------------|---------------------|----------------|---------------------|----------------|----------------|---------------|-----------------------|------------------|----------------|----------------------|----------------------------|-----------------|-----------------------------|----------------|---------------|--------------|----------------|--------------|
| | | | Vinyl chloride | Xylenes (Total) | 1,2,4,5-Tetrachlorobenzene | 1,2,4,5-Trichlorophenol | 2,4,6-Trichlorophenol | 2,4-Dichlorophenol | 2,4-Dimethylphenol | 2,4-Dinitrophenol | 2,4-Dinitrotoluene | 2,6-Dinitrotoluene | 2-Chloronaphthalene | 2-Chlorophenol | 2-Methylnaphthalene | 2-Methylphenol | 2-Nitroaniline | 2-Nitrophenol | 3,3-Dichlorobenzidine | 3+4-Methylphenol | 3-Nitroaniline | 4,6-Dinitro-o-cresol | 4-Bromophenyl phenyl ether | 4-Chloroaniline | 4-Chlorophenyl phenyl ether | 4-Nitroaniline | 4-Nitrophenol | Acenaphthene | Acenaphthylene | Acetophenone |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RIMW-1 | 10 | 12 | 9 | < 8.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-1 | 12 | 14 | < 8.1 | < 8.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-13 | 14 | 16 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-19 | 8 | 10 | 6.14 J2 | < 9.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-19 | 12 | 14 | 2.41 J2 | < 20 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-19 | 16 | 18 | < 8.3 | < 8.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-1-DUP | 12 | 14 | < 8 | < 8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-5 | 0 | 1 | < 8.8 | < 8.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-5 | 4 | 6 | < 9.9 | < 9.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-5 | 12 | 14 | < 9.1 | < 9.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-5 | 18 | 20 | < 8.3 | < 8.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-6 | 0 | 1 | 4.68 J2 | 6.06 J2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-6 | 4 | 6 | 370 | 27 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-6 | 8 | 10 | 7.47 J2 | 3.49 J2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-6 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-6 | 18 | 19 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-7 | 0 | 1 | < 9.6 | < 9.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-7 | 4 | 6 | < 8.6 | < 8.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-7 | 8 | 10 | < 8.5 | < 8.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 0 | 1 | < 9.7 | 1.64 J2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 2 | 4 | < 9.3 | 300 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 4 | 6 | < 9 | 1400 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 6 | 8 | < 8.4 | 1200 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 8 | 10 | < 9.1 | 1100 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 10 | 12 | < 9 | 130 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 12 | 14 | < 8.5 | 370 J2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 14 | 16 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 25 | 27 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8-DUP | 10 | 12 | < 8.8 | 110 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIPZ-3 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIPZ-3 | 18 | 20 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-56 | 0 | 1 | < 8.9 | < 8.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-56 | 4 | 6 | < 8.9 | < 8.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-56 | 8 | 10 | < 9.9 | < 9.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-56 | 12 | 14 | < 8.7 | 15 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |

Table D-5
Phase II Soil Sampling Results

Remedial Investigation Report
September 2008
Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | VOCs | | | | | | | | | | SVOCs | | | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|----------------|-----------------|----------------------------|-------------------------|-----------------------|--------------------|--------------------|-------------------|--------------------|--------------------|---------------------|----------------|---------------------|----------------|----------------|---------------|-----------------------|------------------|----------------|----------------------|----------------------------|-----------------|-----------------------------|----------------|---------------|--------------|----------------|--------------|
| | | | Vinyl chloride | Xylenes (Total) | 1,2,4,5-Tetrachlorobenzene | 1,2,4,5-Trichlorophenol | 2,4,6-Trichlorophenol | 2,4-Dichlorophenol | 2,4-Dimethylphenol | 2,4-Dinitrophenol | 2,4-Dinitrotoluene | 2,6-Dinitrotoluene | 2-Chloronaphthalene | 2-Chlorophenol | 2-Methylnaphthalene | 2-Methylphenol | 2-Nitroaniline | 2-Nitrophenol | 3,3-Dichlorobenzidine | 3+4-Methylphenol | 3-Nitroaniline | 4,6-Dinitro-o-cresol | 4-Bromophenyl phenyl ether | 4-Chloroaniline | 4-Chlorophenyl phenyl ether | 4-Nitroaniline | 4-Nitrophenol | Acenaphthene | Acenaphthylene | Acetophenone |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-57 | 0 | 1 | < 8.7 | < 8.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-57 | 3 | 5 | 8.54 J2 | < 15 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-57 | 10 | 14 | 32 J | 1.76 J2J | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-57 | 14 | 18 | 22 J | 1.79 J2J | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-57 | 18 | 22 | < 8.9 | < 8.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-58 | 0 | 1 | < 9.4 | < 9.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-58 | 4 | 6 | < 10 | < 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-58 | 10 | 12 | < 9.9 | < 9.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-58 | 14 | 16 | < 9 | < 9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-58 | 18 | 20 | < 9.7 | < 9.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-59 | 0 | 1 | < 9.7 | < 9.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-59 | 4 | 6 | < 8.2 | < 8.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-59 | 10 | 12 | < 8 | < 8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-59 | 12 | 14 | < 8.7 | < 8.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-59-DUP | 12 | 14 | < 8.2 | < 8.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-61 | 10 | 12 | < 9.2 | < 9.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-61 | 16 | 18 | < 7.7 | < 7.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-61 | 20 | 22 | < 10 | < 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-62 | 0 | 1 | < 11 | < 11 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-62 | 4 | 6 | 1 J2 | 2.27 J2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-62 | 8 | 10 | < 9.2 | 1.35 J2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-62 | 12 | 14 | < 9.5 | < 9.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-62-DUP | 12 | 14 | < 8.5 | .68 J2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-63 | 0 | 1 | < 10 | 1.81 J2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-63 | 4 | 6 | 1.31 J2 | .78 J2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-63 | 8 | 10 | 1.04 J2 | < 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-63 | 14 | 16 | < 8.9 | < 8.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-63 | 16 | 18 | < 8.7 | < 8.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-64 | 0 | 5 | 56.7 J2 | 5500 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 430 | < 430 | 300 J2 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | |
| RISB-64 | 5 | 10 | 85.8 J2 | 160000 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 420 | < 420 | 380 J2 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | |
| RISB-64 | 10 | 15 | < 620 | 306 J2 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 420 | |
| RISB-65 | 0 | 5 | < 540 | 16000 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 | < 1000 | < 1000 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 | |
| RISB-65 | 5 | 10 | < 550 | 560 | < 390 | < 980 | < 390 | < 390 | < 390 | < 980 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 980 | < 390 | < 390 | < 390 | < 980 | < 980 | < 390 | < 390 | < 980 | < 980 | < 390 | < 390 | < 390 | |
| RISB-65 | 10 | 15 | < 550 | 1300 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 1100 | < 420 | < 420 | < 420 | < 1100 | < 1100 | < 420 | < 420 | |
| RISB-65 | 15 | 20 | 2.81 J2 | 174 J2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-66 | 0 | 5 | 5.32 J2 | < 9.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-66 | 5 | 9 | 13 | .73 J2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-67 | 0 | 5 | < 10 | < 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-67 | 5 | 10 | < 9.4 | < 9.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |

Table D-5
Phase II Soil Sampling Results

Remedial Investigation Report
September 2008
Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | SVOCs | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|------------------|----------------|------------|----------|--------------|--------------------|----------------|----------------------|----------------------|----------------------|----------|----------------------------|-------------------------|-----------------------------|----------------------------|------------------------|-------------|-----------|----------|------------------------|--------------|-------------------|--------------------|---------------------|---------------------|--------------|----------|-------------------|---------------------|---------------------------|
| | | | Anthracene | Atrazine | Benzaldehyde | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Biphenyl | Bis(2-chloroethoxy)methane | Bis(2-chloroethyl)ether | Bis(2-chloroisopropyl)ether | Bis(2-ethylhexyl)phthalate | Butyl benzyl phthalate | Caprolactam | Carbazole | Chrysene | Dibenzo(a,h)anthracene | Dibenzofuran | Diethyl phthalate | Dimethyl phthalate | Di-n-butylphthalate | Di-n-octylphthalate | Fluoranthene | Fluorene | Hexachlorobenzene | Hexachlorobutadiene | Hexachlorocyclopentadiene |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RIMW-1 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-1 | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-13 | 14 | 16 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-19 | 8 | 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-19 | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-19 | 16 | 18 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-1-DUP | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-5 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-5 | 4 | 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-5 | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-5 | 18 | 20 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-6 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-6 | 4 | 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-6 | 8 | 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-6 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-6 | 18 | 19 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-7 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-7 | 4 | 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-7 | 8 | 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 2 | 4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 4 | 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 6 | 8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 8 | 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 14 | 16 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8 | 25 | 27 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIMW-8-DUP | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIPZ-3 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RIPZ-3 | 18 | 20 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-56 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-56 | 4 | 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-56 | 8 | 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-56 | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |

Table D-5
Phase II Soil Sampling Results

Remedial Investigation Report
September 2008
Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | SVOCs | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------|------------------|----------------|------------|----------|--------------|--------------------|----------------|----------------------|----------------------|----------------------|----------|----------------------------|-------------------------|-----------------------------|----------------------------|------------------------|-------------|-----------|----------|------------------------|--------------|-------------------|--------------------|---------------------|---------------------|--------------|----------|-------------------|---------------------|---------------------------|
| | | | Anthracene | Atrazine | Benzaldehyde | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Biphenyl | Bis(2-chloroethoxy)methane | Bis(2-chloroethyl)ether | Bis(2-chloroisopropyl)ether | Bis(2-ethylhexyl)phthalate | Butyl benzyl phthalate | Caprolactam | Carbazole | Chrysene | Dibenzo(a,h)anthracene | Dibenzofuran | Diethyl phthalate | Dimethyl phthalate | Di-n-butylphthalate | Di-n-octylphthalate | Fluoranthene | Fluorene | Hexachlorobenzene | Hexachlorobutadiene | Hexachlorocyclopentadiene |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg |
| RISB-57 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-57 | 3 | 5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-57 | 10 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-57 | 14 | 18 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-57 | 18 | 22 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-58 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-58 | 4 | 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-58 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-58 | 14 | 16 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-58 | 18 | 20 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-59 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-59 | 4 | 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-59 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-59 | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-59-DUP | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-61 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-61 | 16 | 18 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-61 | 20 | 22 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-62 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-62 | 4 | 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-62 | 8 | 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-62 | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-62-DUP | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-63 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-63 | 4 | 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-63 | 8 | 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-63 | 14 | 16 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-63 | 16 | 18 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-64 | 0 | 5 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | 6800 | < 430 | < 430 | < 430 | 1800 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | < 430 | |
| RISB-64 | 5 | 10 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | 4200 | < 420 | < 420 | < 420 | 1800 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | |
| RISB-64 | 10 | 15 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | |
| RISB-65 | 0 | 5 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | 300 J2 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | | |
| RISB-65 | 5 | 10 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | 990 | 260 J2 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | |
| RISB-65 | 10 | 15 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | | |
| RISB-65 | 15 | 20 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-66 | 0 | 5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-66 | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-67 | 0 | 5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| RISB-67 | 5 | 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |

Table D-5
Phase II Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | SVOCs | | | | | | | | | | | | | Other |
|------------|------------------|----------------|------------------|------------------------|------------|-------------|----------|--------------|---------------------------|-------------------|-------------------|--------------|--------|--------|----------------------|-------|
| | | | Hexachloroethane | Indeno(1,2,3-cd)pyrene | Isophorone | Naphthalene | NDPA/DPA | Nitrobenzene | n-Nitrosodi-n-propylamine | p-Chloro-m-cresol | Pentachlorophenol | Phenanthrene | Phenol | Pyrene | Total Organic Carbon | |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | |
| RIMW-1 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-1 | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-13 | 14 | 16 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | < 101 |
| RIMW-19 | 8 | 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-19 | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-19 | 16 | 18 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-1-DUP | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-5 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-5 | 4 | 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-5 | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-5 | 18 | 20 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-6 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-6 | 4 | 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-6 | 8 | 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-6 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 167 |
| RIMW-6 | 18 | 19 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | < 104 |
| RIMW-7 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-7 | 4 | 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-7 | 8 | 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-8 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-8 | 2 | 4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-8 | 4 | 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-8 | 6 | 8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-8 | 8 | 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-8 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-8 | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | < 113 |
| RIMW-8 | 14 | 16 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | < 108 |
| RIMW-8 | 25 | 27 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 415 |
| RIMW-8-DUP | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIPZ-3 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 4760 |
| RIPZ-3 | 18 | 20 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | < 107 |
| RISB-56 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-56 | 4 | 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-56 | 8 | 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-56 | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Table D-5
Phase II Soil Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Start Depth (ft) | End Depth (ft) | SVOCs | | | | | | | | | | | | | Other |
|-------------|------------------|----------------|------------------|------------------------|------------|-------------|----------|--------------|---------------------------|-------------------|-------------------|--------------|--------|--------|----------------------|-------|
| | | | Hexachloroethane | Indeno(1,2,3-cd)pyrene | Isophorone | Naphthalene | NDPA/DPA | Nitrobenzene | n-Nitrosodi-n-propylamine | p-Chloro-m-cresol | Pentachlorophenol | Phenanthrene | Phenol | Pyrene | Total Organic Carbon | |
| | | | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | |
| RISB-57 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-57 | 3 | 5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-57 | 10 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-57 | 14 | 18 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-57 | 18 | 22 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-58 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-58 | 4 | 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-58 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-58 | 14 | 16 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-58 | 18 | 20 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-59 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-59 | 4 | 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-59 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-59 | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-59-DUP | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-61 | 10 | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-61 | 16 | 18 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-61 | 20 | 22 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-62 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-62 | 4 | 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-62 | 8 | 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-62 | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-62-DUP | 12 | 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-63 | 0 | 1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-63 | 4 | 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-63 | 8 | 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-63 | 14 | 16 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-63 | 16 | 18 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-64 | 0 | 5 | < 430 | < 430 | < 430 | 270 J2 | < 430 | < 430 | < 430 | < 430 | < 1100 | < 430 | < 430 | < 430 | NA | NA |
| RISB-64 | 5 | 10 | < 420 | < 420 | < 420 | 640 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | NA | NA |
| RISB-64 | 10 | 15 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | NA | NA |
| RISB-65 | 0 | 5 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 410 | < 1000 | < 410 | < 410 | < 410 | NA | NA |
| RISB-65 | 5 | 10 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 390 | < 980 | < 390 | < 390 | < 390 | NA | NA |
| RISB-65 | 10 | 15 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 420 | < 1100 | < 420 | < 420 | < 420 | NA | NA |
| RISB-65 | 15 | 20 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-66 | 0 | 5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-66 | 5 | 9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-67 | 0 | 5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RISB-67 | 5 | 10 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

D-6 Phase II Groundwater

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | VOCs | | | | | | | | | | | | |
|------------|------------------------------|----------------------------|-----------------------|---------------------------|---------------------------------------|-----------------------|--------------------|--------------------|------------------------|------------------------|-----------------------------|-------------------|---------------------|--------------------|---------------------|
| | | | 1,1,1-Trichloroethane | 1,1,2,2-Tetrachloroethane | 1,1,1-Trichloro-1,2,2-trifluoroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethane | 1,1-Dichloroethene | 1,2,3-Trichlorobenzene | 1,2,4-Trichlorobenzene | 1,2-Dibromo-3-chloropropane | 1,2-Dibromoethane | 1,2-Dichlorobenzene | 1,2-Dichloroethane | 1,2-Dichloropropane |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| BP-1A | | | < 10 | < 10 | < 10 | < 10 | .43 J2 | .87 J2 | < 10 | < 10 | < 10 | < 10 | .61 J2 | .42 J2 | < 10 |
| BP-1B | | | 1.63 J2 | < 10 | 1.74 J2 | .75 J2 | 6.18 J2 | 22 | < 10 | .84 J2 | < 10 | < 10 | .36 J2 | 1.27 J2 | < 10 |
| EW-1 | | | 2.16 J2 | < 10 | 2.83 J2 | 1.73 J2 | 72 | 94 | < 10 | < 10 | < 10 | < 10 | 3.25 J2 | 3200 | < 10 |
| EW-4 | | | 1.38 J2 | < 10 | < 10 | < 10 | 82 | 22 | < 10 | < 10 | < 10 | < 10 | 3.06 J2 | 97 | < 10 |
| MW-100 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-101 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-102 | | | < 10 | < 10 | < 10 | < 10 | .4 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-103 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-104 | | | < 10 | < 10 | < 10 | < 10 | 1.47 J2 | .52 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-105 | | | < 10 | < 10 | < 10 | < 10 | .35 J2 | 2.03 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-106 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-107 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-108 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-111 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .36 J2 | < 10 | < 10 |
| MW-112 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-113A | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-113B | | | < 10 | < 10 | < 10 | < 10 | .72 J2 | 2.82 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | .18 J2 | < 10 |
| MW-114 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-115A | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-115B | | | < 10 | < 10 | < 10 | < 10 | 1.45 J2 | 6.68 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | 6.61 J2 | < 10 |
| MW-116 | | | < 10 | < 10 | < 10 | < 10 | 7.21 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 8.88 J2 | < 10 |
| MW-117 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .29 J2 | < 10 | < 10 |
| MW-117-DUP | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .19 J2 | < 10 | < 10 |
| MW-118 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-119 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-120A | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-120B | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | VOCs | | | | | | | | | | | | |
|----------|------------------------------|----------------------------|-----------------------|---------------------------|---------------------------------------|-----------------------|--------------------|--------------------|------------------------|------------------------|-----------------------------|-------------------|---------------------|--------------------|---------------------|
| | | | 1,1,1-Trichloroethane | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloro-1,2,2-trifluoroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethane | 1,1-Dichloroethene | 1,2,3-Trichlorobenzene | 1,2,4-Trichlorobenzene | 1,2-Dibromo-3-chloropropane | 1,2-Dibromoethane | 1,2-Dichlorobenzene | 1,2-Dichloroethane | 1,2-Dichloropropane |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| MW-121B | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-122B | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .46 J2 | < 10 |
| MW-123A | | | < 250 | < 250 | < 250 | 9 J2 | 21.5 J2 | 4.5 J2 | < 250 | < 250 | < 250 | < 250 | 2500 | 4900 | < 250 |
| MW-123B | | | < 10 | < 10 | < 10 | 7.74 J2 | 25 | 15 | < 10 | 1.14 J2 | < 10 | < 10 | 1400 | 2300 | < 10 |
| OB-109 | | | < 10 | < 10 | < 10 | < 10 | 4.57 J2 | 1.28 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | .33 J2 | < 10 |
| OB-109B | | | 2.97 J2 | < 10 | < 10 | < 10 | 15 | 39 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.57 J2 | < 10 |
| OB-11 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 2.94 J2 | < 10 |
| OB-110A | | | 55.3 J2 | < 100 | < 100 | < 100 | 160 | 71.5 J2 | < 100 | < 100 | < 100 | < 100 | 1.9 J2 | 46.6 J2 | < 100 |
| OB-110B | | | < 10 | < 10 | < 10 | < 10 | 2.47 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 8.34 J2 | < 10 |
| OB-12 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.04 J2 | < 10 |
| OB-13 | | | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 |
| OB-21 | | | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 |
| OB-22 | | | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 |
| OB-23 | | | < 10 | < 10 | < 10 | < 10 | 7.66 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 2.77 J2 | < 10 |
| OB-8A | | | 310 | < 10 | 7.64 J2 | 4.98 J2 | 232.5 J2 | 71 | < 10 | < 10 | < 10 | < 10 | 14 | 540 | .53 J2 |
| OB-900 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| OB-901 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| OB-902 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| P-1 | | | 3.23 J2 | < 10 | < 10 | 1.07 J2 | 89 | 100 | < 10 | .2 J2 | < 10 | < 10 | 2.53 J2 | 2600 | .66 J2 |
| P-2 | | | < 10 | < 10 | < 10 | < 10 | 1.36 J2J1M | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 4.51 J2J1M | < 10 |
| P-3 | | | 13 | < 10 | 6.55 J2 | 2.38 J2 | 45 | 100 | < 10 | < 10 | < 10 | < 10 | 3.29 J2 | 6200 | < 10 |
| PW-1 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .33 J2 | < 10 | < 10 | < 10 | < 10 | < 10 |
| PW-2A | | | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | 374 J2 | 126 J2 | < 500 | < 500 | 27.5 J2 | < 500 | < 500 |
| RIMW-1 | | | 9.44 J2 | < 10 | < 10 | 3.8 J2 | 177 J2 | 247 J2 | < 10 | < 10 | < 10 | < 10 | 3.71 J2 | 267 J2 | < 10 |
| RIMW-10 | | | < 10 | < 10 | < 10 | < 10 | < 10 | 1.31 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | 1100 | < 10 |
| RIMW-11 | | | < 10 | < 10 | < 10 | < 10 | 310 | 2.3 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | .41 J2 | < 10 |
| RIMW-12 | | | 7.73 J2 | < 10 | < 10 | < 10 | < 10 | 1.12 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | VOCs | | | | | | | | | | | | |
|-------------|------------------------------|----------------------------|-----------------------|---------------------------|---------------------------------------|-----------------------|--------------------|--------------------|------------------------|------------------------|-----------------------------|-------------------|---------------------|--------------------|---------------------|
| | | | 1,1,1-Trichloroethane | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloro-1,2,2-trifluoroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethane | 1,1-Dichloroethene | 1,2,3-Trichlorobenzene | 1,2,4-Trichlorobenzene | 1,2-Dibromo-3-chloropropane | 1,2-Dibromoethane | 1,2-Dichlorobenzene | 1,2-Dichloroethane | 1,2-Dichloropropane |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| RIMW-13 | | | < 10 | < 10 | < 10 | < 10 | .51 J2 | .22 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | .79 J2 | < 10 |
| RIMW-14 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-15 | | | 3.5 J2 | < 10 | < 10 | 1.17 J2 | 2.25 J2 | 12 | < 10 | < 10 | < 10 | < 10 | < 10 | 2.31 J2 | < 10 |
| RIMW-15-DUP | | | 3.28 J2 | < 10 | < 10 | 1.2 J2 | 2.34 J2 | 11 | < 10 | < 10 | < 10 | < 10 | < 10 | 2.06 J2 | < 10 |
| RIMW-16 | | | 20 | < 10 | 15 | 1.82 J2 | 20 | 69 | < 10 | < 10 | < 10 | < 10 | 3.96 J2 | 4.3 J2 | < 10 |
| RIMW-18 | | | < 10 | < 10 | < 10 | < 10 | < 10 | 1.85 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-18 | 44 | 56 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.2 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-18 | 56 | 68 | < 10 | < 10 | < 10 | < 10 | < 10 | 2.14 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-19 | | | 8.66 J2 | < 10 | 1.13 J2 | 1.56 J2 | 15 | 45 | < 10 | < 10 | < 10 | < 10 | < 10 | 28 | < 10 |
| RIMW-19 | 63 | 75 | 10 | < 10 | < 10 | 1.24 J2 | 18 | 60 | < 10 | < 10 | < 10 | < 10 | < 10 | 460 | < 10 |
| RIMW-19 | 76 | 88 | 8.92 J2 | < 10 | < 10 | 1.24 J2 | 15 | 56 | < 10 | < 10 | < 10 | < 10 | .56 J2 | 3000 | < 10 |
| RIMW-3 | | | 124 J2 | < 10 | < 10 | 1.77 J2 | 92 | 640 | < 10 | < 10 | < 10 | < 10 | .36 J2 | 13000 | < 10 |
| RIMW-4 | | | 2.9 J2 | < 10 | 35 | 7.41 J2 | 232 J2 | 245 J2 | < 10 | < 10 | < 10 | < 10 | 6.35 J2 | 7800 | 1.34 J2 |
| RIMW-4-DUP | | | 2.76 J2 | < 10 | 32 | 7.15 J2 | 227 J2 | 233 J2 | < 10 | < 10 | < 10 | < 10 | 5.63 J2 | 7800 | 1.15 J2 |
| RIMW-5 | | | 30 J1M | < 10 | 8.58 J1MJ2 | 6.86 J1MJ2 | 52 J1M | 349 J2 | < 10 | < 10 | < 10 | < 10 | 8.03 J1MJ2 | 52000 | < 10 |
| RIMW-5-DUP | | | 31 J1M | < 10 | 9.24 J1MJ2 | 7.34 J1MJ2 | 55 J1M | 370 | < 10 | < 10 | < 10 | < 10 | 9.15 J1MJ2 | 53000 J | < 10 |
| RIMW-6 | | | 35 | < 10 | < 10 | 2.79 J2 | 2.83 J2 | 35 | < 10 | < 10 | < 10 | < 10 | < 10 | 3.18 J2 | < 10 |
| RIMW-7 | | | < 10 | < 10 | < 10 | < 10 | 1.07 J2 | 1.75 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | .58 J2 | < 10 |
| RIMW-8 | | | 47000 | < 2000 | < 2000 | 140 J2 | 7000 | 9000 | < 2000 | < 2000 | < 2000 | < 2000 | < 2000 | 19000 | < 2000 |
| RIMW-8-DUP | | | 47000 | < 2000 | < 2000 | 146 J2 | 7400 | 7200 | < 2000 | < 2000 | < 2000 | < 2000 | < 2000 | 19000 | < 2000 |
| RIMW-9 | | | < 10 | < 10 | < 10 | < 10 | 120 | 6.48 J2 | < 10 | < 10 | < 10 | < 10 | .26 J2B | < 10 | < 10 |
| RIMW-9-DUP | | | < 10 | < 10 | < 10 | < 10 | 110 | 5.07 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIPZ-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIPZ-3 | | | < 10 | < 10 | 1.31 J2 | 1.05 J2 | 27 | 96 | < 10 | < 10 | < 10 | < 10 | .71 J2 | 680 | < 10 |
| RIPZ-3-DUP | | | < 10 | < 10 | 1.3 J2 | 1.83 J2 | 27 | 97 | < 10 | < 10 | < 10 | < 10 | 1.03 J2 | 660 | < 10 |
| RITW-64 | | | < 10 | < 10 | < 10 | .75 J2 | 470 | 20 | < 10 | < 10 | < 10 | < 10 | 2.13 J2 | 199.6 J2 | < 10 |
| RITW-65 | | | 14 | < 10 | < 10 | 5.15 J2 | 560 | 180 J2 | < 10 | < 10 | < 10 | < 10 | 1.07 J2 | 19 | < 10 |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | VOCs | | | | | | | | | | | | | |
|----------|------------------------------|----------------------------|-----------------------|---------------------------|---------------------------------------|-----------------------|--------------------|--------------------|------------------------|------------------------|-----------------------------|-------------------|---------------------|--------------------|---------------------|------|
| | | | 1,1,1-Trichloroethane | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloro-1,2,2-trifluoroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethane | 1,1-Dichloroethene | 1,2,3-Trichlorobenzene | 1,2,4-Trichlorobenzene | 1,2-Dibromo-3-chloropropane | 1,2-Dibromoethane | 1,2-Dichlorobenzene | 1,2-Dichloroethane | 1,2-Dichloropropane | |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | |
| W-1 | | | 5.78 J2 | < 10 | < 10 | 1.37 J2 | 7.34 J2 | 24 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.17 J2 | < 10 |
| W-2 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| W-4 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .34 J2 | < 10 |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | VOCs | | | | | | | | | | | | | |
|------------|------------------------------|----------------------------|---------------------|---------------------|------------|------------|----------------------|---------|---------|--------------------|----------------------|-----------|--------------|------------------|----------------------|------|
| | | | 1,3-Dichlorobenzene | 1,4-Dichlorobenzene | 2-Butanone | 2-Hexanone | 4-Methyl-2-pentanone | Acetone | Benzene | Bromochloromethane | Bromodichloromethane | Bromoform | Bromomethane | Carbon disulfide | Carbon tetrachloride | |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| BP-1A | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .45 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| BP-1B | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .34 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| EW-1 | | | .42 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.94 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| EW-4 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 6.41 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-100 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .94 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-101 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.26 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-102 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-103 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-104 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-105 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.54 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-106 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.38 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-107 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-108 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-111 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-112 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-113A | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-113B | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-114 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-115A | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-115B | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .18 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-116 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 120 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-117 | | | .38 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 2.39 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-117-DUP | | | .35 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 2.43 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-118 | | | .46 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 23 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-119 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-120A | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-120B | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | VOCs | | | | | | | | | | | | |
|----------|------------------------------|----------------------------|---------------------|---------------------|------------|------------|----------------------|----------|----------|--------------------|----------------------|-----------|--------------|------------------|----------------------|
| | | | 1,3-Dichlorobenzene | 1,4-Dichlorobenzene | 2-Butanone | 2-Hexanone | 4-Methyl-2-pentanone | Acetone | Benzene | Bromochloromethane | Bromodichloromethane | Bromoform | Bromomethane | Carbon disulfide | Carbon tetrachloride |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| MW-121B | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-122B | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-123A | | | 101.5 J2 | 1300 | 190 J2 | 16.25 J2 | 51.25 J2 | 900 | 16.25 J2 | < 250 | < 250 | < 250 | < 250 | < 250 | < 250 |
| MW-123B | | | 110 | 1100 | 210 | 21 | 59 | 860 | 17 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| OB-109 | | | < 10 | < 10 | < 10 | < 10 | < 10 | 1.65 J2 | .66 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| OB-109B | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| OB-11 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 100 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| OB-110A | | | < 100 | < 100 | < 100 | < 100 | < 100 | < 100 | 33.9 J2 | < 100 | < 100 | < 100 | < 100 | < 100 | < 100 |
| OB-110B | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| OB-12 | | | < 10 | < 10 | < 10 | 12 | < 10 | 4.13 J2 | 36 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| OB-13 | | | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | 22000 | 18000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 |
| OB-21 | | | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | 306 J2 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 |
| OB-22 | | | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | 1050 J2 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 |
| OB-23 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 69 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| OB-8A | | | < 10 | .61 J2 | 550 | 55 | 900 | 810 | 20 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| OB-900 | | | < 10 | < 10 | < 10 | < 10 | < 10 | 9.82 J1M | 60 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| OB-901 | | | < 10 | < 10 | 6.02 J2 | < 10 | 2.62 J2 | 32 | 13 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| OB-902 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 2.88 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| P-1 | | | .52 J2 | 1.02 J2 | < 10 | < 10 | < 10 | < 10 | 1.08 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| P-2 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 91 J1M | < 10 | < 10 | < 10 | < 10 | 1.22 J2J1M | < 10 |
| P-3 | | | < 10 | .76 J2 | < 10 | < 10 | < 10 | < 10 | 1.5 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| PW-1 | | | .55 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| PW-2A | | | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | 54 J2 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 |
| RIMW-1 | | | .48 J2 | 1.07 J2 | < 10 | < 10 | < 10 | < 10 | 45 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-10 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-11 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 6.27 J2 | < 10 | < 10 | < 10 | < 10 |
| RIMW-12 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | VOCs | | | | | | | | | | | | |
|-------------|------------------------------|----------------------------|---------------------|---------------------|------------|------------|----------------------|----------|------------|--------------------|----------------------|-----------|--------------|------------------|----------------------|
| | | | 1,3-Dichlorobenzene | 1,4-Dichlorobenzene | 2-Butanone | 2-Hexanone | 4-Methyl-2-pentanone | Acetone | Benzene | Bromochloromethane | Bromodichloromethane | Bromoform | Bromomethane | Carbon disulfide | Carbon tetrachloride |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| RIMW-13 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-14 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-15 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.95 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-15-DUP | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.76 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-16 | | | < 10 | 1.05 J2 | < 10 | < 10 | 4.26 J2 | 3.53 J2J | 16 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-18 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 3.23 J2 | < 10 | < 10 | < 10 | < 10 |
| RIMW-18 | 44 | 56 | < 10 | < 10 | < 10 | < 10 | 5.23 J2 | < 10 | < 10 | < 10 | 3.77 J2 | < 10 | < 10 | < 10 | < 10 |
| RIMW-18 | 56 | 68 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 3.86 J2 | < 10 | < 10 | < 10 | < 10 |
| RIMW-19 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-19 | 63 | 75 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-19 | 76 | 88 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .36 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-3 | | | .37 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | 12 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-4 | | | .43 J2 | 1.43 J2 | < 10 | < 10 | < 10 | 2.33 J2 | 31 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-4-DUP | | | .38 J2 | .55 J2 | < 10 | < 10 | < 10 | < 10 | 30 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-5 | | | .49 J1MJ2 | 1.97 J1MJ2 | < 10 | < 10 | < 10 | < 10 | 5.27 J1MJ2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-5-DUP | | | .52 J1MJ2 | 2.72 J1MJ2 | < 10 | < 10 | < 10 | < 10 | 5.69 J1MJ2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-6 | | | < 10 | < 10 | < 10 | < 10 | 130 | 880 | 6.82 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-7 | | | .32 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-8 | | | < 2000 | < 2000 | 3200 | 178 J2 | 1810 J2 | 4400 | 58 J2 | < 2000 | < 2000 | < 2000 | < 2000 | < 2000 | < 2000 |
| RIMW-8-DUP | | | < 2000 | < 2000 | 3100 | 108 J2 | 1774 J2 | 4400 | 58 J2 | < 2000 | < 2000 | < 2000 | < 2000 | < 2000 | < 2000 |
| RIMW-9 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-9-DUP | | | < 10 | < 10 | < 10 | < 10 | < 10 | 1.32 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIPZ-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIPZ-3 | | | < 10 | < 10 | 12 | < 10 | < 10 | < 10 | 1.03 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIPZ-3-DUP | | | < 10 | .61 J2 | 12 | < 10 | < 10 | < 10 | 1.05 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RITW-64 | | | < 10 | .5 J2 | 8.52 J2 | < 10 | 20 | 75 | 25 | < 10 | 2.45 J2 | < 10 | < 10 | < 10 | < 10 |
| RITW-65 | | | < 10 | .69 J2 | 87 | < 10 | 74 | 130 | 14 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | VOCs | | | | | | | | | | | | |
|----------|------------------------------|----------------------------|---------------------|---------------------|------------|------------|----------------------|---------|---------|--------------------|----------------------|-----------|--------------|------------------|----------------------|
| | | | 1,3-Dichlorobenzene | 1,4-Dichlorobenzene | 2-Butanone | 2-Hexanone | 4-Methyl-2-pentanone | Acetone | Benzene | Bromochloromethane | Bromodichloromethane | Bromoform | Bromomethane | Carbon disulfide | Carbon tetrachloride |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| W-1 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| W-2 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| W-4 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | VOCs | | | | | | | | | | | | |
|------------|------------------------------|----------------------------|---------------|--------------|------------|---------------|------------------------|-------------------------|-------------|----------------------|-------------------------|--------------|------------------|----------------|-------------------------|
| | | | Chlorobenzene | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | cis-1,3-Dichloropropene | Cyclohexane | Dibromochloromethane | Dichlorodifluoromethane | Ethylbenzene | Isopropylbenzene | Methyl acetate | Methyl tert butyl ether |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| BP-1A | | | 1.02 J2 | < 10 | < 10 | < 10 | 39 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| BP-1B | | | 1.13 J2 | < 10 | .38 J2 | < 10 | 670 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| EW-1 | | | 71 | 31 | 1.29 J2 | < 10 | 148 J2 | < 10 | < 10 | < 10 | < 10 | .14 J2 | .72 J2 | < 10 | .52 J2 |
| EW-4 | | | 110 | 400 | < 10 | < 10 | 6.58 J2 | < 10 | < 10 | < 10 | < 10 | 140 | 7.4 J2 | < 10 | .41 J2 |
| MW-100 | | | .52 J2B | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-101 | | | .54 J2B | < 10 | < 10 | < 10 | 1.87 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-102 | | | < 10 | < 10 | 1.34 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-103 | | | < 10 | < 10 | < 10 | < 10 | .92 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-104 | | | < 10 | < 10 | < 10 | < 10 | 2.93 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | 2 J2 | < 10 | < 10 |
| MW-105 | | | .52 J2B | < 10 | .51 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-106 | | | .51 J2B | < 10 | .52 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-107 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-108 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-111 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-112 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-113A | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-113B | | | < 10 | < 10 | < 10 | < 10 | 41 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-114 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-115A | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-115B | | | < 10 | < 10 | < 10 | < 10 | 11 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-116 | | | < 10 | 5.1 J2 | < 10 | < 10 | 5.22 J2 | < 10 | 15 | < 10 | < 10 | 67 | 29 | < 10 | 35 |
| MW-117 | | | 6.62 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .21 J2 | 51 | < 10 | < 10 |
| MW-117-DUP | | | 6.69 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .2 J2 | 51 | < 10 | < 10 |
| MW-118 | | | 72 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .55 J2 | 4.16 J2 | < 10 | 13 |
| MW-119 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 6.45 J2 | < 10 | 2.14 J2 |
| MW-120A | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-120B | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | VOCs | | | | | | | | | | | | |
|----------|------------------------------|----------------------------|---------------|--------------|------------|---------------|------------------------|-------------------------|-------------|----------------------|-------------------------|--------------|------------------|----------------|-------------------------|
| | | | Chlorobenzene | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | cis-1,3-Dichloropropene | Cyclohexane | Dibromochloromethane | Dichlorodifluoromethane | Ethylbenzene | Isopropylbenzene | Methyl acetate | Methyl tert butyl ether |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| MW-121B | | | < 10 | < 10 | < 10 | < 10 | 1.75 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-122B | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-123A | | | 3000 | 42.5 J2 | < 250 | < 250 | 1100 | < 250 | < 250 | < 250 | < 250 | 4 J2 | < 250 | < 250 | < 250 |
| MW-123B | | | 3500 | 35 | 4.17 J2 | < 10 | 680 | < 10 | < 10 | < 10 | < 10 | 4.56 J2 | .95 J2 | < 10 | < 10 |
| OB-109 | | | < 10 | < 10 | < 10 | < 10 | 41 | < 10 | < 10 | < 10 | < 10 | < 10 | .38 J2 | < 10 | .58 J2 |
| OB-109B | | | < 10 | < 10 | 1.12 J2 | < 10 | 34 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| OB-11 | | | < 10 | < 10 | < 10 | < 10 | .45 J2 | < 10 | 7.7 J2 | < 10 | < 10 | 32 | 11 | < 10 | 80 |
| OB-110A | | | 70.4 J2 | 1300 | < 100 | < 100 | 7.2 J2 | < 100 | < 100 | < 100 | < 100 | 640 | 32.4 J2 | < 100 | < 100 |
| OB-110B | | | < 10 | < 10 | < 10 | < 10 | 2.55 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| OB-12 | | | < 10 | < 10 | < 10 | < 10 | .62 J2 | < 10 | 7.34 J2 | < 10 | < 10 | 14 | 5.43 J2 | < 10 | 43 |
| OB-13 | | | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | 63000 | < 10000 | < 10000 | 150000 J | 100000 | < 10000 | < 10000 |
| OB-21 | | | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | 770 J2 | < 1000 | < 1000 | 3100 | 2900 | < 1000 | 444 J2 |
| OB-22 | | | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | 46000 | 36000 | < 10000 | < 10000 |
| OB-23 | | | 1.45 J2 | 6.6 J2 | < 10 | < 10 | < 10 | < 10 | 15 | < 10 | < 10 | 91 | 41 | < 10 | 100 |
| OB-8A | | | 460 | 1300 | 2.05 J2 | 14 | 23 | < 10 | < 10 | < 10 | < 10 | 310 | 9.97 J2 | < 10 | 2.97 J2 |
| OB-900 | | | < 10 | < 10 | < 10 | < 10 | .57 J2 | < 10 | 19 | < 10 | < 10 | 4.1 J2 | 56 | < 10 | 8.7 J2 |
| OB-901 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 11 | 8.15 J2 | < 10 | .42 J2 |
| OB-902 | | | < 10 | < 10 | < 10 | < 10 | .39 J2 | < 10 | < 10 | < 10 | < 10 | 6.83 J2 | 17 | < 10 | < 10 |
| P-1 | | | 42 | 25 | 1.74 J2 | < 10 | 120 | < 10 | < 10 | < 10 | < 10 | .89 J2 | .23 J2 | < 10 | < 10 |
| P-2 | | | < 10 | 12 J1M | < 10 | < 10 | .47 J2J1M | < 10 | 150 J1M | < 10 | < 10 | 390 J1MJ | 220 J1MJ | < 10 | 250 J1M |
| P-3 | | | 68 | 31 | 5.11 J2 | < 10 | 205 J2 | < 10 | < 10 | < 10 | < 10 | .14 J2 | < 10 | < 10 | < 10 |
| PW-1 | | | < 10 | < 10 | < 10 | < 10 | 4.69 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| PW-2A | | | 14.5 J2 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | < 500 | 900 | 1300 | < 500 | 302 J2 |
| RIMW-1 | | | 20 | < 10 | 16 | < 10 | 3600 | < 10 | < 10 | < 10 | < 10 | .54 J2 | 2.58 J2 | < 10 | < 10 |
| RIMW-10 | | | < 10 | 11 | 19 | < 10 | 190 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-11 | | | .28 J2 | 46 | 16 | < 10 | 73 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-12 | | | < 10 | < 10 | < 10 | < 10 | 3.66 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | VOCs | | | | | | | | | | | | |
|-------------|------------------------------|----------------------------|---------------|--------------|------------|---------------|------------------------|-------------------------|-------------|----------------------|-------------------------|--------------|------------------|----------------|-------------------------|
| | | | Chlorobenzene | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | cis-1,3-Dichloropropene | Cyclohexane | Dibromochloromethane | Dichlorodifluoromethane | Ethylbenzene | Isopropylbenzene | Methyl acetate | Methyl tert butyl ether |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| RIMW-13 | | | < 10 | < 10 | < 10 | < 10 | 1.22 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-14 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-15 | | | < 10 | < 10 | < 10 | < 10 | 3000 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-15-DUP | | | < 10 | < 10 | < 10 | < 10 | 2800 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-16 | | | 5.2 J2 | < 10 | < 10 | 3.83 J2 | 11000 | < 10 | < 10 | < 10 | < 10 | 1.64 J2 | 3.28 J2 | < 10 | < 10 |
| RIMW-18 | | | < 10 | < 10 | 15 | < 10 | 2.64 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-18 | 44 | 56 | < 10 | < 10 | 19 | < 10 | 5.5 J2 | < 10 | < 10 | < 10 | < 10 | 1.78 J2 | < 10 | < 10 | < 10 |
| RIMW-18 | 56 | 68 | < 10 | < 10 | 19 | < 10 | 6.06 J2 | < 10 | < 10 | < 10 | < 10 | 1.15 J2 | < 10 | < 10 | < 10 |
| RIMW-19 | | | < 10 | < 10 | 1.99 J2 | < 10 | 69 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-19 | 63 | 75 | < 10 | < 10 | 2.18 J2 | < 10 | 70 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-19 | 76 | 88 | 3.76 J2 | 5.89 J2 | 2.07 J2 | < 10 | 50 | < 10 | < 10 | < 10 | < 10 | .34 J2 | < 10 | < 10 | < 10 |
| RIMW-3 | | | 1.28 J2 | 1.14 J2 | 3.24 J2 | < 10 | 151 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | .92 J2 | < 10 | < 10 |
| RIMW-4 | | | 110 | 31 | 21 | 3.95 J2 | 1100 | < 10 | 15 | < 10 | < 10 | < 10 | 27 | < 10 | 1.95 J2 |
| RIMW-4-DUP | | | 110 | 28 | 20 | < 10 | 1100 | < 10 | 15 | < 10 | < 10 | < 10 | 26 | < 10 | 1.92 J2 |
| RIMW-5 | | | 1.26 J1MJ2 | 8.33 J1MJ2 | 19 J1M | < 10 | 90 J1M | < 10 | < 10 | < 10 | < 10 | < 10 | 1.52 J1MJ2 | < 10 | < 10 |
| RIMW-5-DUP | | | 1.64 J1MJ2 | 8.74 J1MJ2 | 20 J1M | < 10 | 93 J1M | < 10 | < 10 | < 10 | < 10 | < 10 | 1.52 J1MJ2 | < 10 | < 10 |
| RIMW-6 | | | < 10 | < 10 | < 10 | < 10 | 13000 | < 10 | < 10 | < 10 | < 10 | 3.39 J2 | 2.64 J2 | < 10 | < 10 |
| RIMW-7 | | | < 10 | < 10 | < 10 | < 10 | 1.84 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-8 | | | 540 J2 | 3000 | 140 J2 | < 2000 | 1536 J2 | < 2000 | < 2000 | < 2000 | < 2000 | 3000 | 64 J2 | < 2000 | < 2000 |
| RIMW-8-DUP | | | 530 J2 | 2700 | 134 J2 | < 2000 | 1506 J2 | < 2000 | < 2000 | < 2000 | < 2000 | 3000 | 60 J2 | < 2000 | < 2000 |
| RIMW-9 | | | .58 J2B | < 10 | 3.98 J2 | < 10 | 20 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-9-DUP | | | .54 J2B | < 10 | 3.79 J2 | < 10 | 14 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIPZ-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIPZ-3 | | | 15 | 27 | 1.51 J2 | < 10 | 280 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIPZ-3-DUP | | | 15 | 27 | 1.59 J2 | < 10 | 290 | < 10 | < 10 | < 10 | < 10 | .21 J2 | < 10 | < 10 | < 10 |
| RITW-64 | | | 1.88 J2 | 7.1 J2 | 12.51 J2 | < 10 | 930 | < 10 | 2.23 J2 | < 10 | < 10 | 8.17 J2 | .42 J2 | < 10 | < 10 |
| RITW-65 | | | 2.35 J2 | 47 | 2.17 J2 | < 10 | 1000 | < 10 | < 10 | < 10 | < 10 | 25 | .89 J2 | < 10 | .55 J2 |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | VOCs | | | | | | | | | | | | |
|----------|------------------------------|----------------------------|---------------|--------------|------------|---------------|------------------------|-------------------------|-------------|----------------------|-------------------------|--------------|------------------|----------------|-------------------------|
| | | | Chlorobenzene | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | cis-1,3-Dichloropropene | Cyclohexane | Dibromochloromethane | Dichlorodifluoromethane | Ethylbenzene | Isopropylbenzene | Methyl acetate | Methyl tert butyl ether |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| W-1 | | | < 10 | < 10 | 1.72 J2 | < 10 | 31 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| W-2 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| W-4 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | VOCs | | | | | | | | | | |
|------------|------------------------------|----------------------------|-------------------|--------------------|---------|-------------------|---------|--------------------------|---------------------------|-----------------|------------------------|----------------|-----------------|
| | | | Methylcyclohexane | Methylene chloride | Styrene | Tetrachloroethene | Toluene | trans-1,2-Dichloroethene | trans-1,3-Dichloropropene | Trichloroethene | Trichlorofluoromethane | Vinyl chloride | Xylenes (Total) |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| BP-1A | | | < 10 | < 10 | < 10 | 1.37 J2 | .15 J2B | < 10 | < 10 | 9.07 J2 | < 10 | 1.4 J2 | < 10 |
| BP-1B | | | < 10 | < 10 | < 10 | 170 | .15 J2B | 7.82 J2 | < 10 | 620 | < 10 | 2.06 J2 | < 10 |
| EW-1 | | | 1.21 J2 | 3.39 J2 | < 10 | 44 J2 | .24 J2B | 1.22 J2 | < 10 | 130 | 1.55 J2 | 38 | < 10 |
| EW-4 | | | 3.95 J2 | 8.91 J2 | < 10 | 1.48 J2 | 540 | .57 J2 | < 10 | 2.5 J2 | < 10 | 14 | 280 |
| MW-100 | | | < 10 | < 10 | < 10 | < 10 | .12 J2B | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-101 | | | < 10 | < 10 | < 10 | < 10 | .18 J2B | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-102 | | | < 10 | < 10 | < 10 | .27 J2 | .23 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-103 | | | < 10 | < 10 | < 10 | .41 J2 | .15 J2B | < 10 | < 10 | 1.15 J2 | < 10 | < 10 | < 10 |
| MW-104 | | | 2.58 J2 | < 10 | < 10 | 1.64 J2 | .12 J2B | < 10 | < 10 | 1.79 J2 | < 10 | < 10 | < 10 |
| MW-105 | | | < 10 | < 10 | < 10 | < 10 | .16 J2B | < 10 | < 10 | .29 J2 | < 10 | < 10 | < 10 |
| MW-106 | | | < 10 | < 10 | < 10 | .29 J2 | .19 J2B | < 10 | < 10 | .23 J2 | < 10 | < 10 | < 10 |
| MW-107 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-108 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-111 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-112 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-113A | | | < 10 | < 10 | < 10 | < 10 | .14 J2B | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-113B | | | < 10 | < 10 | < 10 | 24 | .22 J2B | < 10 | < 10 | 16 | < 10 | < 10 | < 10 |
| MW-114 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-115A | | | < 10 | < 10 | < 10 | < 10 | .29 J2B | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-115B | | | < 10 | < 10 | < 10 | < 10 | .19 J2B | < 10 | < 10 | .34 J2 | < 10 | .49 J2 | < 10 |
| MW-116 | | | 34 | .88 J2 | < 10 | < 10 | 40 | < 10 | < 10 | < 10 | < 10 | 12 | 160 |
| MW-117 | | | 3.77 J2 | < 10 | < 10 | < 10 | .32 J2B | < 10 | < 10 | < 10 | < 10 | < 10 | .76 J2 |
| MW-117-DUP | | | 3.82 J2 | < 10 | < 10 | < 10 | .42 J2B | < 10 | < 10 | < 10 | < 10 | < 10 | .74 J2 |
| MW-118 | | | 1.96 J2 | < 10 | < 10 | < 10 | .3 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.47 J2 |
| MW-119 | | | 1.24 J2 | < 10 | < 10 | < 10 | .22 J2B | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-120A | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-120B | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | VOCs | | | | | | | | | | |
|----------|------------------------------|----------------------------|-------------------|--------------------|---------|-------------------|----------|--------------------------|---------------------------|-----------------|------------------------|----------------|-----------------|
| | | | Methylcyclohexane | Methylene chloride | Styrene | Tetrachloroethene | Toluene | trans-1,2-Dichloroethene | trans-1,3-Dichloropropene | Trichloroethene | Trichlorofluoromethane | Vinyl chloride | Xylenes (Total) |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| MW-121B | | | < 10 | < 10 | < 10 | .57 J2 | < 10 | < 10 | < 10 | 7.66 J2 | < 10 | < 10 | < 10 |
| MW-122B | | | < 10 | < 10 | < 10 | < 10 | .12 J2B | < 10 | < 10 | .25 J2 | < 10 | < 10 | < 10 |
| MW-123A | | | < 250 | 29.75 J2 | < 250 | < 250 | 96 J2 | < 250 | < 250 | 37 J2 | < 250 | 140 J2 | 17.75 J2 |
| MW-123B | | | 1.74 J2 | 12 | < 10 | 2.3 J2 | 90 | 5.82 J2 | < 10 | 130 | < 10 | 84 | 21 |
| OB-109 | | | < 10 | < 10 | < 10 | .31 J2 | .14 J2 | .72 J2 | < 10 | 15 | < 10 | 4.97 J2 | < 10 |
| OB-109B | | | < 10 | < 10 | < 10 | 210 | .16 J2 | .74 J2 | < 10 | 44 | < 10 | < 10 | < 10 |
| OB-11 | | | 16 | < 10 | < 10 | < 10 | 1 J2 | < 10 | < 10 | .32 J2 | < 10 | < 10 | 33 |
| OB-110A | | | 17.4 J2 | 29 J2 | < 100 | 6.9 J2 | 2500 | < 100 | < 100 | 3.9 J2 | < 100 | 34.4 J2 | 1700 |
| OB-110B | | | < 10 | < 10 | < 10 | < 10 | .42 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| OB-12 | | | 14 | < 10 | < 10 | < 10 | 4.15 J2 | < 10 | < 10 | .55 J2 | < 10 | < 10 | 250 |
| OB-13 | | | 200000 J | < 10000 | < 10000 | < 10000 | 2290 J2 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | 570000 J |
| OB-21 | | | 4000 | < 1000 | < 1000 | < 1000 | 401 J2 | < 1000 | < 1000 | < 1000 | < 1000 | < 1000 | 17000 |
| OB-22 | | | 19000 | < 10000 | < 10000 | < 10000 | 3080 J2 | < 10000 | < 10000 | < 10000 | < 10000 | < 10000 | 150000 |
| OB-23 | | | 43 | .37 J2 | < 10 | < 10 | 12 | < 10 | < 10 | .22 J2 | < 10 | .56 J2 | 170 |
| OB-8A | | | 4.56 J2 | 330 | < 10 | 19 | 5200 | 1 J2 | < 10 | 15 | 1.59 J2 | 24 | 1000 |
| OB-900 | | | 53 | < 10 | < 10 | < 10 | .96 J2B | < 10 | < 10 | < 10 | < 10 | < 10 | 3.33 J2 |
| OB-901 | | | 15 | < 10 | < 10 | < 10 | 1.66 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | 12 |
| OB-902 | | | 13 | < 10 | < 10 | < 10 | .36 J2B | < 10 | < 10 | < 10 | < 10 | < 10 | 5.2 J2 |
| P-1 | | | < 10 | 3.08 J2 | < 10 | 46 | 2.57 J2B | 1.63 J2 | < 10 | 84 | 2.2 J2 | 13 | 2.6 J2 |
| P-2 | | | 540 J1MJ | < 10 | < 10 | < 10 | 10 J1M | < 10 | < 10 | < 10 | < 10 | < 10 | 330 J1M |
| P-3 | | | < 10 | 2.6 J2 | < 10 | 150 | 1.51 J2B | 5.85 J2 | < 10 | 196.5 J2 | 7.18 J2 | 6.61 J2 | .69 J2 |
| PW-1 | | | < 10 | < 10 | < 10 | < 10 | .85 J2 | < 10 | < 10 | .55 J2 | < 10 | < 10 | < 10 |
| PW-2A | | | 136 J2 | < 500 | < 500 | < 500 | 51.5 J2 | < 500 | < 500 | < 500 | < 500 | < 500 | 5700 |
| RIMW-1 | | | 4.88 J2 | 24 | < 10 | 2600 | 1.3 J2 | 15 | < 10 | 14000 | < 10 | 34 | 3.18 J2 |
| RIMW-10 | | | < 10 | .96 J2 | < 10 | 96 | < 10 | .37 J2 | < 10 | 87 | < 10 | 7.26 J2 | < 10 |
| RIMW-11 | | | < 10 | .39 J2 | < 10 | 220 | < 10 | .4 J2 | < 10 | 31 | < 10 | < 10 | < 10 |
| RIMW-12 | | | < 10 | < 10 | < 10 | 1.88 J2 | .77 J2 | < 10 | < 10 | 1.42 J2 | < 10 | .45 J2 | < 10 |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | VOCs | | | | | | | | | | |
|-------------|------------------------------|----------------------------|-------------------|--------------------|---------|-------------------|-----------|--------------------------|---------------------------|-----------------|------------------------|----------------|-----------------|
| | | | Methylcyclohexane | Methylene chloride | Styrene | Tetrachloroethene | Toluene | trans-1,2-Dichloroethene | trans-1,3-Dichloropropene | Trichloroethene | Trichlorofluoromethane | Vinyl chloride | Xylenes (Total) |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| RIMW-13 | | | < 10 | < 10 | < 10 | < 10 | .12 J2B | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-14 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .22 J2 | < 10 | < 10 | < 10 |
| RIMW-15 | | | < 10 | < 10 | < 10 | 880 | 5.6 J2 | 13 | < 10 | 700 | < 10 | 166 J2 | < 10 |
| RIMW-15-DUP | | | < 10 | < 10 | < 10 | 710 | 5.25 J2 | 11 | < 10 | 610 | < 10 | 140 | < 10 |
| RIMW-16 | | | 15 | .92 J2 | < 10 | 13000 | 9.56 J2 | 32 | < 10 | 1900 | < 10 | 1100 | 10 |
| RIMW-18 | | | < 10 | .36 J2 | < 10 | 27 | .21 J2 | < 10 | < 10 | 2.05 J2 | < 10 | < 10 | < 10 |
| RIMW-18 | 44 | 56 | < 10 | < 10 | < 10 | 70 | 80 | < 10 | < 10 | 2.08 J2 | < 10 | < 10 | 3.48 J2 |
| RIMW-18 | 56 | 68 | < 10 | < 10 | < 10 | 93 | 36 | < 10 | < 10 | 2.32 J2 | < 10 | < 10 | 2.28 J2 |
| RIMW-19 | | | < 10 | < 10 | < 10 | 64 | .59 J2 | < 10 | < 10 | 48 | .83 J2 | < 10 | < 10 |
| RIMW-19 | 63 | 75 | < 10 | < 10 | < 10 | 85 | .86 J2 | < 10 | < 10 | 68 | 1.75 J2 | < 10 | < 10 |
| RIMW-19 | 76 | 88 | < 10 | < 10 | < 10 | 57 | 1.43 J2 | < 10 | < 10 | 42 | 2.72 J2 | .62 J2 | < 10 |
| RIMW-3 | | | 1.96 J2 | 12 | < 10 | 234 J2 | .46 J2 | 1.72 J2 | < 10 | 120 | < 10 | 18 | .77 J2 |
| RIMW-4 | | | 24 | 21 | < 10 | 245 J2 | 1.53 J2 | 33 | < 10 | 195 J2 | 29 | 67 | 1.11 J2 |
| RIMW-4-DUP | | | 25 | 20 | < 10 | 261 J2 | .93 J2 | 8.3 J2 | < 10 | 193 J2 | 25 | 66 | .61 J2 |
| RIMW-5 | | | < 10 | 7.59 J1MJ2 | < 10 | 55 J1M | .21 J1MJ2 | 1.2 J1MJ2 | < 10 | 83 J1M | 8.51 J1MJ2 | 7.15 J1MJ2 | < 10 |
| RIMW-5-DUP | | | < 10 | 8.06 J1MJ2 | < 10 | 56 J1M | .2 J1MJ2 | 2.3 J1MJ2 | < 10 | 88 J1M | 9.12 J1MJ2 | 7.86 J1MJ2 | < 10 |
| RIMW-6 | | | 4.12 J2 | .97 J2 | < 10 | 880 | 75 | 49 | < 10 | 710 | < 10 | 1200 | 9.79 J2 |
| RIMW-7 | | | < 10 | < 10 | < 10 | 24 | .14 J2B | < 10 | < 10 | 2.58 J2 | < 10 | < 10 | < 10 |
| RIMW-8 | | | < 2000 | 3700 | < 2000 | 960 J2 | 52000 | < 2000 | < 2000 | 580 J2 | 354 J2 | 844 J2B | 11000 |
| RIMW-8-DUP | | | < 2000 | 3700 | < 2000 | 892 J2 | 52000 | < 2000 | < 2000 | 582 J2 | 344 J2 | 824 J2B | 11000 |
| RIMW-9 | | | < 10 | < 10 | < 10 | 70 | .16 J2B | < 10 | < 10 | 23 | < 10 | < 10 | < 10 |
| RIMW-9-DUP | | | < 10 | < 10 | < 10 | 66 | .17 J2B | < 10 | < 10 | 17 | < 10 | < 10 | < 10 |
| RIPZ-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIPZ-3 | | | < 10 | 1.36 J2 | < 10 | 220 | .29 J2 | .53 J2 | < 10 | 340 | < 10 | 4.39 J2 | < 10 |
| RIPZ-3-DUP | | | < 10 | 1.42 J2 | < 10 | 220 | < 10 | .65 J2 | < 10 | 330 | < 10 | 4.36 J2 | .93 J2 |
| RITW-64 | | | 9.38 J2 | 16 | < 10 | 1300 | 380 | 22 | < 10 | 820 | < 10 | 13 | 23 |
| RITW-65 | | | < 10 | 3.13 J2 | < 10 | 5500 | 820 | 6.88 J2 | < 10 | 246 J2 | < 10 | 1.08 J2 | 81 |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | VOCs | | | | | | | | | | |
|----------|------------------------------|----------------------------|-------------------|--------------------|---------|-------------------|---------|--------------------------|---------------------------|-----------------|------------------------|----------------|-----------------|
| | | | Methylcyclohexane | Methylene chloride | Styrene | Tetrachloroethene | Toluene | trans-1,2-Dichloroethene | trans-1,3-Dichloropropene | Trichloroethene | Trichlorofluoromethane | Vinyl chloride | Xylenes (Total) |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| W-1 | | | < 10 | < 10 | < 10 | 160 | < 10 | < 10 | < 10 | 17 | < 10 | < 10 | < 10 |
| W-2 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| W-4 | | | < 10 | < 10 | < 10 | < 10 | .11 J2B | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | SVOC | | | | | | | | | | | | | | | | | | | | | | | |
|------------|------------------------------|----------------------------|----------------------------|-----------------------|-----------------------|--------------------|--------------------|-------------------|--------------------|--------------------|---------------------|----------------|---------------------|----------------|----------------|---------------|------------------------|------------------|----------------|----------------------|----------------------------|-----------------|-----------------------------|----------------|---------------|------|
| | | | 1,2,4,5-Tetrachlorobenzene | 2,4,5-Trichlorophenol | 2,4,6-Trichlorophenol | 2,4-Dichlorophenol | 2,4-Dimethylphenol | 2,4-Dinitrophenol | 2,4-Dinitrotoluene | 2,6-Dinitrotoluene | 2-Chloronaphthalene | 2-Chlorophenol | 2-Methylnaphthalene | 2-Methylphenol | 2-Nitroaniline | 2-Nitrophenol | 3,3'-Dichlorobenzidine | 3+4-Methylphenol | 3-Nitroaniline | 4,6-Dinitro-o-cresol | 4-Bromophenyl phenyl ether | 4-Chloroaniline | 4-Chlorophenyl phenyl ether | 4-Nitroaniline | 4-Nitrophenol | |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| BP-1A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| BP-1B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| EW-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| EW-4 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-100 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-101 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-102 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-103 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-104 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-105 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-106 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-107 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-108 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-111 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-112 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-113A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-113B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-114 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-115A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-115B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-116 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-117 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-117-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-118 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-119 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-120A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-120B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | SVOC | | | | | | | | | | | | | | | | | | | | | | | |
|----------|------------------------------|----------------------------|----------------------------|-----------------------|-----------------------|--------------------|--------------------|-------------------|--------------------|--------------------|---------------------|----------------|---------------------|----------------|----------------|---------------|------------------------|------------------|----------------|----------------------|----------------------------|-----------------|-----------------------------|----------------|---------------|------|
| | | | 1,2,4,5-Tetrachlorobenzene | 2,4,5-Trichlorophenol | 2,4,6-Trichlorophenol | 2,4-Dichlorophenol | 2,4-Dimethylphenol | 2,4-Dinitrophenol | 2,4-Dinitrotoluene | 2,6-Dinitrotoluene | 2-Chloronaphthalene | 2-Chlorophenol | 2-Methylnaphthalene | 2-Methylphenol | 2-Nitroaniline | 2-Nitrophenol | 3,3'-Dichlorobenzidine | 3+4-Methylphenol | 3-Nitroaniline | 4,6-Dinitro-o-cresol | 4-Bromophenyl phenyl ether | 4-Chloroaniline | 4-Chlorophenyl phenyl ether | 4-Nitroaniline | 4-Nitrophenol | |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| MW-121B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| MW-122B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-123A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-123B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-109 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-109B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-11 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-110A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-110B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-12 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-13 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-21 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-22 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-23 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-8A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-900 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-901 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-902 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| P-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| P-2 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| P-3 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| PW-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| PW-2A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-1 | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 25 | |
| RIMW-10 | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 25 | |
| RIMW-11 | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 25 | |
| RIMW-12 | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 25 | |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | SVOC | | | | | | | | | | | | | | | | | | | | | | | |
|-------------|------------------------------|----------------------------|----------------------------|-----------------------|-----------------------|--------------------|--------------------|-------------------|--------------------|--------------------|---------------------|----------------|---------------------|----------------|----------------|---------------|------------------------|------------------|----------------|----------------------|----------------------------|-----------------|-----------------------------|----------------|---------------|------|
| | | | 1,2,4,5-Tetrachlorobenzene | 2,4,5-Trichlorophenol | 2,4,6-Trichlorophenol | 2,4-Dichlorophenol | 2,4-Dimethylphenol | 2,4-Dinitrophenol | 2,4-Dinitrotoluene | 2,6-Dinitrotoluene | 2-Chloronaphthalene | 2-Chlorophenol | 2-Methylnaphthalene | 2-Methylphenol | 2-Nitroaniline | 2-Nitrophenol | 3,3'-Dichlorobenzidine | 3+4-Methylphenol | 3-Nitroaniline | 4,6-Dinitro-o-cresol | 4-Bromophenyl phenyl ether | 4-Chloroaniline | 4-Chlorophenyl phenyl ether | 4-Nitroaniline | 4-Nitrophenol | |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| RIMW-13 | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | | |
| RIMW-14 | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | | |
| RIMW-15 | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | | |
| RIMW-15-DUP | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | | |
| RIMW-16 | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | | |
| RIMW-18 | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | | |
| RIMW-18 | 44 | 56 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | | |
| RIMW-18 | 56 | 68 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | | |
| RIMW-19 | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | | |
| RIMW-19 | 63 | 75 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | | |
| RIMW-19 | 76 | 88 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | | |
| RIMW-3 | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | | |
| RIMW-4 | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | | |
| RIMW-4-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | | |
| RIMW-5 | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | | |
| RIMW-5-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | | |
| RIMW-6 | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | | |
| RIMW-7 | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | | |
| RIMW-8 | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | 150 | < 10 | 91 | < 25 | < 10 | < 10 | 52 | < 25 | < 25 | < 10 | 30 | < 10 | < 25 | < 25 |
| RIMW-8-DUP | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | 140 | < 10 | 86 | < 25 | < 10 | < 10 | 53 | < 25 | < 25 | < 10 | 40 | < 10 | < 25 | < 25 |
| RIMW-9 | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | | |
| RIMW-9-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | | |
| RIPZ-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | | |
| RIPZ-3 | | | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | < 10 | < 10 | < 10 | < 25 | < 25 | | |
| RIPZ-3-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | | |
| RITW-64 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | | |
| RITW-65 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | | |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | SVOC | | | | | | | | | | | | | | | | | | | | | | | |
|----------|------------------------------|----------------------------|----------------------------|-----------------------|-----------------------|--------------------|--------------------|-------------------|--------------------|--------------------|---------------------|----------------|---------------------|----------------|----------------|---------------|------------------------|------------------|----------------|----------------------|----------------------------|-----------------|-----------------------------|----------------|---------------|------|
| | | | 1,2,4,5-Tetrachlorobenzene | 2,4,5-Trichlorophenol | 2,4,6-Trichlorophenol | 2,4-Dichlorophenol | 2,4-Dimethylphenol | 2,4-Dinitrophenol | 2,4-Dinitrotoluene | 2,6-Dinitrotoluene | 2-Chloronaphthalene | 2-Chlorophenol | 2-Methylnaphthalene | 2-Methylphenol | 2-Nitroaniline | 2-Nitrophenol | 3,3'-Dichlorobenzidine | 3+4-Methylphenol | 3-Nitroaniline | 4,6-Dinitro-o-cresol | 4-Bromophenyl phenyl ether | 4-Chloroaniline | 4-Chlorophenyl phenyl ether | 4-Nitroaniline | 4-Nitrophenol | |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| W-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| W-2 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| W-4 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | SVOC | | | | | | | | | | | | | | | | | | | | | | | |
|------------|------------------------------|----------------------------|--------------|----------------|--------------|------------|----------|--------------|--------------------|----------------|----------------------|--------------------|----------------------|----------|----------------------------|-------------------------|------------------------------|----------------------------|------------------------|-------------|-----------|----------|------------------------|--------------|-------------------|------|
| | | | Acenaphthene | Acenaphthylene | Acetophenone | Anthracene | Atrazine | Benzaldehyde | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(ghi)perylene | Benzo(k)fluoranthene | Biphenyl | Bis(2-chloroethoxy)methane | Bis(2-chloroethyl)ether | Bis(2-chloroisopropyl) ether | Bis(2-ethylhexyl)phthalate | Butyl benzyl phthalate | Caprolactam | Carbazole | Chrysene | Dibenzo(a,h)anthracene | Dibenzofuran | Diethyl phthalate | |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| BP-1A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| BP-1B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| EW-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| EW-4 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-100 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-101 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-102 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-103 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-104 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-105 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-106 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-107 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-108 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-111 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-112 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-113A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-113B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-114 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-115A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-115B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-116 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-117 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-117-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-118 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-119 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-120A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-120B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | SVOC | | | | | | | | | | | | | | | | | | | | | | | |
|----------|------------------------------|----------------------------|--------------|----------------|--------------|------------|----------|--------------|--------------------|----------------|----------------------|--------------------|----------------------|----------|----------------------------|-------------------------|------------------------------|----------------------------|------------------------|-------------|-----------|----------|------------------------|--------------|-------------------|------|
| | | | Acenaphthene | Acenaphthylene | Acetophenone | Anthracene | Atrazine | Benzaldehyde | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(ghi)perylene | Benzo(k)fluoranthene | Biphenyl | Bis(2-chloroethoxy)methane | Bis(2-chloroethyl)ether | Bis(2-chloroisopropyl) ether | Bis(2-ethylhexyl)phthalate | Butyl benzyl phthalate | Caprolactam | Carbazole | Chrysene | Dibenzo(a,h)anthracene | Dibenzofuran | Diethyl phthalate | |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| MW-121B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| MW-122B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-123A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-123B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-109 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-109B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-11 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-110A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-110B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-12 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-13 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-21 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-22 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-23 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-8A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-900 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-901 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-902 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| P-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| P-2 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| P-3 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| PW-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| PW-2A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-1 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | |
| RIMW-10 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | |
| RIMW-11 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | |
| RIMW-12 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | SVOC | | | | | | | | | | | | | | | | | | | | | | |
|-------------|------------------------------|----------------------------|--------------|----------------|--------------|------------|----------|--------------|--------------------|----------------|----------------------|--------------------|----------------------|----------|----------------------------|-------------------------|------------------------------|----------------------------|------------------------|-------------|-----------|----------|------------------------|--------------|-------------------|
| | | | Acenaphthene | Acenaphthylene | Acetophenone | Anthracene | Atrazine | Benzaldehyde | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(ghi)perylene | Benzo(k)fluoranthene | Biphenyl | Bis(2-chloroethoxy)methane | Bis(2-chloroethyl)ether | Bis(2-chloroisopropyl) ether | Bis(2-ethylhexyl)phthalate | Butyl benzyl phthalate | Caprolactam | Carbazole | Chrysene | Dibenzo(a,h)anthracene | Dibenzofuran | Diethyl phthalate |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| RIMW-13 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 7 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-14 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-15 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-15-DUP | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-16 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-18 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-18 | 44 | 56 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-18 | 56 | 68 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-19 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-19 | 63 | 75 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-19 | 76 | 88 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-3 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-4 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 6.1 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-4-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-5 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-5-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-6 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-7 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-8 | | | < 10 | < 10 | 60 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 10 | 22 | < 10 | < 10 | < 10 | < 10 | < 10 | 7.1 J2 |
| RIMW-8-DUP | | | < 10 | < 10 | 60 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 19 | 50 | < 10 | < 10 | < 10 | < 10 | < 10 | 6.6 J2 |
| RIMW-9 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-9-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIPZ-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIPZ-3 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIPZ-3-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RITW-64 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RITW-65 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | SVOC | | | | | | | | | | | | | | | | | | | | | | |
|----------|------------------------------|----------------------------|--------------|----------------|--------------|------------|----------|--------------|--------------------|----------------|----------------------|--------------------|----------------------|----------|-----------------------------|-------------------------|------------------------------|----------------------------|------------------------|-------------|-----------|----------|------------------------|--------------|-------------------|
| | | | Acenaphthene | Acenaphthylene | Acetophenone | Anthracene | Atrazine | Benzaldehyde | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(ghi)perylene | Benzo(k)fluoranthene | Biphenyl | Bis(2-chloroethoxy) methane | Bis(2-chloroethyl)ether | Bis(2-chloroisopropyl) ether | Bis(2-ethylhexyl)phthalate | Butyl benzyl phthalate | Caprolactam | Carbazole | Chrysene | Dibenzo(a,h)anthracene | Dibenzofuran | Diethyl phthalate |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| W-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| W-2 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| W-4 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | SVOCs | | | | | | | | | | | | | | | | | | | | |
|------------|------------------------------|----------------------------|--------------------|---------------------|---------------------|--------------|----------|-------------------|---------------------|---------------------------|------------------|------------------------|------------|-------------|----------|--------------|---------------------------|-------------------|-------------------|--------------|--------|--------|------|
| | | | Dimethyl phthalate | Di-n-butylphthalate | Di-n-octylphthalate | Fluoranthene | Fluorene | Hexachlorobenzene | Hexachlorobutadiene | Hexachlorocyclopentadiene | Hexachloroethane | Indeno(1,2,3-cd)pyrene | Isophorone | Naphthalene | NDPA/DPA | Nitrobenzene | n-Nitrosodi-n-propylamine | p-Chloro-m-cresol | Pentachlorophenol | Phenanthrene | Phenol | Pyrene | |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| BP-1A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| BP-1B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| EW-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| EW-4 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-100 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-101 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-102 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-103 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-104 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-105 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-106 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-107 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-108 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-111 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-112 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-113A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-113B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-114 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-115A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-115B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-116 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-117 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-117-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-118 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-119 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-120A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-120B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | SVOCs | | | | | | | | | | | | | | | | | | | | |
|----------|------------------------------|----------------------------|--------------------|---------------------|---------------------|--------------|----------|-------------------|---------------------|---------------------------|------------------|------------------------|------------|-------------|----------|--------------|---------------------------|-------------------|-------------------|--------------|--------|--------|------|
| | | | Dimethyl phthalate | Di-n-butylphthalate | Di-n-octylphthalate | Fluoranthene | Fluorene | Hexachlorobenzene | Hexachlorobutadiene | Hexachlorocyclopentadiene | Hexachloroethane | Indeno(1,2,3-cd)pyrene | Isophorone | Naphthalene | NDPA/DPA | Nitrobenzene | n-Nitrosodi-n-propylamine | p-Chloro-m-cresol | Pentachlorophenol | Phenanthrene | Phenol | Pyrene | |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| MW-121B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| MW-122B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-123A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-123B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-109 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-109B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-11 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-110A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-110B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-12 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-13 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-21 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-22 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-23 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-8A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-900 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-901 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-902 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| P-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| P-2 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| P-3 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| PW-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| PW-2A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-1 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | |
| RIMW-10 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | |
| RIMW-11 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | |
| RIMW-12 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 25 | < 10 | < 10 | < 10 | |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | SVOCs | | | | | | | | | | | | | | | | | | | |
|-------------|------------------------------|----------------------------|--------------------|---------------------|---------------------|--------------|----------|-------------------|---------------------|---------------------------|------------------|------------------------|------------|-------------|----------|--------------|---------------------------|-------------------|-------------------|--------------|--------|--------|
| | | | Dimethyl phthalate | Di-n-butylphthalate | Di-n-octylphthalate | Fluoranthene | Fluorene | Hexachlorobenzene | Hexachlorobutadiene | Hexachlorocyclopentadiene | Hexachloroethane | Indeno(1,2,3-cd)pyrene | Isophorone | Naphthalene | NDPA/DPA | Nitrobenzene | n-Nitrosodi-n-propylamine | p-Chloro-m-cresol | Pentachlorophenol | Phenanthrene | Phenol | Pyrene |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| RIMW-13 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-14 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-15 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-15-DUP | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-16 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-18 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-18 | 44 | 56 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-18 | 56 | 68 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-19 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-19 | 63 | 75 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-19 | 76 | 88 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-3 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-4 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-4-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-5 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-5-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-6 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 9.1 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-7 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-8 | | | 19 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 16 | 33 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 44 |
| RIMW-8-DUP | | | 19 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 17 | 28 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 44 |
| RIMW-9 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-9-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIPZ-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIPZ-3 | | | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIPZ-3-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RITW-64 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RITW-65 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | SVOCs | | | | | | | | | | | | | | | | | | | |
|----------|------------------------------|----------------------------|--------------------|---------------------|---------------------|--------------|----------|-------------------|---------------------|---------------------------|------------------|------------------------|------------|-------------|----------|--------------|---------------------------|-------------------|-------------------|--------------|--------|--------|
| | | | Dimethyl phthalate | Di-n-butylphthalate | Di-n-octylphthalate | Fluoranthene | Fluorene | Hexachlorobenzene | Hexachlorobutadiene | Hexachlorocyclopentadiene | Hexachloroethane | Indeno(1,2,3-cd)pyrene | Isophorone | Naphthalene | NDPA/DPA | Nitrobenzene | n-Nitrosodi-n-propylamine | p-Chloro-m-cresol | Pentachlorophenol | Phenanthrene | Phenol | Pyrene |
| | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| W-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| W-2 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| W-4 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | Inorganic | | | | | | | | | | | | | | | |
|------------|------------------------------|----------------------------|-----------|----------|---------|--------|-----------|---------|---------|----------|--------|--------|------|------|-----------|-----------|---------|--------|
| | | | Aluminum | Antimony | Arsenic | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Iron | Lead | Magnesium | Manganese | Mercury | Nickel |
| | | | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| BP-1A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| BP-1B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| EW-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| EW-4 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-100 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-101 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-102 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-103 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-104 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-105 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-106 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-107 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-108 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-111 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-112 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-113A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-113B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-114 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-115A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-115B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-116 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-117 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-117-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-118 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-119 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-120A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-120B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | Inorganic | | | | | | | | | | | | | | | |
|----------|------------------------------|----------------------------|-----------|----------|---------|--------|-----------|---------|---------|----------|---------|--------|---------|-------|-----------|-----------|------------|----------|
| | | | Aluminum | Antimony | Arsenic | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Iron | Lead | Magnesium | Manganese | Mercury | Nickel |
| | | | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| MW-121B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-122B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-123A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-123B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-109 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-109B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-11 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-110A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-110B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-12 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-13 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-21 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-22 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-23 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-8A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-900 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-901 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-902 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| P-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| P-2 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| P-3 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| PW-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| PW-2A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-1 | | | .051 J2B | < .05 | < .01 | 0.02 | .0005 J2B | < .005 | 54 | < .01 | .018 J2 | < .02 | 1 | < .01 | 22 | 6.1 | < .0002 | .016 J2 |
| RIMW-10 | | | .1 J2 | < .05 | < .01 | 0.15 | < .005 | < .005 | 64 | < .01 | < .05 | < .02 | 0.1 | < .01 | 25 | 0.42 | .000057 J2 | .017 J2B |
| RIMW-11 | | | .053 J2 | < .05 | < .01 | 0.02 | < .005 | < .005 | 37 | < .01 | < .05 | < .02 | .037 J2 | < .01 | 19 | 0.032 | < .0002 | .007 J2B |
| RIMW-12 | | | .14 J2 | < .05 | < .01 | 0.03 | < .005 | < .005 | 33 | < .01 | < .05 | < .02 | .088 J2 | < .01 | 16 | 0.04 | < .0002 | .004 J2B |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | Inorganic | | | | | | | | | | | | | | | |
|-------------|------------------------------|----------------------------|-----------|----------|---------|----------|-----------|---------|---------|----------|----------|----------|---------|-------|-----------|-----------|------------|-----------|
| | | | Aluminum | Antimony | Arsenic | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Iron | Lead | Magnesium | Manganese | Mercury | Nickel |
| | | | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| RIMW-13 | | | 0.2 | < .05 | < .01 | .009 J2 | .0006 J2 | < .005 | 38 | < .01 | < .05 | < .02 | 0.2 | < .01 | 11 | 0.047 | .000051 J2 | < .02 |
| RIMW-14 | | | .14 J2B | < .05 | < .01 | .0094 J2 | .0005 J2B | < .005 | 51 | < .01 | < .05 | < .02 | .085 J2 | < .01 | 20 | 0.029 | < .0002 | < .02 |
| RIMW-15 | | | .14 J2B | < .05 | < .01 | 0.03 | .0008 J2 | < .005 | 35 | < .01 | < .05 | < .02 | .097 J2 | < .01 | 18 | 0.098 | < .0002 | < .02 |
| RIMW-15-DUP | | | .16 J2 | < .05 | < .01 | 0.03 | .0006 J2 | < .005 | 37 | < .01 | < .05 | < .02 | 0.1 | < .01 | 19 | 0.11 | .000071 J2 | < .02 |
| RIMW-16 | | | 0.2 | < .05 | < .01 | 0.03 | .0005 J2 | < .005 | 62 | < .01 | .02 J2 | < .02 | 0.2 | < .01 | 40 | 2.4 | < .0002 | 0.05 |
| RIMW-18 | | | 1.4 | < .05 | < .01 | 0.02 | < .005 | < .005 | 35 | .0058 J2 | < .05 | .005 J2 | 1.4 | < .01 | 8.2 | 0.046 | < .0002 | < .02 |
| RIMW-18 | 44 | 56 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-18 | 56 | 68 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-19 | | | .041 J2B | < .05 | < .01 | .0052 J2 | .0007 J2B | < .005 | 36 | < .01 | < .05 | < .02 | < .1 | < .01 | 17 | .022 J2B | < .0002 | .0054 J2 |
| RIMW-19 | 63 | 75 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-19 | 76 | 88 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-3 | | | .067 J2B | < .05 | < .01 | 0.02 | .0005 J2B | < .005 | 51 | < .01 | .021 J2 | < .02 | .043 J2 | < .01 | 24 | 0.7 | < .0002 | .013 J2 |
| RIMW-4 | | | .047 J2B | < .05 | < .01 | 0.08 | .0005 J2B | < .005 | 140 | < .01 | .012 J2 | < .02 | .023 J2 | < .01 | 63 | 0.39 | .000055 J2 | .0077 J2 |
| RIMW-4-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-5 | | | .038 J2B | < .05 | < .01 | 0.02 | .0005 J2B | < .005 | 57 | < .01 | .011 J2 | < .02 | < .1 | < .01 | 30 | 0.55 | < .0002 | .01 J2 |
| RIMW-5-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-6 | | | .098 J2B | < .05 | < .01 | 0.08 | .0005 J2 | < .005 | 120 | < .01 | .1 J2 | < .02 | 6.9 | < .01 | 75 | 6 | < .0002 | .017 J2B |
| RIMW-7 | | | .045 J2B | < .05 | < .01 | 0.02 | .0005 J2 | < .005 | 38 | < .01 | < .05 | < .02 | < .1 | < .01 | 20 | 0.14 | < .0002 | < .02 |
| RIMW-8 | | | .06 J2B | < .05 | < .01 | 0.08 | .0006 J2B | < .005 | 100 | < .01 | 0.12 | .01 J2 | 13 | < .01 | 34 | 12 | < .0002 | 0.04 |
| RIMW-8-DUP | | | .15 J2B | < .05 | < .01 | 0.08 | .0005 J2B | < .005 | 100 | < .01 | 0.12 | .011 J2 | 12 | < .01 | 34 | 12 | < .0002 | 0.04 |
| RIMW-9 | | | 0.6 | < .05 | < .01 | 0.04 | < .005 | < .005 | 28 | < .01 | < .05 | .0043 J2 | 0.5 | < .01 | 14 | 0.052 | < .0002 | < .02 |
| RIMW-9-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIPZ-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIPZ-3 | | | .061 J2B | < .05 | < .01 | 0.03 | .0005 J2 | < .005 | 59 | < .01 | .0059 J2 | < .02 | 0.4 | < .01 | 20 | 1.1 | < .0002 | .0042 J2B |
| RIPZ-3-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RITW-64 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RITW-65 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | Inorganic | | | | | | | | | | | | | | | |
|----------|------------------------------|----------------------------|-----------|----------|---------|--------|-----------|---------|---------|----------|--------|--------|------|------|-----------|-----------|---------|--------|
| | | | Aluminum | Antimony | Arsenic | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Iron | Lead | Magnesium | Manganese | Mercury | Nickel |
| | | | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| W-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| W-2 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| W-4 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | Inorganics | | | | | | | Other | | | |
|------------|------------------------------|----------------------------|------------|----------|--------|--------|----------|----------|------|--------------------------|---------|--------|--------|
| | | | Potassium | Selenium | Silver | Sodium | Thallium | Vanadium | Zinc | Dissolved Organic Carbon | Methane | Ethene | Ethane |
| | | | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ug/L | ug/L | ug/L |
| BP-1A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| BP-1B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| EW-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| EW-4 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-100 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-101 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-102 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-103 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-104 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-105 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-106 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-107 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-108 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-111 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-112 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-113A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-113B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-114 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-115A | | | NA | NA | NA | NA | NA | NA | NA | 2 | 1.8 | 0.2 | 0.065 |
| MW-115B | | | NA | NA | NA | NA | NA | NA | NA | 2 | 22 | 0.24 | 0.1 |
| MW-116 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-117 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-117-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-118 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-119 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-120A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-120B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | Inorganics | | | | | | | Other | | | |
|----------|------------------------------|----------------------------|------------|----------|--------|--------|-----------|----------|-----------|--------------------------|---------|--------|--------|
| | | | Potassium | Selenium | Silver | Sodium | Thallium | Vanadium | Zinc | Dissolved Organic Carbon | Methane | Ethene | Ethane |
| | | | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ug/L | ug/L | ug/L |
| MW-121B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-122B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-123A | | | NA | NA | NA | NA | NA | NA | NA | 442 | 4700 | 7100 | 27 |
| MW-123B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-109 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-109B | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-11 | | | NA | NA | NA | NA | NA | NA | NA | 52 | 15000 | 0.048 | 0.31 |
| OB-110A | | | NA | NA | NA | NA | NA | NA | NA | 11 | 5000 | 2400 | 110 |
| OB-110B | | | NA | NA | NA | NA | NA | NA | NA | 5 | 22 | 1.9 | 0.16 |
| OB-12 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-13 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-21 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-22 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-23 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-8A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-900 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-901 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| OB-902 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| P-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| P-2 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| P-3 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| PW-1 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| PW-2A | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-1 | | | 1.8 | .028 J2 | < .01 | 17 | .001 J2B | < .05 | .0075 J2B | NA | NA | NA | NA |
| RIMW-10 | | | 0.7 | .023 J2 | < .01 | 34 | < .025 | .0081 J2 | < .02 | NA | NA | NA | NA |
| RIMW-11 | | | 1.1 | < .035 | < .01 | 25 | .00089 J2 | .0037 J2 | .0046 J2B | NA | NA | NA | NA |
| RIMW-12 | | | 1.6 | < .035 | < .01 | 18 | .00081 J2 | .0047 J2 | 0.03 | NA | NA | NA | NA |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | Inorganics | | | | | | | Other | | | |
|-------------|------------------------------|----------------------------|------------|----------|--------|--------|------------|----------|-----------|--------------------------|---------|--------|--------|
| | | | Potassium | Selenium | Silver | Sodium | Thallium | Vanadium | Zinc | Dissolved Organic Carbon | Methane | Ethene | Ethane |
| | | | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ug/L | ug/L | ug/L |
| RIMW-13 | | | 1.2 | .027 J2 | < .01 | 17 | < .025 | < .05 | .005 J2B | NA | NA | NA | NA |
| RIMW-14 | | | 1.1 | .025 J2 | < .01 | 16 | < .025 | < .05 | .014 J2B | 2 | 4.2 | 1.3 | <.025 |
| RIMW-15 | | | 1.6 | .026 J2 | < .01 | 13 | < .025 | .012 J2 | < .02 | 1 | 23 | 1.6 | 1.9 |
| RIMW-15-DUP | | | 1.7 | .022 J2 | < .01 | 14 | .00082 J2B | .012 J2 | < .02 | NA | NA | NA | NA |
| RIMW-16 | | | 1.5 | .026 J2 | < .01 | 26 | < .025 | .0085 J2 | < .02 | NA | NA | NA | NA |
| RIMW-18 | | | 1.9 | .021 J2 | < .01 | 29 | < .025 | .0055 J2 | .0093 J2B | NA | NA | NA | NA |
| RIMW-18 | 44 | 56 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-18 | 56 | 68 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-19 | | | 1.4 | .026 J2 | < .01 | 16 | < .025 | .013 J2 | .0051 J2B | NA | NA | NA | NA |
| RIMW-19 | 63 | 75 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-19 | 76 | 88 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-3 | | | 1.1 | .024 J2 | < .01 | 16 | < .025 | .0039 J2 | .0047 J2B | NA | NA | NA | NA |
| RIMW-4 | | | 1.7 | .028 J2 | < .01 | 36 | .00072 J2B | .011 J2 | .009 J2B | NA | NA | NA | NA |
| RIMW-4-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-5 | | | 1.6 | .024 J2 | < .01 | 19 | < .025 | .0081 J2 | .0049 J2B | 2 | 28 | 13 | 0.61 |
| RIMW-5-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIMW-6 | | | 2.3 | .033 J2 | < .01 | 34 | .00097 J2B | < .05 | .005 J2B | 16 | 81 | 6.5 | 0.73 |
| RIMW-7 | | | 2.5 | .026 J2 | < .01 | 17 | .00088 J2B | < .05 | < .02 | NA | NA | NA | NA |
| RIMW-8 | | | 0.95 | .032 J2 | < .01 | 21 | < .025 | < .05 | < .02 | NA | NA | NA | NA |
| RIMW-8-DUP | | | 1 | .032 J2 | < .01 | 21 | < .025 | < .05 | .0044 J2B | NA | NA | NA | NA |
| RIMW-9 | | | 0.3 | < .035 | < .01 | 11 | .0011 J2 | .0043 J2 | .0045 J2B | NA | NA | NA | NA |
| RIMW-9-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RIPZ-1 | | | NA | NA | NA | NA | NA | NA | NA | 4 | 0.99 | 0.18 | 0.15 |
| RIPZ-3 | | | 3.3 | .028 J2 | < .01 | 17 | .0014 J2B | < .05 | < .02 | NA | NA | NA | NA |
| RIPZ-3-DUP | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RITW-64 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RITW-65 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Table D-6
Phase II Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | Packer Test Start Depth (ft) | Packer Test End Depth (ft) | Inorganics | | | | | | | Other | | | |
|----------|------------------------------|----------------------------|------------|----------|--------|--------|----------|----------|------|--------------------------|---------|--------|--------|
| | | | Potassium | Selenium | Silver | Sodium | Thallium | Vanadium | Zinc | Dissolved Organic Carbon | Methane | Ethene | Ethane |
| | | | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ug/L | ug/L | ug/L |
| W-1 | | | NA | NA | NA | NA | NA | NA | NA | 2 | 1.9 | 0.026 | <.025 |
| W-2 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| W-4 | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

D-7 Phase III Groundwater

Table D-7
Phase III Groundwater Sampling Results
Remedial Investigation Report
September 2008
Rock Hill, South Carolina

| Location | VOCs | | | | | | | | | | | | | | | | | | | | |
|------------|-----------------------|---------------------------|---------------------------------------|-----------------------|--------------------|--------------------|------------------------|------------------------|-----------------------------|-------------------|---------------------|--------------------|---------------------|---------------------|---------------------|------------|------------|----------------------|---------|---------|--------------------|
| | 1,1,1-Trichloroethane | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloro-1,2,2-trifluoroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethane | 1,1-Dichloroethene | 1,2,3-Trichlorobenzene | 1,2,4-Trichlorobenzene | 1,2-Dibromo-3-chloropropane | 1,2-Dibromoethane | 1,2-Dichlorobenzene | 1,2-Dichloroethane | 1,2-Dichloropropane | 1,3-Dichlorobenzene | 1,4-Dichlorobenzene | 2-Butanone | 2-Hexanone | 4-Methyl-2-pentanone | Acetone | Benzene | Bromochloromethane |
| | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| MW-121B | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| MW-122B | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-15 | < 10 | < 10 | < 10 | < 10 | .31 J2 | 2.23 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.26 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-20 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-21 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-22 | < 10 | < 10 | < 10 | < 10 | .33 J2 | .86 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-23 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-24 | < 10 | < 10 | 1.4 J2 | < 10 | 6 J2 | 27 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.17 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .44 J2 | < 10 |
| RIMW-25 | 770 | 3.24 J2 | 100 | 36 | 950 | 540 | < 10 | < 10 | < 10 | < 10 | 58 | 4100 | 2.18 J2 | < 10 | 1.63 J2 | 260 | 36 | 150 | 220 | 43 | < 10 |
| RIMW-25-DU | 720 | 2.93 J2 | 78 | 30 | 860 | 510 | < 10 | < 10 | < 10 | < 10 | 49 | 3700 | 1.8 J2 | < 10 | 1.37 J2 | 270 | 33 | 130 | 180 | 35 | < 10 |
| RIMW-26 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-27 | < 10 | < 10 | 1.8 J2 | 1.49 J2 | 34 | 82 | < 10 | < 10 | < 10 | < 10 | .44 J2 | 260 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.21 J2 |
| RIMW-27-DU | < 10 | < 10 | 2.24 J2 | 1.31 J2 | 35 | 83 | < 10 | < 10 | < 10 | < 10 | .5 J2 | 280 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.26 J2 |
| RIMW-28 | < 10 | < 10 | < 10 | < 10 | 2.53 J2 | 4.7 J2 | < 10 | < 10 | < 10 | < 10 | 3.38 J2 | 37 | < 10 | < 10 | .99 J2 | < 10 | < 10 | < 10 | 9.03 J2 | .76 J2 | < 10 |
| RIMW-29 | < 10 | < 10 | < 10 | < 10 | 8.93 J2 | 30 | < 10 | < 10 | < 10 | < 10 | < 10 | 7.4 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .22 J2 | < 10 |
| RIMW-30 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |

Table D-7
Phase III Groundwater Sampling Results

Remedial Investigation Report
 September 2008
 Rock Hill, South Carolina

| Location | VOCs | | | | | | | | | | | | | | | | | | | | | |
|------------|----------------------|-----------|--------------|------------------|----------------------|---------------|--------------|------------|---------------|------------------------|-------------------------|-------------|----------------------|-------------------------|--------------|------------------|----------------|-------------------------|-------------------|--------------------|---------|-------------------|
| | Bromodichloromethane | Bromoform | Bromomethane | Carbon disulfide | Carbon tetrachloride | Chlorobenzene | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | cis-1,3-Dichloropropene | Cyclohexane | Dibromochloromethane | Dichlorodifluoromethane | Ethylbenzene | Isopropylbenzene | Methyl acetate | Methyl tert butyl ether | Methylcyclohexane | Methylene chloride | Styrene | Tetrachloroethene |
| | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| MW-121B | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.35 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .76 J2 |
| MW-122B | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-15 | < 10 | < 10 | < 10 | < 10 | < 10 | .62 J2 | < 10 | < 10 | < 10 | 730 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 4.76 J2 |
| RIMW-20 | 5.36 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 18 | < 10 | .36 J2 | < 10 | < 10 | 3.85 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .79 J2 |
| RIMW-21 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-22 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 2.58 J2 | < 10 | 59 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.74 J2 |
| RIMW-23 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 3.77 J2 | < 10 | .33 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.73 J2 |
| RIMW-24 | < 10 | < 10 | < 10 | .65 J2 | < 10 | < 10 | < 10 | .33 J2 | < 10 | 570 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .71 J2 | < 10 | 260 |
| RIMW-25 | < 10 | < 10 | < 10 | 1.35 J2 | < 10 | 2200 | 2500 | 120 | 6.81 J2 | 1300 | < 10 | 16 | < 10 | < 10 | 1000 | 50 | < 10 | < 10 | 31 | 1300 | < 10 | 52 |
| RIMW-25-DU | < 10 | < 10 | < 10 | 1.06 J2 | < 10 | 2200 | 2300 | 98 | 5.32 J2 | 1200 | < 10 | 11 | < 10 | < 10 | 1000 | 40 | < 10 | < 10 | 24 | 1200 | < 10 | 42 |
| RIMW-26 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.98 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .41 J2 |
| RIMW-27 | < 10 | < 10 | < 10 | < 10 | < 10 | 6.11 J2 | 2.92 J2 | 2.09 J2 | < 10 | 800 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .96 J2 | < 10 | 400 |
| RIMW-27-DU | < 10 | < 10 | < 10 | < 10 | < 10 | 5.51 J2 | 3.23 J2 | 2.12 J2 | < 10 | 860 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.14 J2 | < 10 | 400 |
| RIMW-28 | 2.58 J2 | < 10 | < 10 | < 10 | < 10 | 14 | 3.24 J2 | 24 | < 10 | 19 | < 10 | < 10 | 3.27 J2 | < 10 | 4.53 J2 | < 10 | < 10 | < 10 | < 10 | 1.02 J2 | < 10 | 3.21 J2 |
| RIMW-29 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 1.43 J2 | < 10 | 370 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .5 J2 | < 10 | 81 |
| RIMW-30 | 3.83 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | 12 | < 10 | < 10 | < 10 | < 10 | 3.32 J2 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 | .33 J2 |

Table D-7

Phase III Groundwater Sampling Results

Remedial Investigation Report

September 2008

Rock Hill, South Carolina

| Location | VOCs | | | | | | |
|------------|---------|--------------------------|---------------------------|-----------------|------------------------|----------------|-----------------|
| | Toluene | trans-1,2-Dichloroethene | trans-1,3-Dichloropropene | Trichloroethene | Trichlorofluoromethane | Vinyl chloride | Xylenes (Total) |
| | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| MW-121B | < 10 | < 10 | < 10 | 7.53 J2 | < 10 | < 10 | < 10 |
| MW-122B | .41 J2B | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-15 | < 10 | 1.94 J2 | < 10 | 610 | < 10 | .64 J2 | < 10 |
| RIMW-20 | .58 J2B | < 10 | < 10 | .54 J2 | < 10 | < 10 | < 10 |
| RIMW-21 | .28 J2B | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-22 | .35 J2 | < 10 | < 10 | 54 | < 10 | < 10 | < 10 |
| RIMW-23 | .78 J2B | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-24 | .47 J2 | 1.22 J2 | < 10 | 260 | < 10 | 1.17 J2 | < 10 |
| RIMW-25 | 9700 | 3.02 J2 | < 10 | 100 | 88 | 800 | 3200 |
| RIMW-25-DU | 8500 | 2.26 J2 | < 10 | 84 | 69 | 740 | 3100 |
| RIMW-26 | .72 J2B | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| RIMW-27 | .32 J2 | 1.34 J2 | < 10 | 370 | < 10 | 15 | < 10 |
| RIMW-27-DU | .38 J2 | 1.22 J2 | < 10 | 370 | 1.27 J2 | 14 | < 10 |
| RIMW-28 | 41 | < 10 | < 10 | 6 | < 10 | 2.64 J2 | 7.17 J2 |
| RIMW-29 | .26 J2 | .62 J2 | < 10 | 260 | < 10 | 4.01 J2 | < 10 |
| RIMW-30 | .23 J2B | < 10 | < 10 | .53 J2 | < 10 | < 10 | < 10 |

Appendix E

Hydraulic Analysis Results

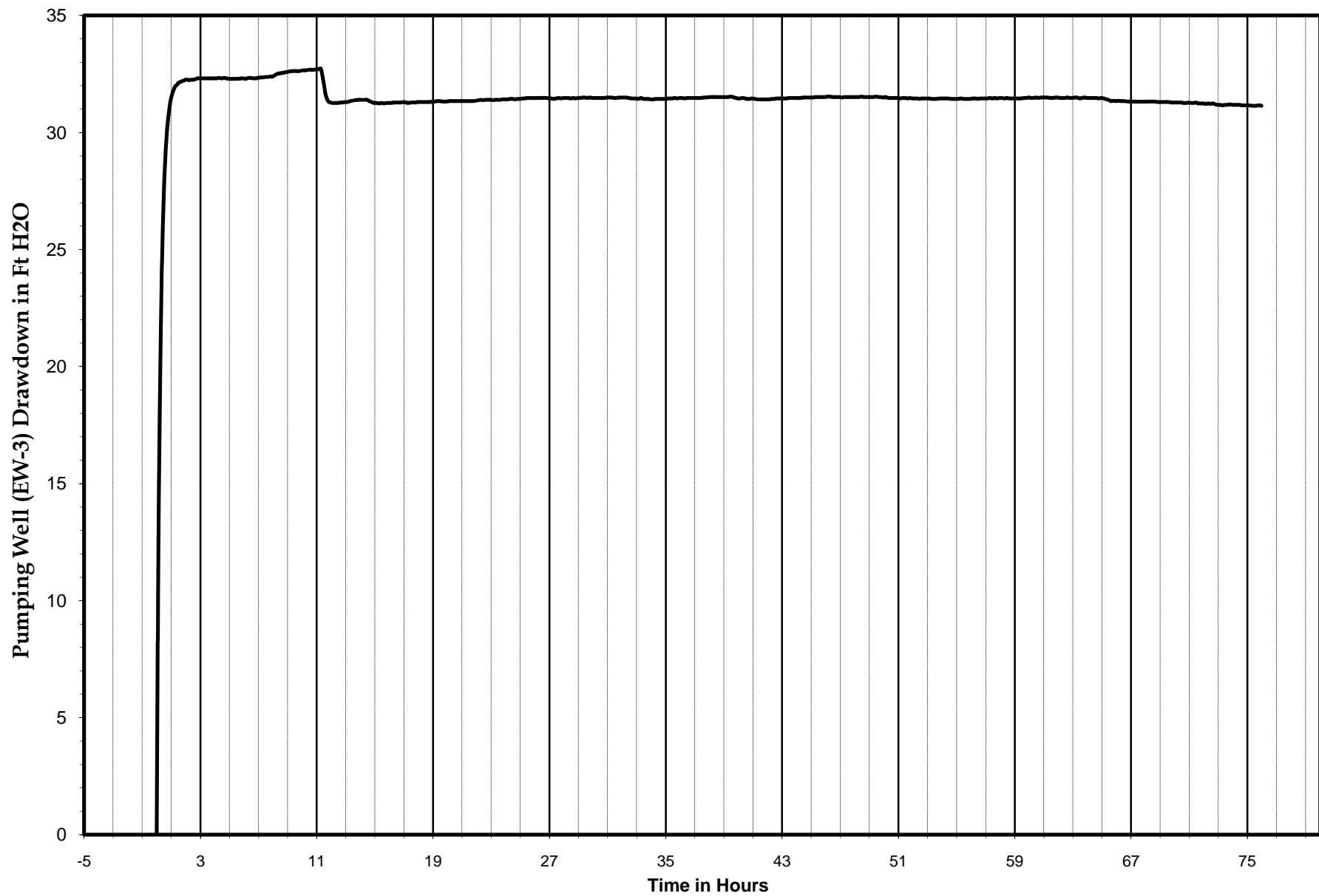


Figure E-1
EW-2 Hydrograph
EW-2 APT
Remedial Investigation Report
September 2008

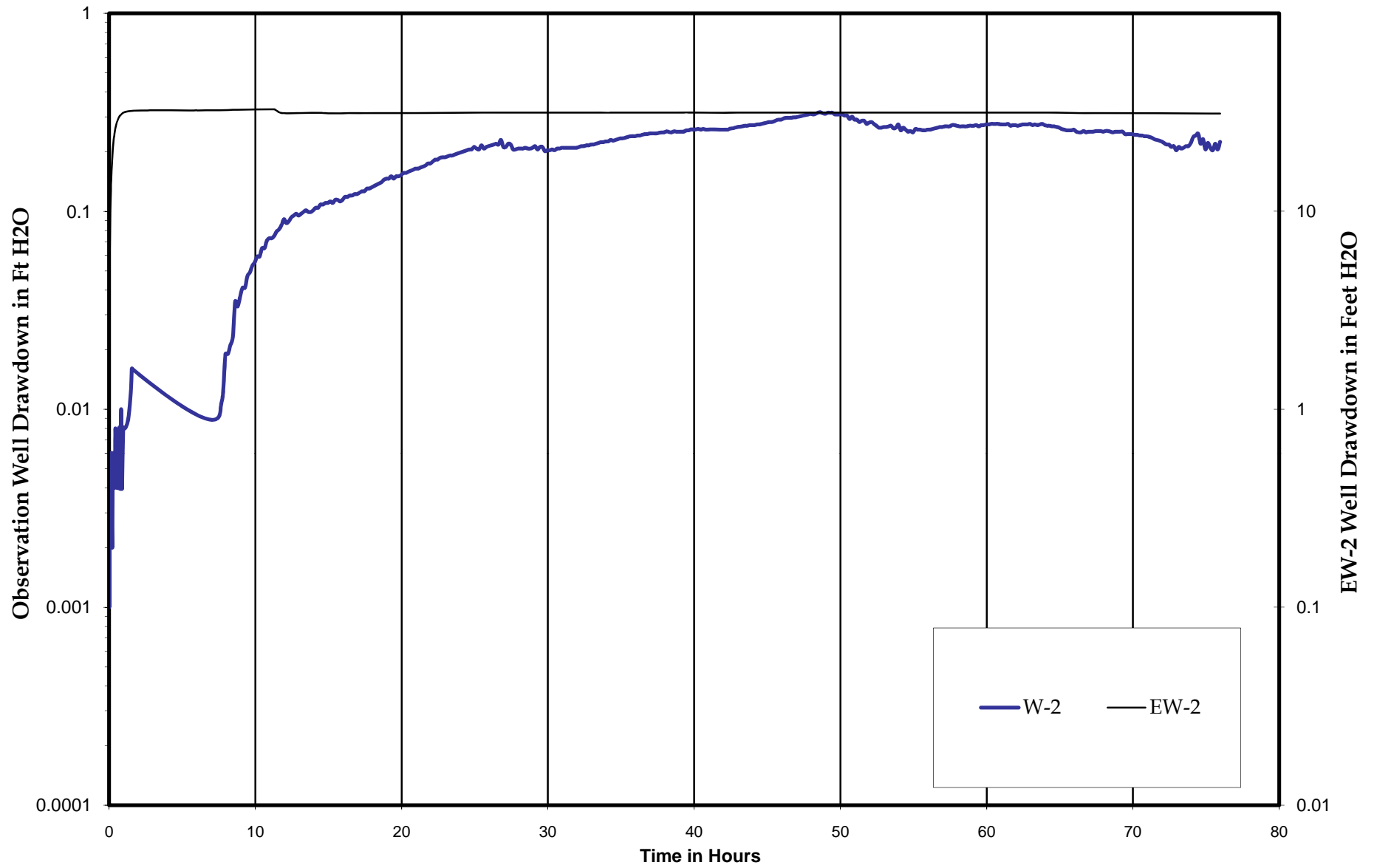


Figure E-2
W-2 Hydrograph
EW-2 APT
Remedial Investigation Report
September 2008

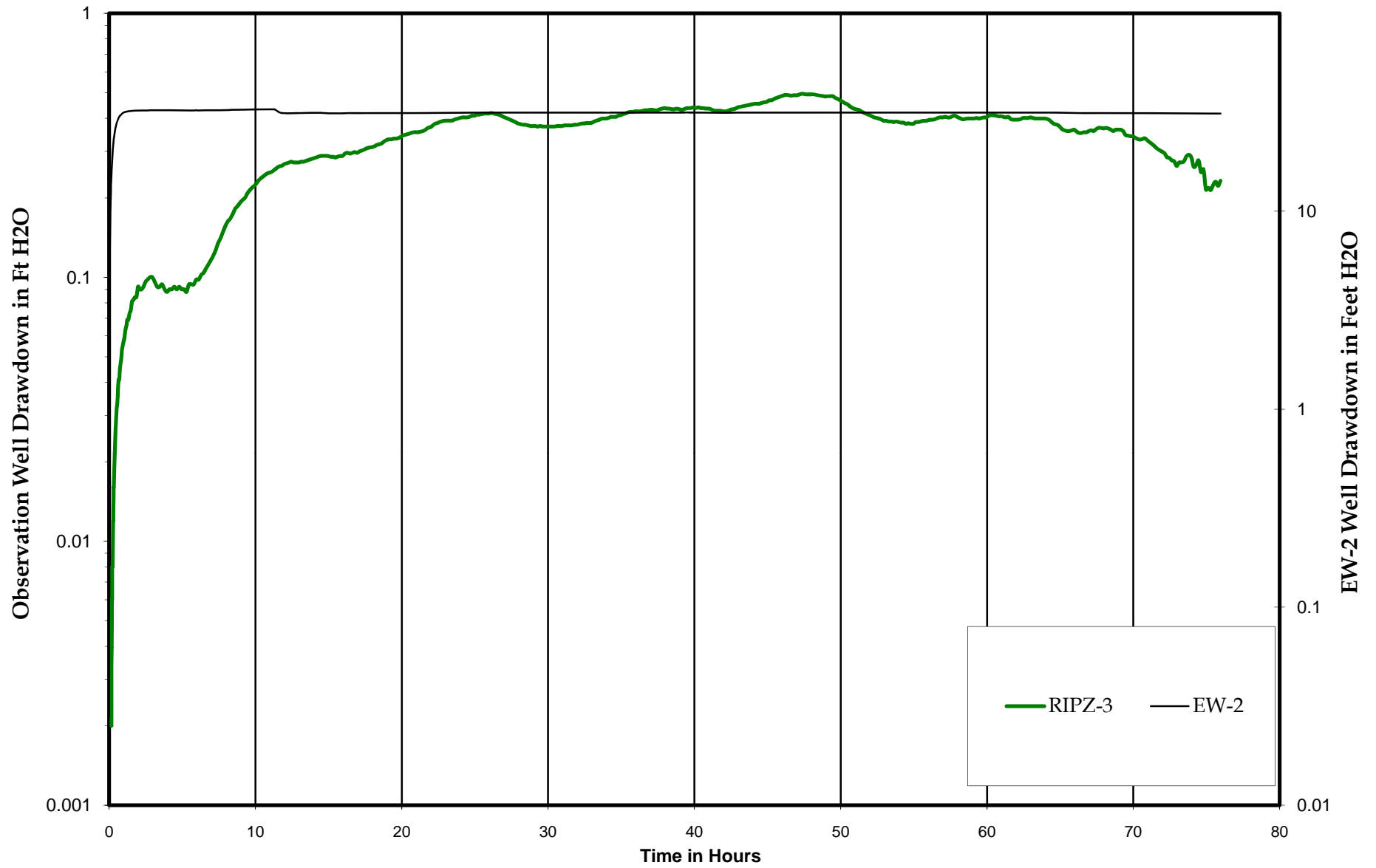


Figure E-3
 RIPZ-3 Hydrograph
 EW-2 APT
 Remedial Investigation Report
 September 2008

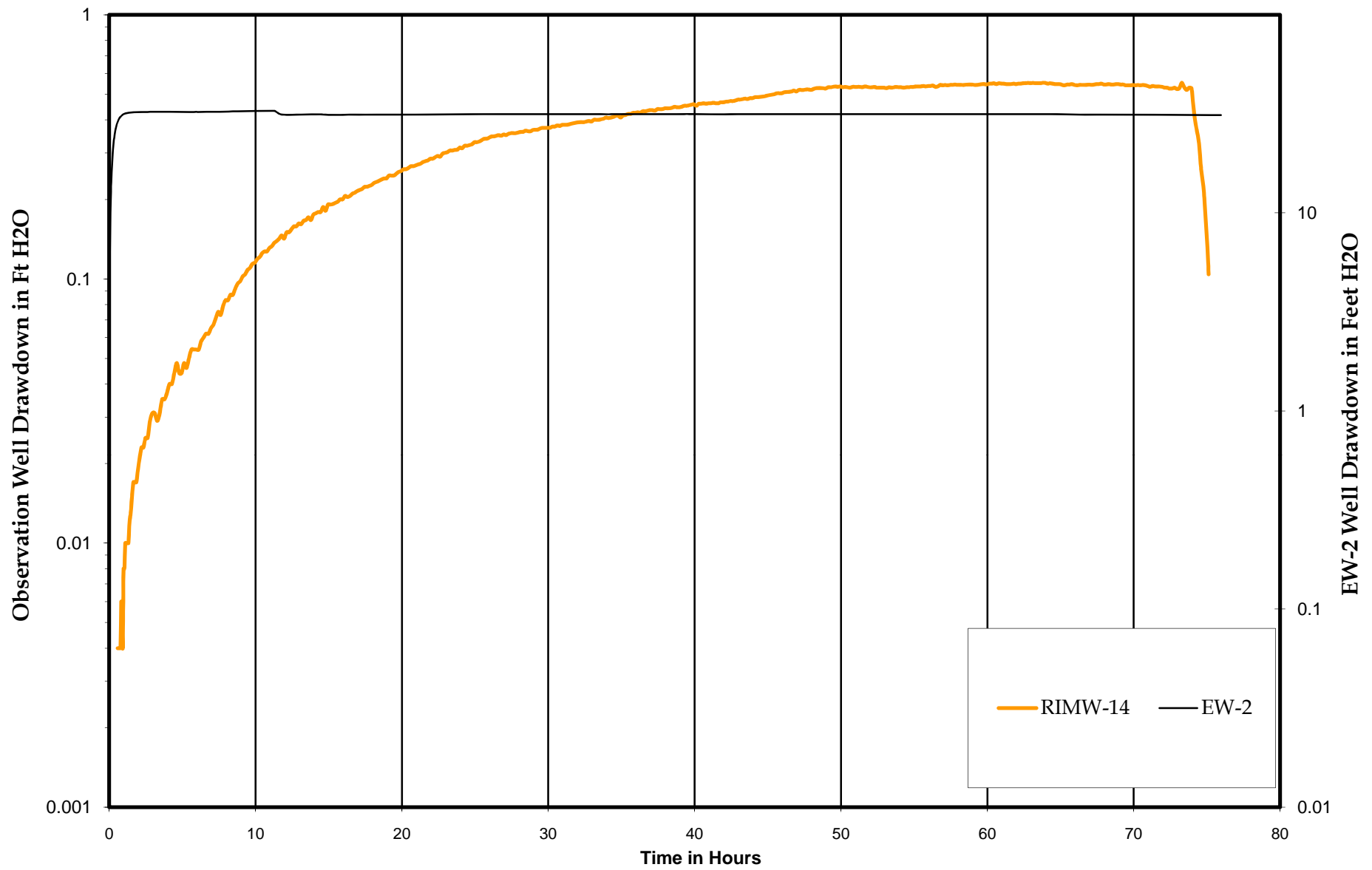


Figure E-4
 RIMW-14 Hydrograph
 EW-2 APT
 Remedial Investigation Report
 September 2008

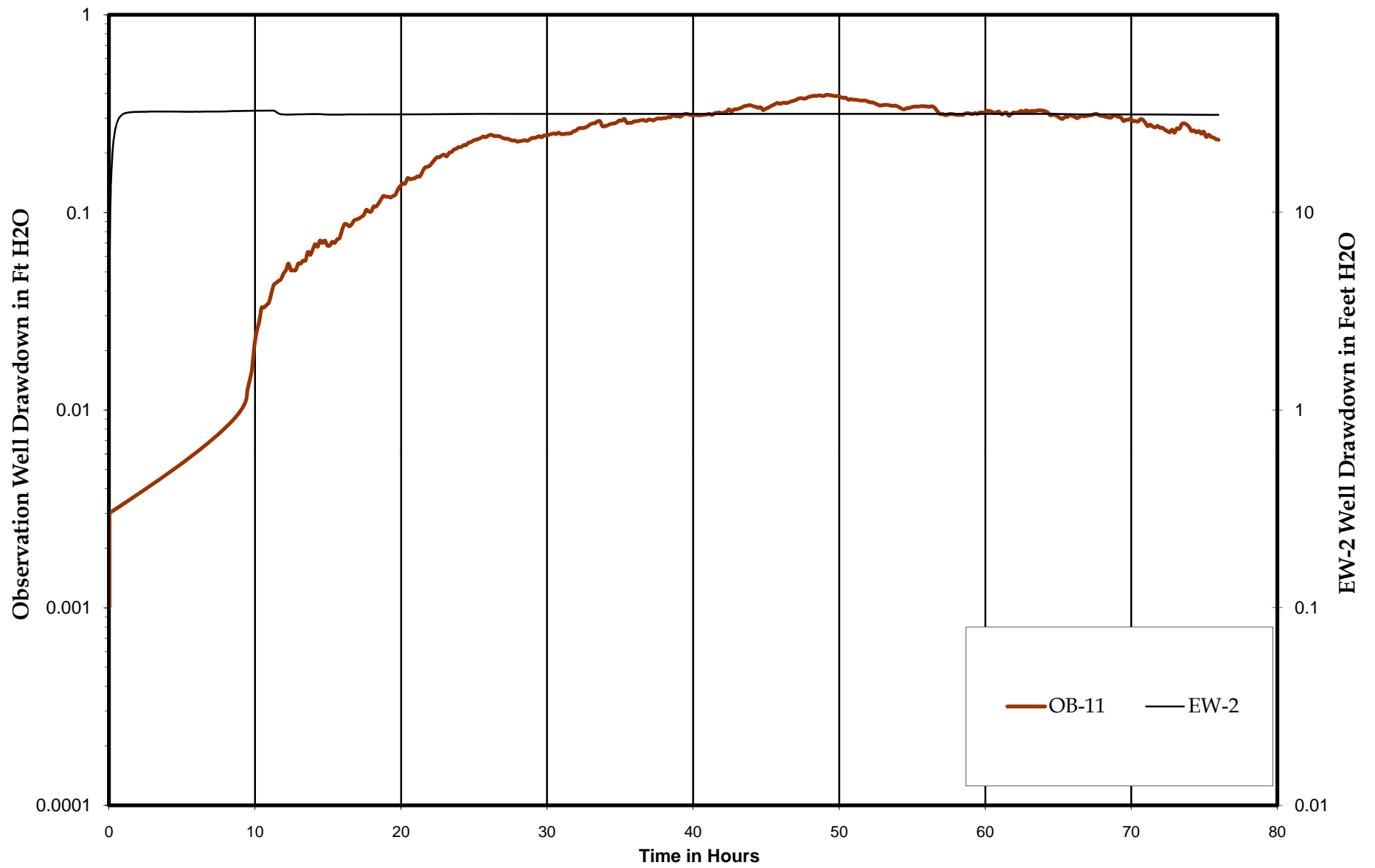


Figure E-5
 OB-11 Hydrograph
 EW-2 APT
 Remedial Investigation Report
 September 2008

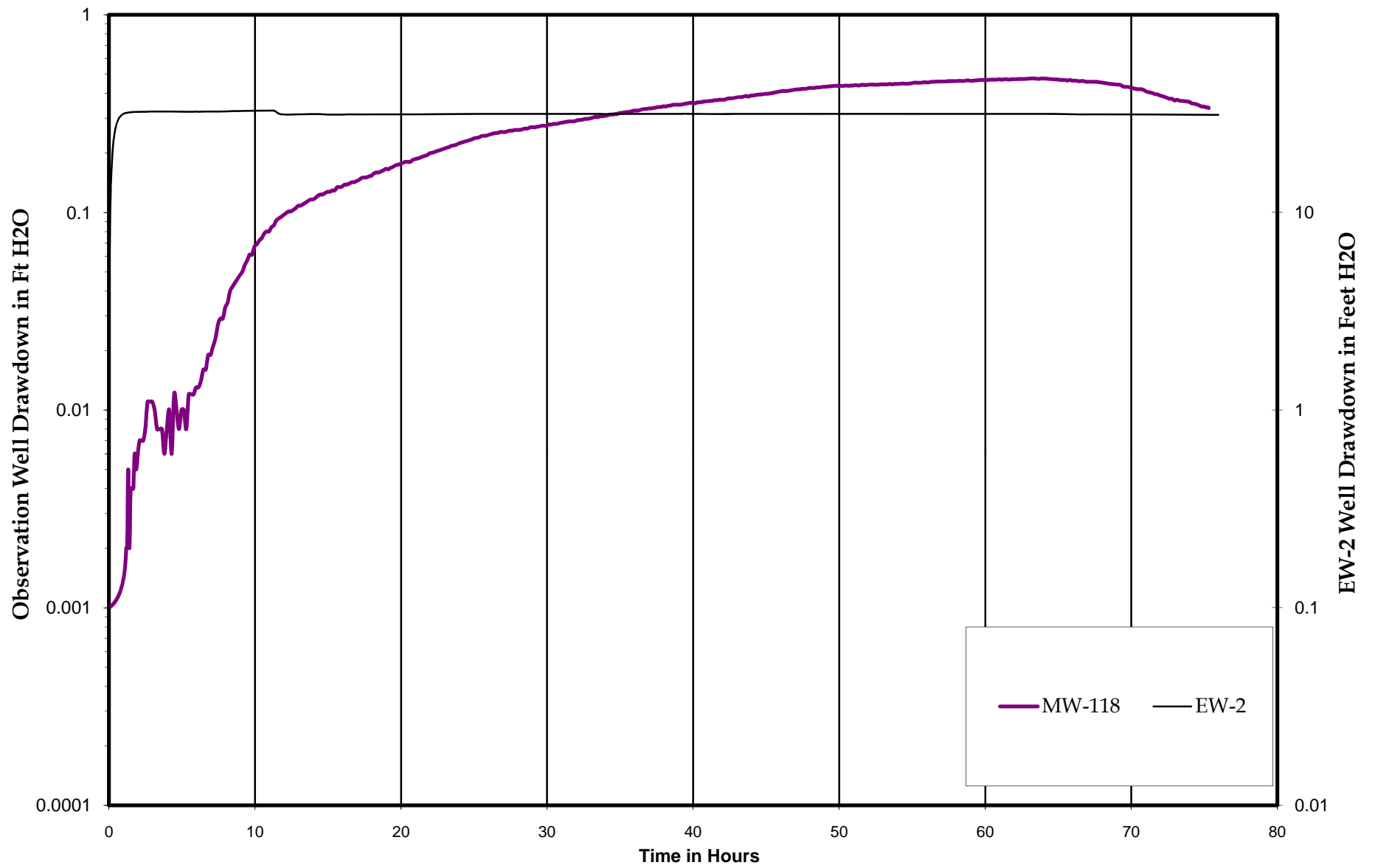
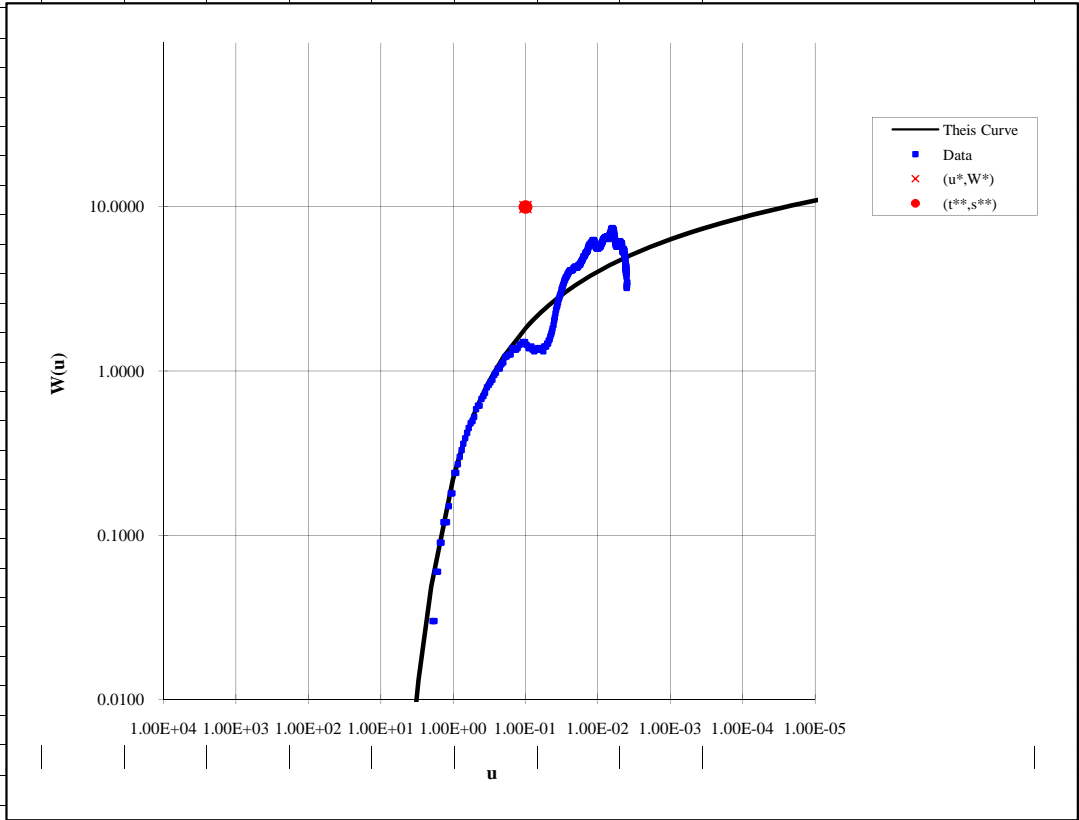


Figure E-6
 MW-118 Hydrograph
 EW-2 APT
 Remedial Investigation Report
 September 2008



| | |
|----------|----------------------------|
| Q | 2.7 gpm |
| | 0.361 ft ³ /min |
| r | 225 ft |

(1) Select convenient $u^{**}, W(u^{**})$ on type curve (shown as (u^{**}, W^{**})).

| | | | | | |
|-----|-------------|--|--|--|--|
| 0.1 | <- u^{**} | | | | |
| 10 | <- W^{**} | | | | |

(2) Shift data point curve relative to type curve

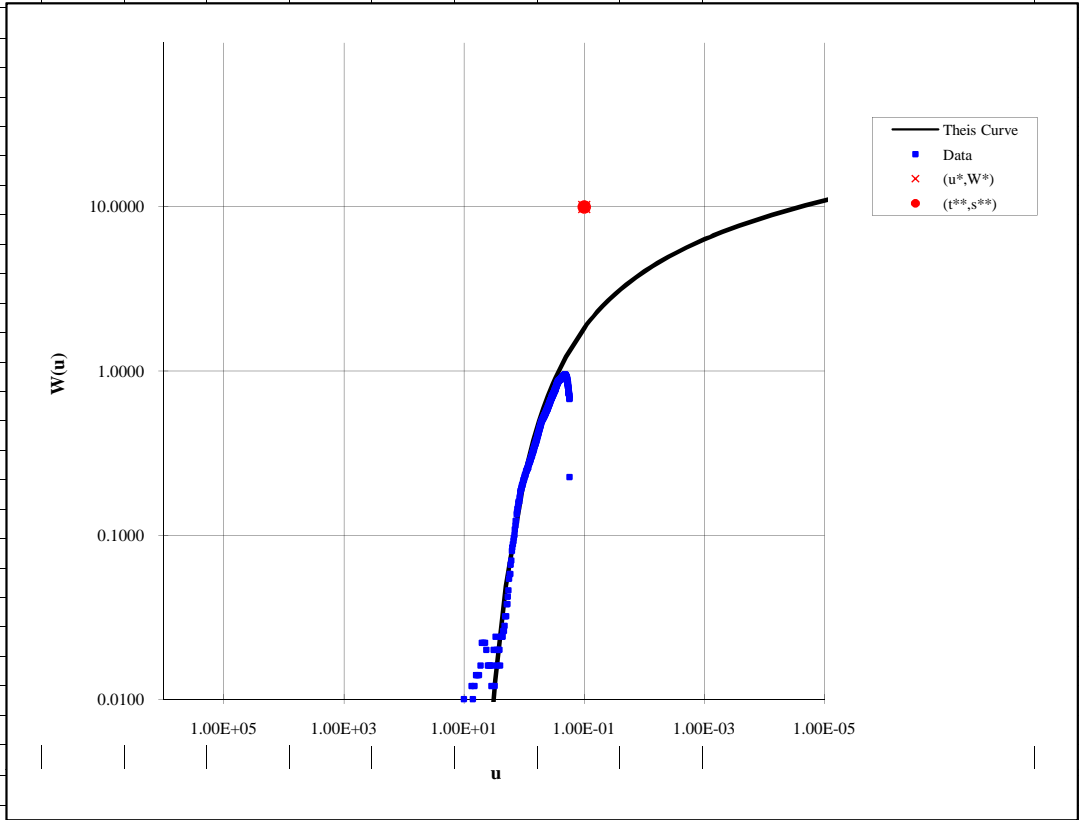
| | | | | | |
|----|------------|-----------------------|--|--|--|
| 18 | <- Shift-h | (Left-Right Shifting) | | | |
| 15 | <- Shift-v | (Up-Down Shifting) | | | |

(3) Adjust (t,s) to move match point (on data curve - shown as (t^{**}, s^{**}))

| | | | | | |
|-------|-------------|-------|-------------------------------------------------------------|--|--|
| 180 | <- t^{**} | 0.10 | <- computed u^{**} (should agree with u^{**} in step 1) | | |
| 0.667 | <- s^{**} | 10.01 | <- computed W^{**} (should agree with W^{**} in step 1) | | |

(5) Compute Formation Constants

| | | |
|-----------|-------------------------------|----------------------------|
| T= | 0.430652 ft ² /min | 620.1 ft ² /day |
| S= | 0.000612 | |



| | |
|----------|----------------------------|
| Q | 2.7 gpm |
| | 0.361 ft ³ /min |
| r | 109 ft |

(1) Select convenient $u^{**}, W(u^{**})$ on type curve (shown as (u^{**}, W^{**})).

| | | | | | |
|------------|-------------|--|--|--|--|
| 0.1 | <- u^{**} | | | | |
| 10 | <- W^{**} | | | | |

(2) Shift data point curve relative to type curve

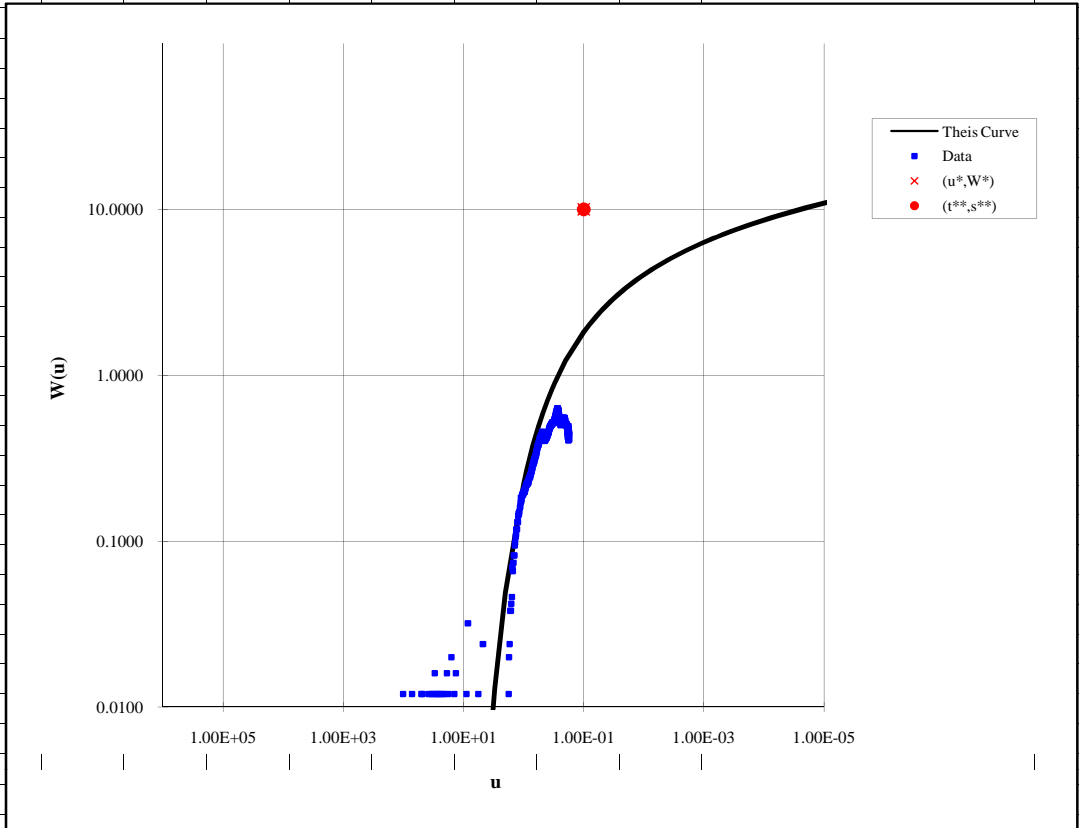
| | | | | | |
|------------|------------|-----------------------|--|--|--|
| 800 | <- Shift-h | (Left-Right Shifting) | | | |
| 2 | <- Shift-v | (Up-Down Shifting) | | | |

(3) Adjust (t, s) to move match point (on data curve - shown as (t^{**}, s^{**}))

| | | | |
|-------------|-------------|-------|-------------------------------------------------------------|
| 8000 | <- t^{**} | 0.10 | <- computed u^{**} (should agree with u^{**} in step 1) |
| 5 | <- s^{**} | 10.00 | <- computed W^{**} (should agree with W^{**} in step 1) |

(5) Compute Formation Constants

| | | |
|-----------|--------------------------------------|----------------------------------|
| T= | 0.057449 ft ² /min | 82.7 ft ² /day |
| S= | 0.015473 | |



| | |
|----------|----------------------------|
| Q | 2.7 gpm |
| | 0.361 ft ³ /min |
| r | 207 ft |

(1) Select convenient $u^{}, W(u^{**})$ on type curve (shown as (u^{**}, W^{**})).**

| | | | | | |
|-----|-------------|--|--|--|--|
| 0.1 | <- u^{**} | | | | |
| 10 | <- W^{**} | | | | |

(2) Shift data point curve relative to type curve

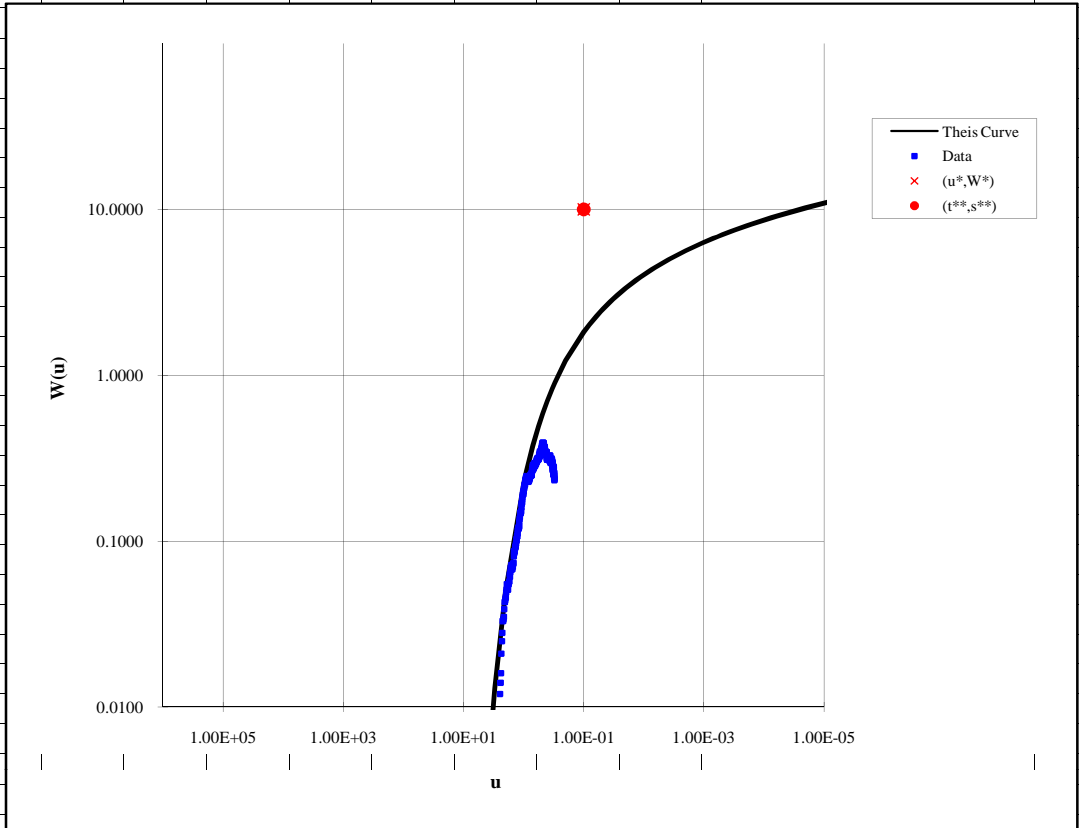
| | | | | | |
|-----|------------|-----------------------|--|--|--|
| 800 | <- Shift-h | (Left-Right Shifting) | | | |
| 2 | <- Shift-v | (Up-Down Shifting) | | | |

(3) Adjust (t,s) to move match point (on data curve - shown as (t^{}, s^{**}))**

| | | | |
|------|-------------|-------|-------------------------------------------------------------|
| 8000 | <- t^{**} | 0.10 | <- computed u^{**} (should agree with u^{**} in step 1) |
| 5 | <- s^{**} | 10.00 | <- computed W^{**} (should agree with W^{**} in step 1) |
| | | | |

(5) Compute Formation Constants

| | | |
|-----------|-------------------------------|---------------------------|
| T= | 0.057449 ft ² /min | 82.7 ft ² /day |
| S= | 0.00429 | |



| | |
|---|----------------------------|
| Q | 2.7 gpm |
| | 0.361 ft ³ /min |
| r | 185 ft |

(1) Select convenient $u^{}, W(u)^{**}$ on type curve (shown as (u^{**}, W^{**})).**

| | |
|-----|-------------|
| 0.1 | <- u^{**} |
| 10 | <- W^{**} |

(2) Shift data point curve relative to type curve

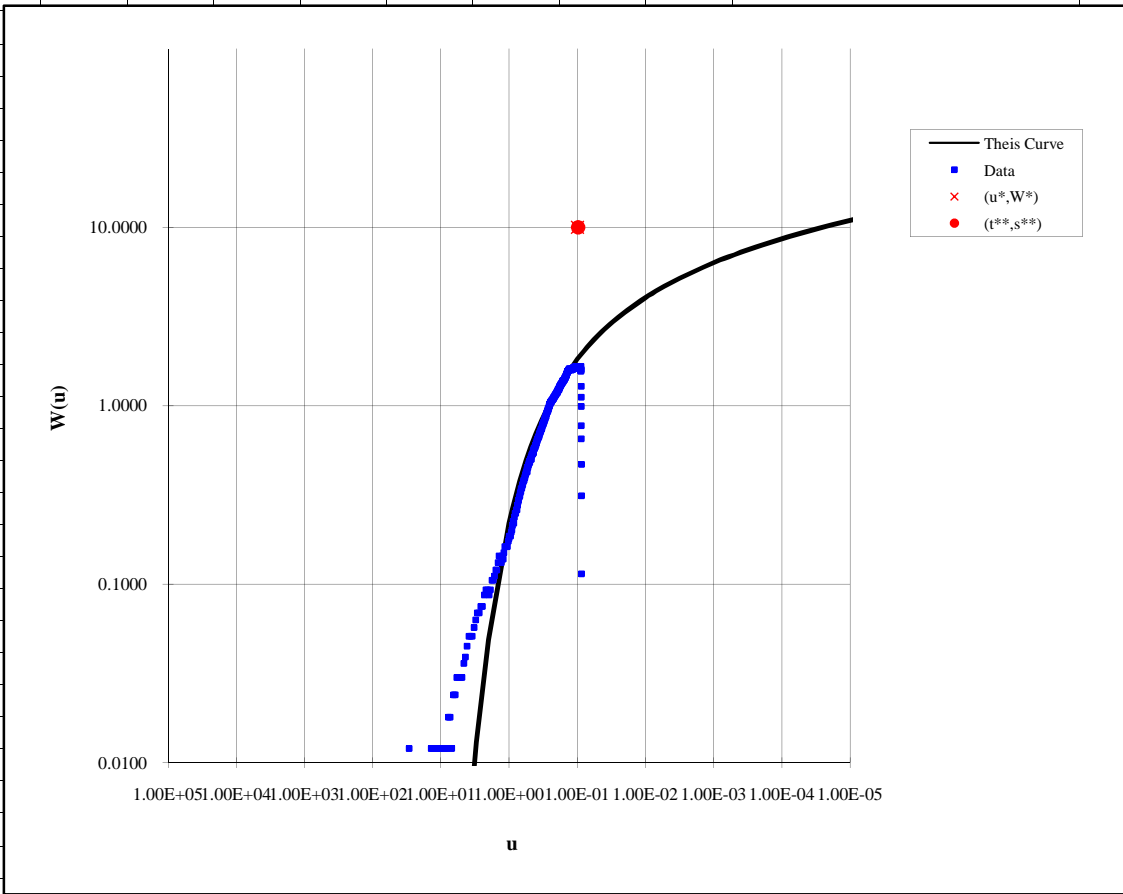
| | | |
|------|------------|-----------------------|
| 1400 | <- Shift-h | (Left-Right Shifting) |
| 1 | <- Shift-v | (Up-Down Shifting) |

(3) Adjust (t,s) to move match point (on data curve - shown as (t^{}, s^{**}))**

| | | | |
|-------|-------------|-------|-------------------------------------------------------------|
| 14000 | <- t^{**} | 0.10 | <- computed u^{**} (should agree with u^{**} in step 1) |
| 10 | <- s^{**} | 10.00 | <- computed W^{**} (should agree with W^{**} in step 1) |

(5) Compute Formation Constants

| | | |
|----|-------------------------------|---------------------------|
| T= | 0.028724 ft ² /min | 41.4 ft ² /day |
| S= | 0.0047 | |



| | |
|---|----------------------------|
| Q | 2.7 gpm |
| | 0.361 ft ³ /min |
| r | 230 ft |

(1) Select convenient $u^{}, W(u)^{**}$ on type curve (shown as (u^{**}, W^{**})).**

| | | | | | |
|-----|-------------|--|--|--|--|
| 0.1 | <- u^{**} | | | | |
| 10 | <- W^{**} | | | | |

(2) Shift data point curve relative to type curve

| | | |
|-----|------------|-----------------------|
| 390 | <- Shift-h | (Left-Right Shifting) |
| 3 | <- Shift-v | (Up-Down Shifting) |

(3) Adjust (t,s) to move match point (on data curve - shown as (t^{}, s^{**})).**

| | | | |
|-------|-------------|-------|-------------------------------------------------------------|
| 4000 | <- t^{**} | 0.10 | <- computed u^{**} (should agree with u^{**} in step 1) |
| 3.333 | <- s^{**} | 10.00 | <- computed W^{**} (should agree with W^{**} in step 1) |

(5) Compute Formation Constants

| | | |
|----|-------------------------------|----------------------------|
| T= | 0.086182 ft ² /min | 124.1 ft ² /day |
| S= | 0.002607 | |

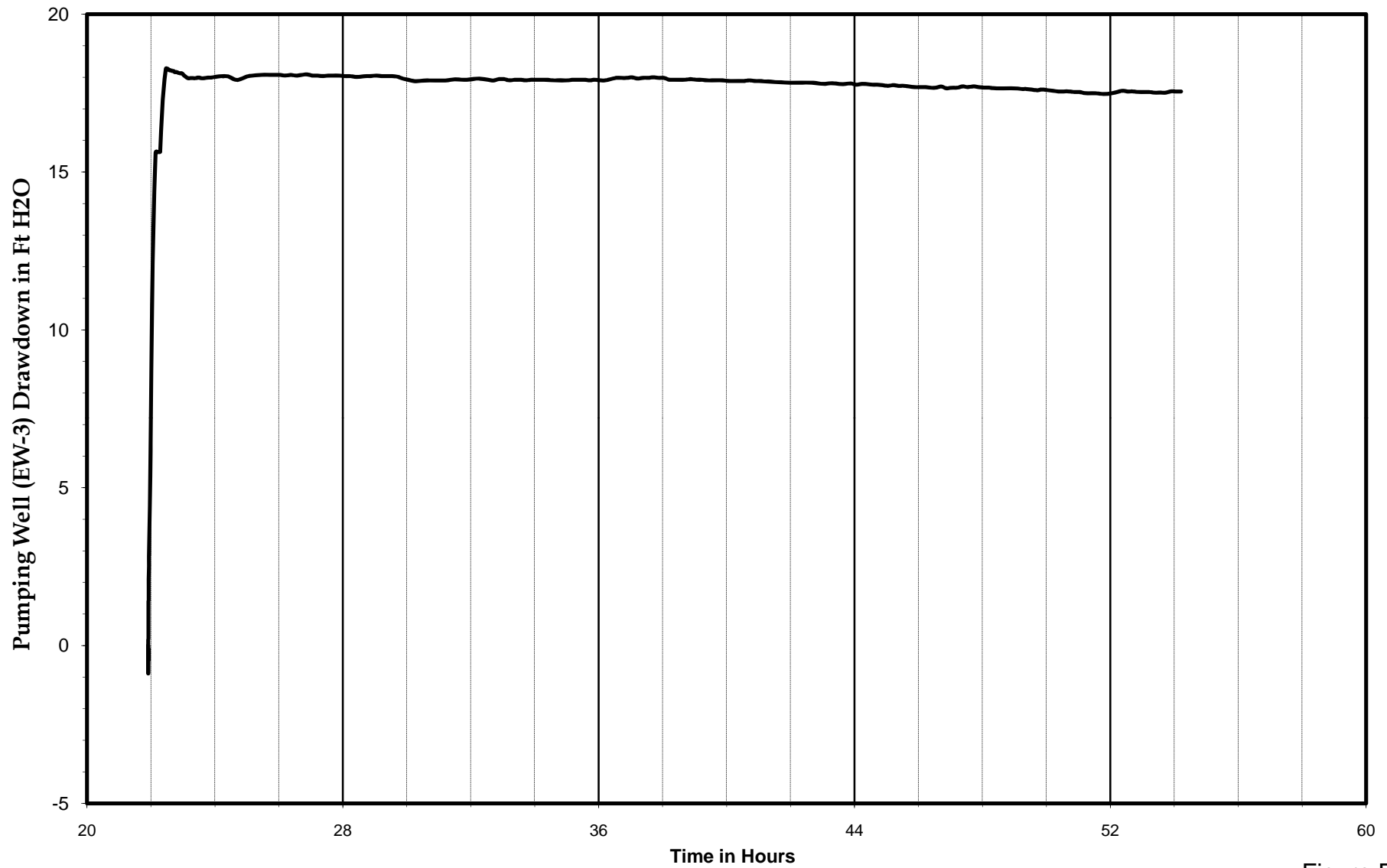


Figure E-7
EW-3 Hydrograph
EW-3 APT
Remedial Investigation Report
September 2008
Former PSC Site, Rock Hill, SC

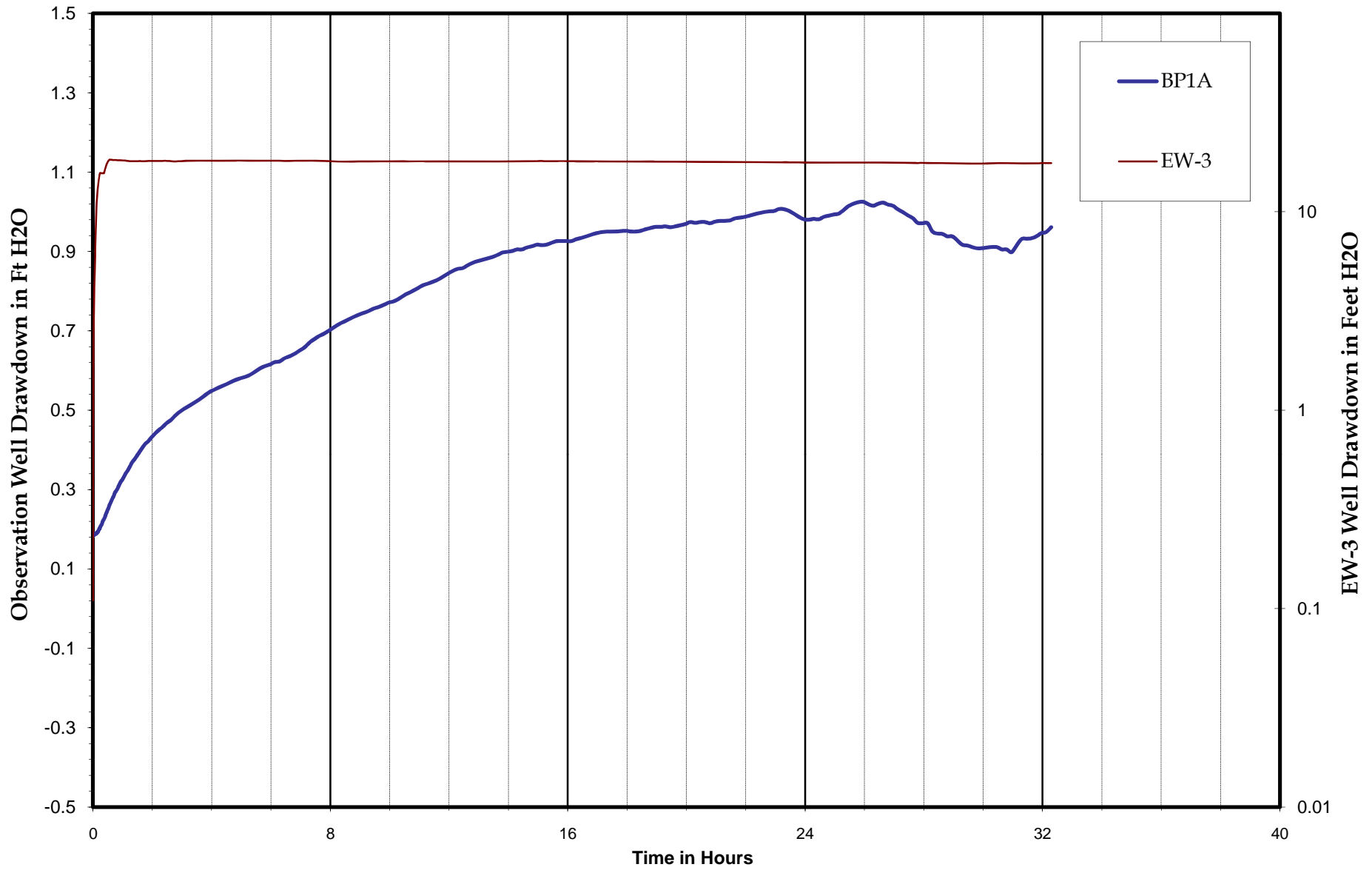


Figure E-8
 BP-1A Hydrograph
 EW-3 APT
 Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

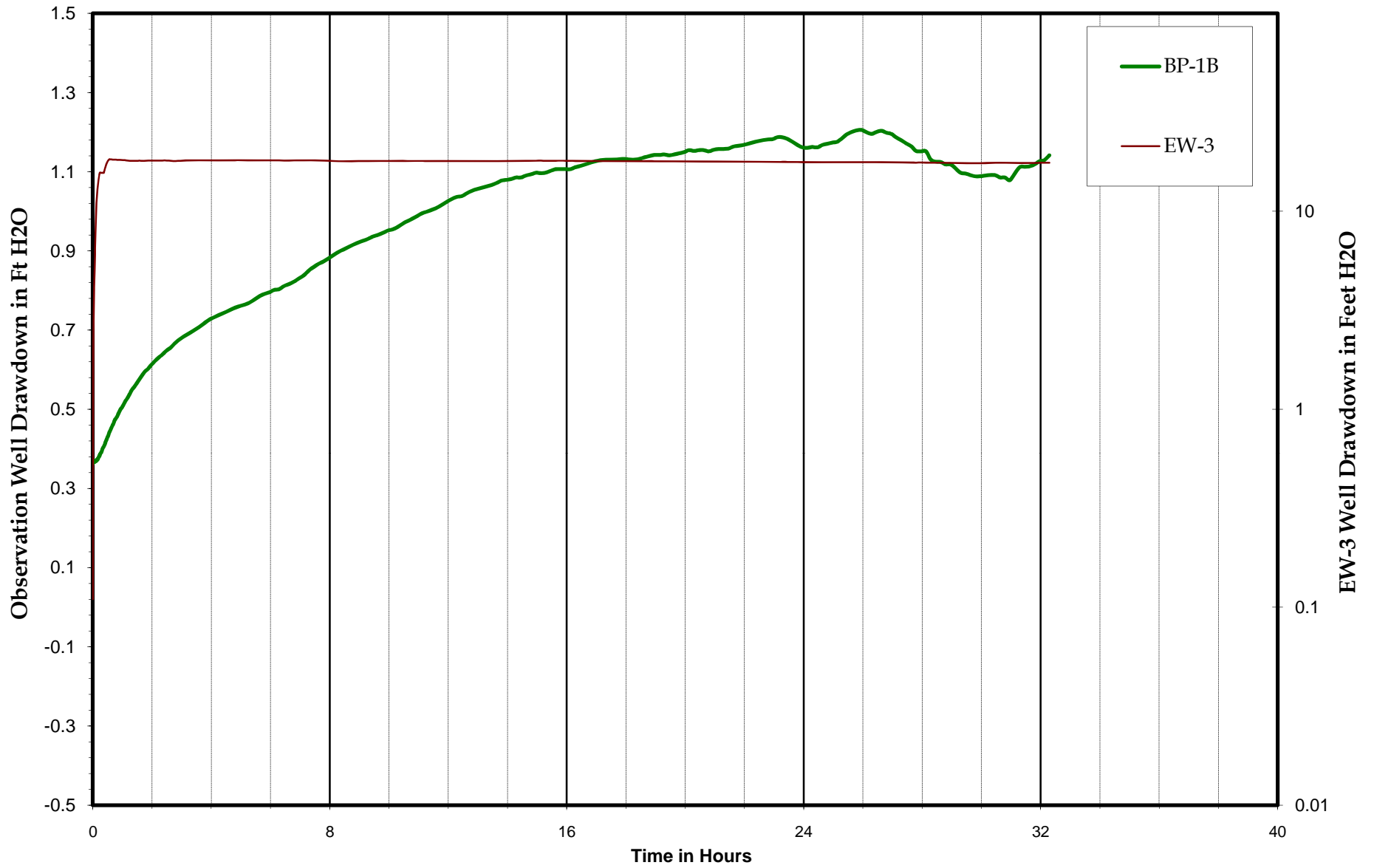


Figure E-9
 BP-1B Hydrograph
 EW-3 APT
 Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

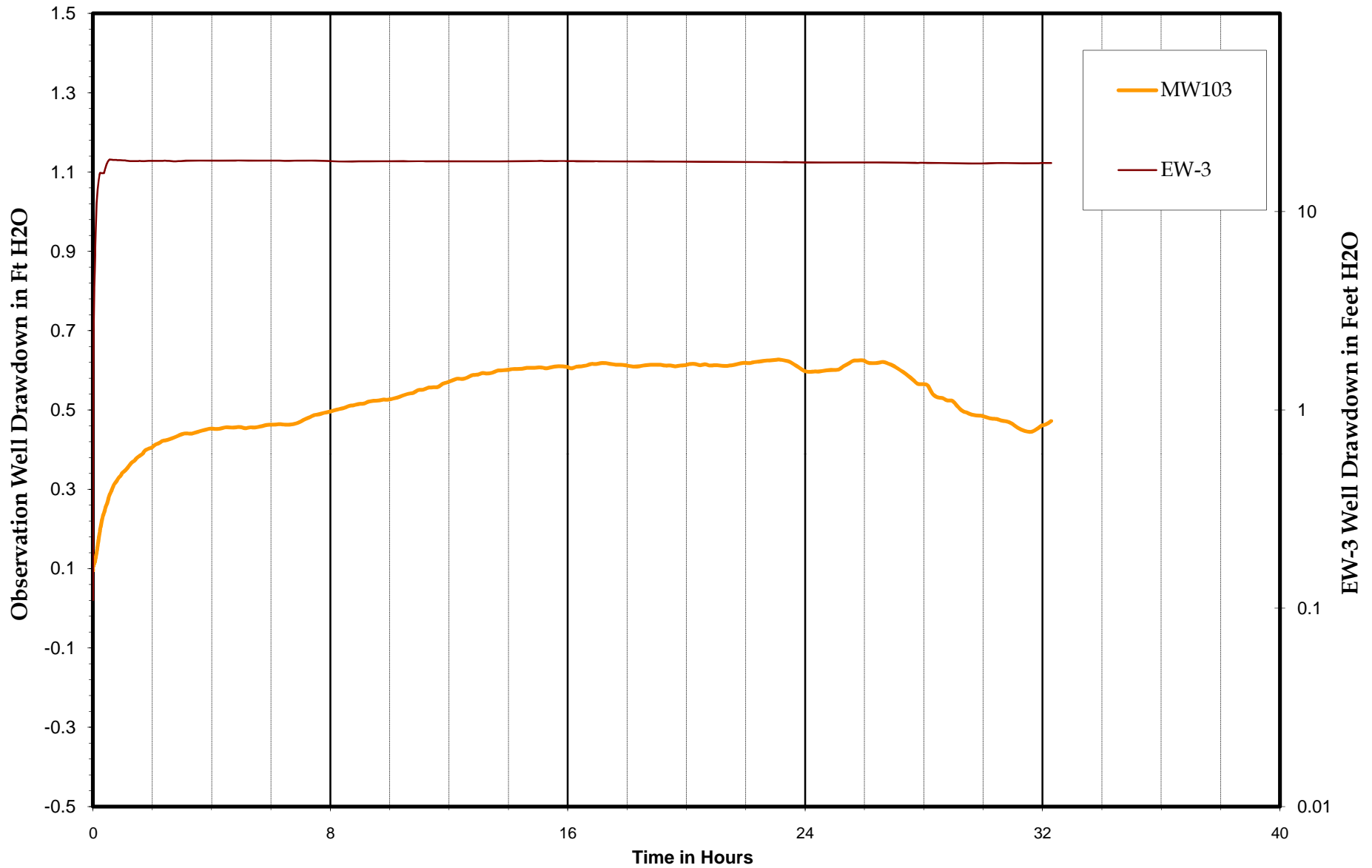


Figure E-10
 MW-103 Hydrograph
 EW-3 APT
 Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

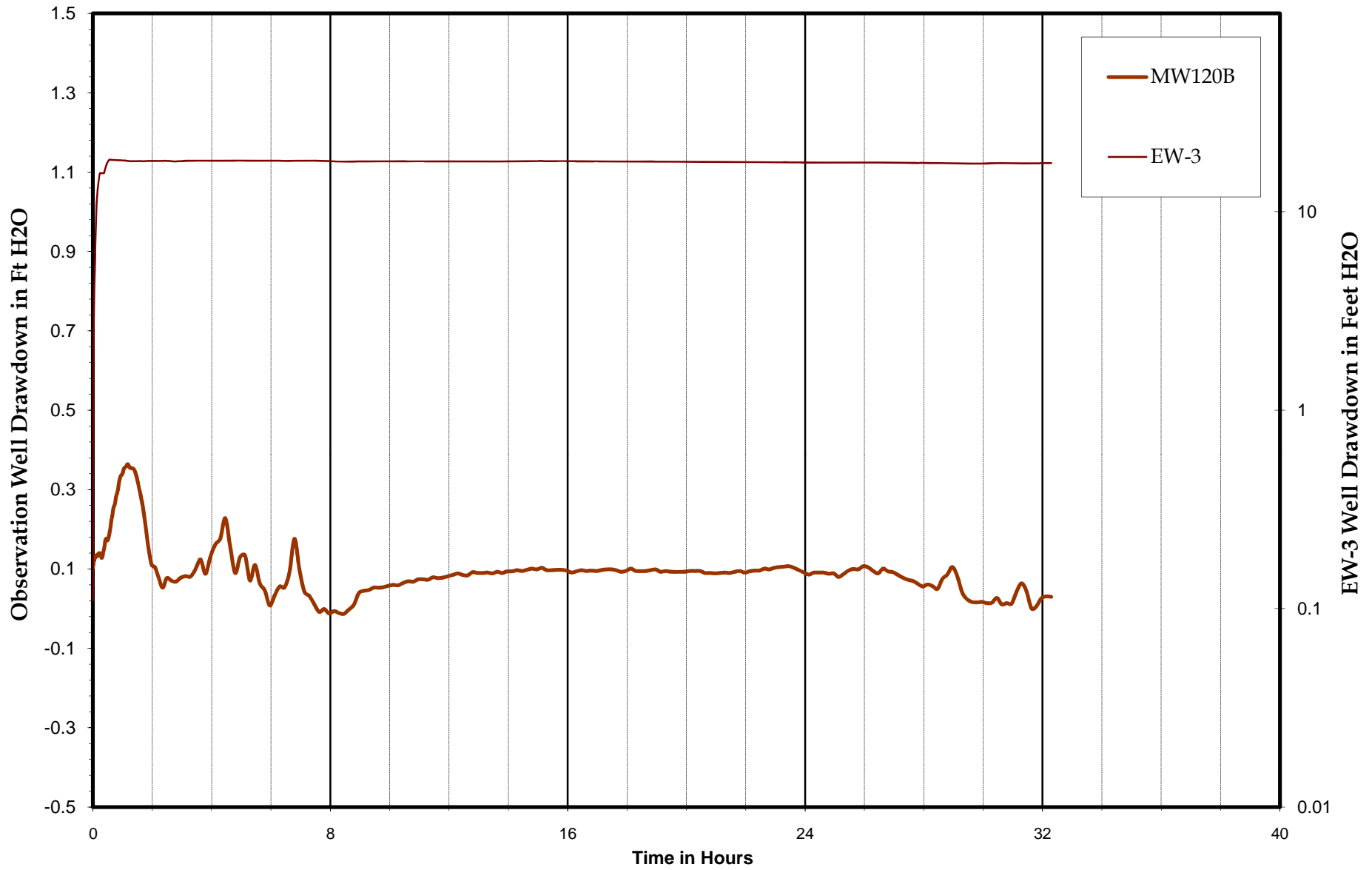


Figure E-11
 MW-120B Hydrograph
 EW-3 APT
 Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC

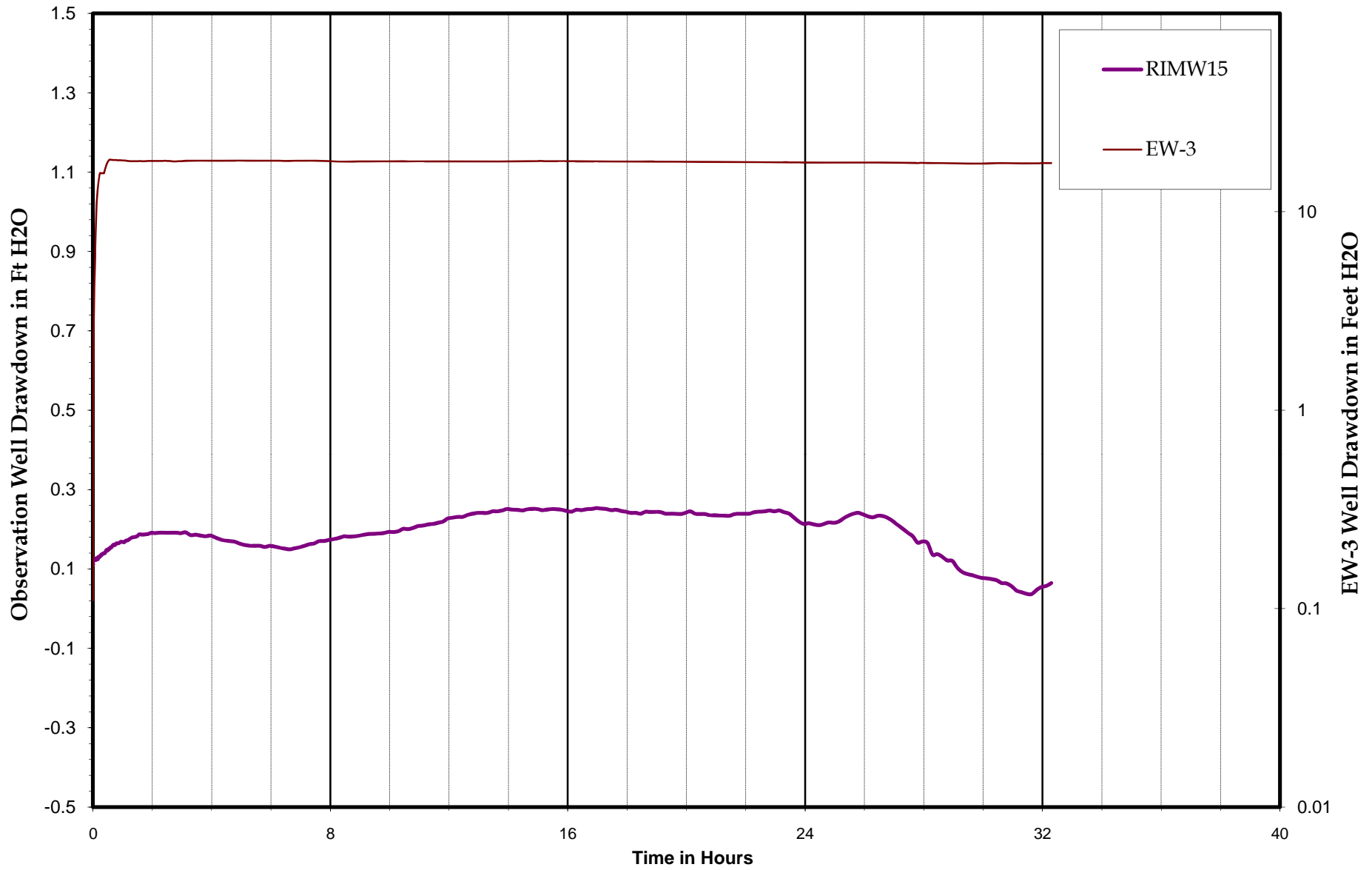
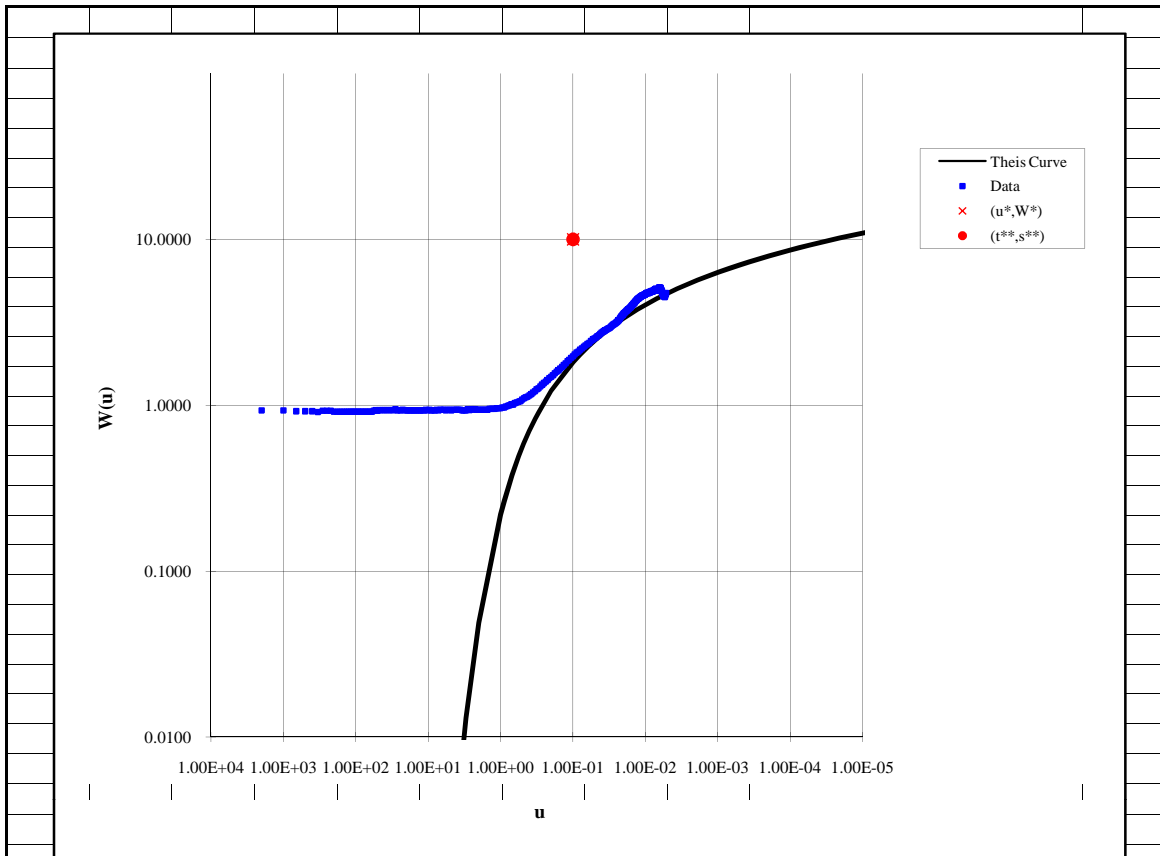
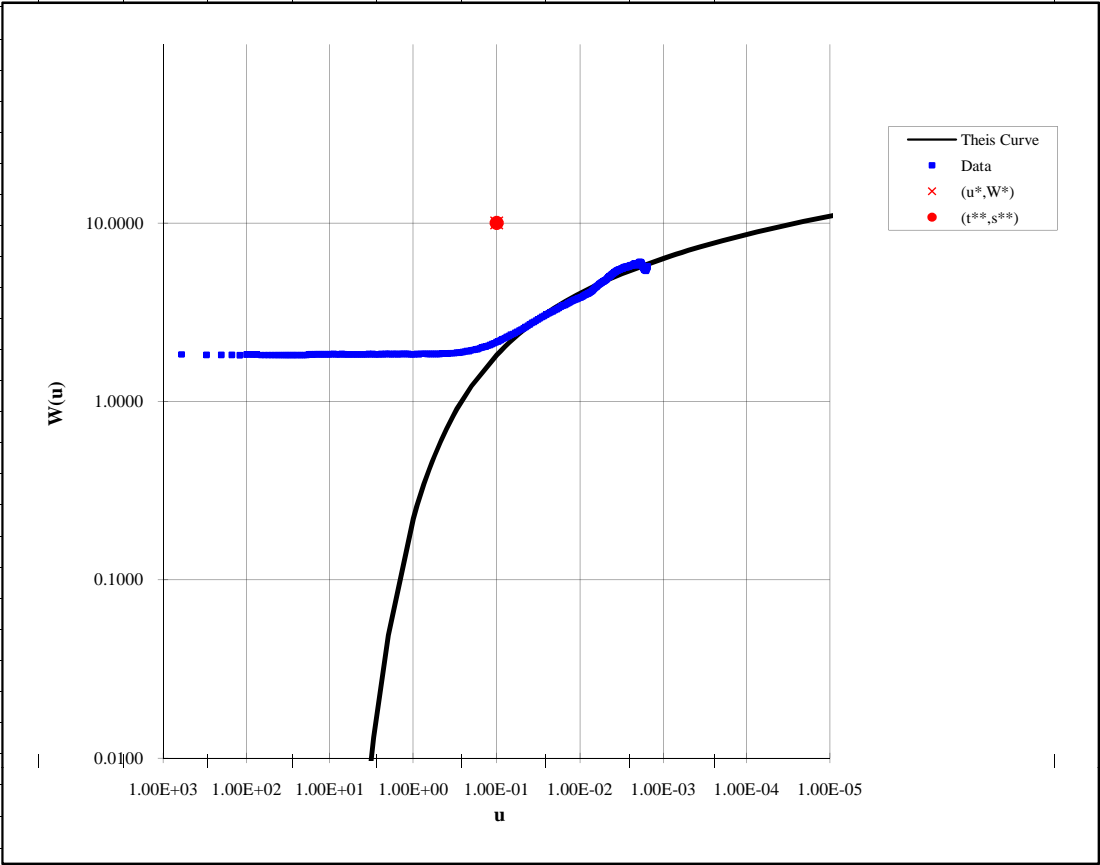


Figure E-12
 RIMW-15 Hydrograph
 EW-3 APT
 Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, SC



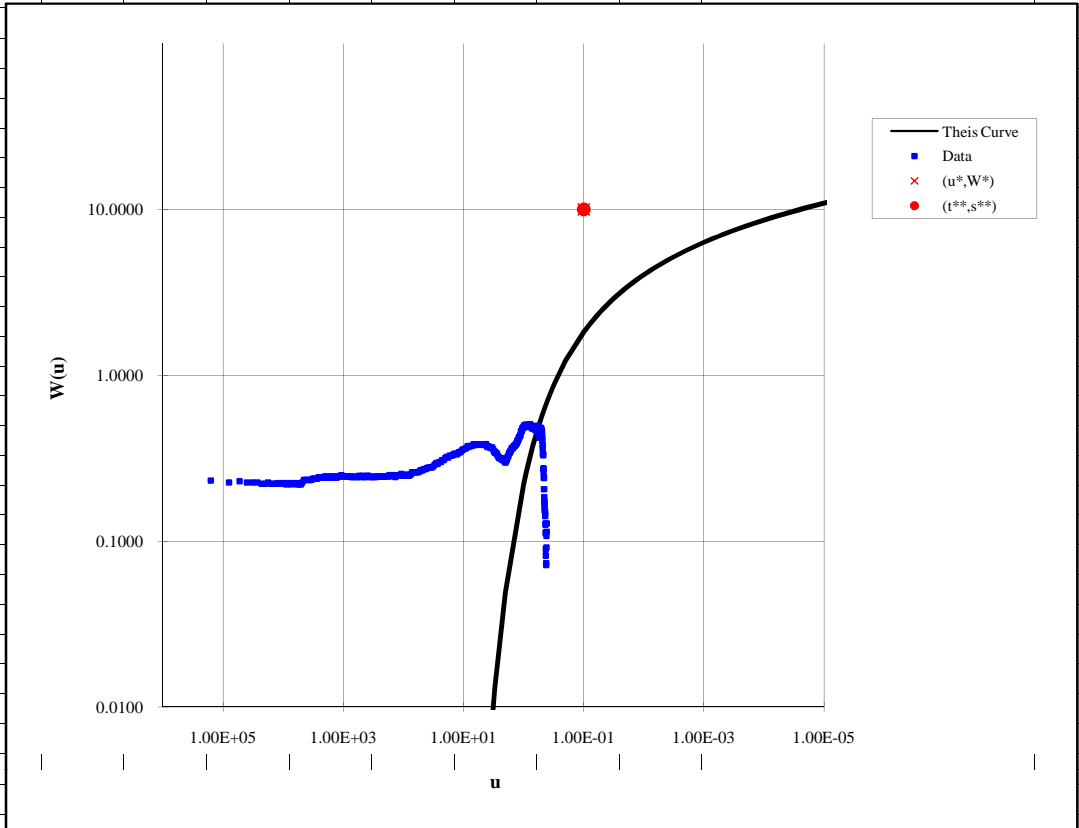
| | |
|---|----------------------------|
| Q | 3.3 gpm |
| | 0.441 ft ³ /min |
| r | 59 ft |

| | | |
|---------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------------------------------------------------------|
| (1) Select convenient $u^{**}, W(u)^{**}$ on type curve (shown as (u^{**}, W^{**})). | | |
| | 0.1 | <- u^{**} |
| | 10 | <- W^{**} |
| (2) Shift data point curve relative to type curve | | |
| | 10 | <- Shift-h (Left-Right Shifting) |
| | 5 | <- Shift-v (Up-Down Shifting) |
| (3) Adjust (t,s) to move match point (on data curve - shown as (t^{**}, s^{**})) | | |
| | 100 | <- t^{**} 0.10 <- computed u^{**} (should agree with u^{**} in step 1) |
| | 2 | <- s^{**} 10.00 <- computed W^{**} (should agree with W^{**} in step 1) |
| (5) Compute Formation Constants | | |
| T= | 0.175539 ft ² /min | 252.8 ft ² /day |
| S= | 0.002017 | |



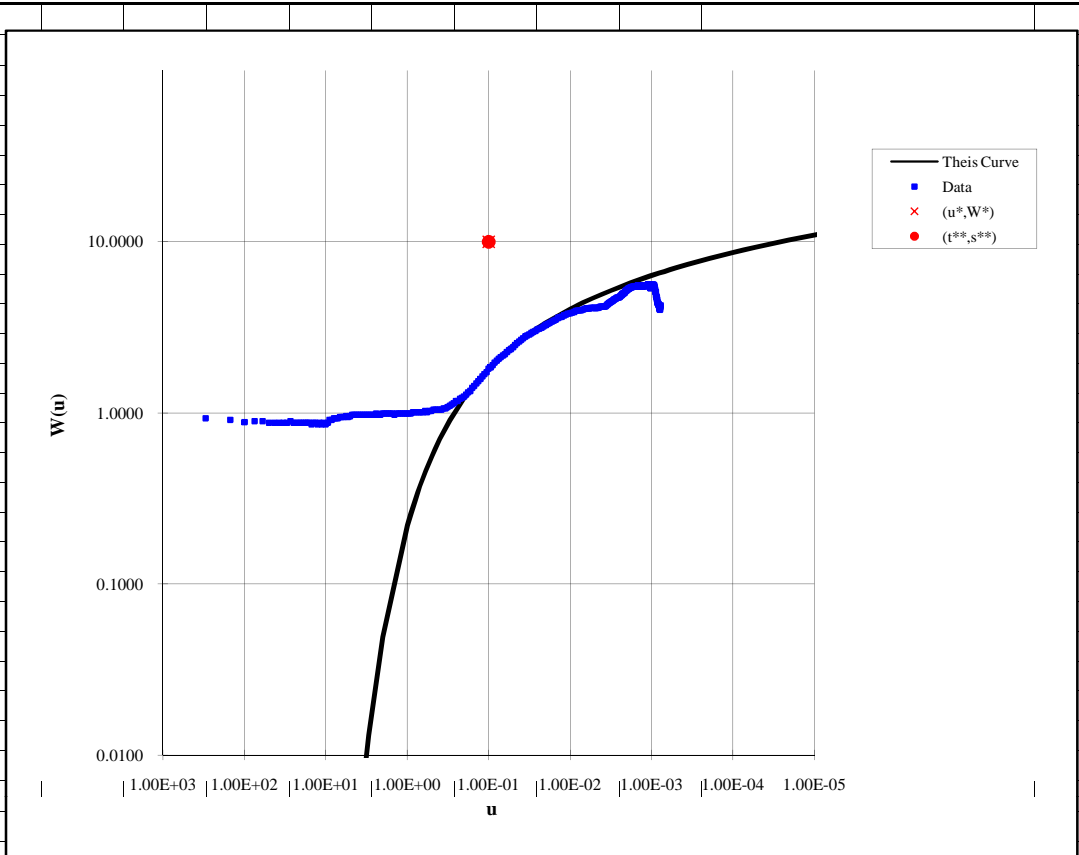
| | |
|---|----------------------------|
| Q | 3.3 gpm |
| | 0.441 ft ³ /min |
| r | 52 ft |

| | | | |
|---------------------------------------------------------------------------------------------------------------------|----------|----------------------------------|-------------------------------------------------------------------|
| (1) Select convenient $u^{**}, W(u)^{**}$ on type curve (shown as (u^{**}, W^{**})). | | | |
| | 0.1 | <- u^{**} | |
| | 10 | <- W^{**} | |
| (2) Shift data point curve relative to type curve | | | |
| | 3 | <- Shift-h (Left-Right Shifting) | |
| | 5 | <- Shift-v (Up-Down Shifting) | |
| (3) Adjust (t,s) to move match point (on data curve - shown as (t^{**}, s^{**})). | | | |
| | 30 | <- t^{**} | 0.10 <- computed u^{**} (should agree with u^{**} in step 1) |
| | 2 | <- s^{**} | 10.00 <- computed W^{**} (should agree with W^{**} in step 1) |
| (5) Compute Formation Constants | | | |
| T= | 0.175539 | ft ² /min | 252.8 ft ² /day |
| S= | 0.000779 | | |



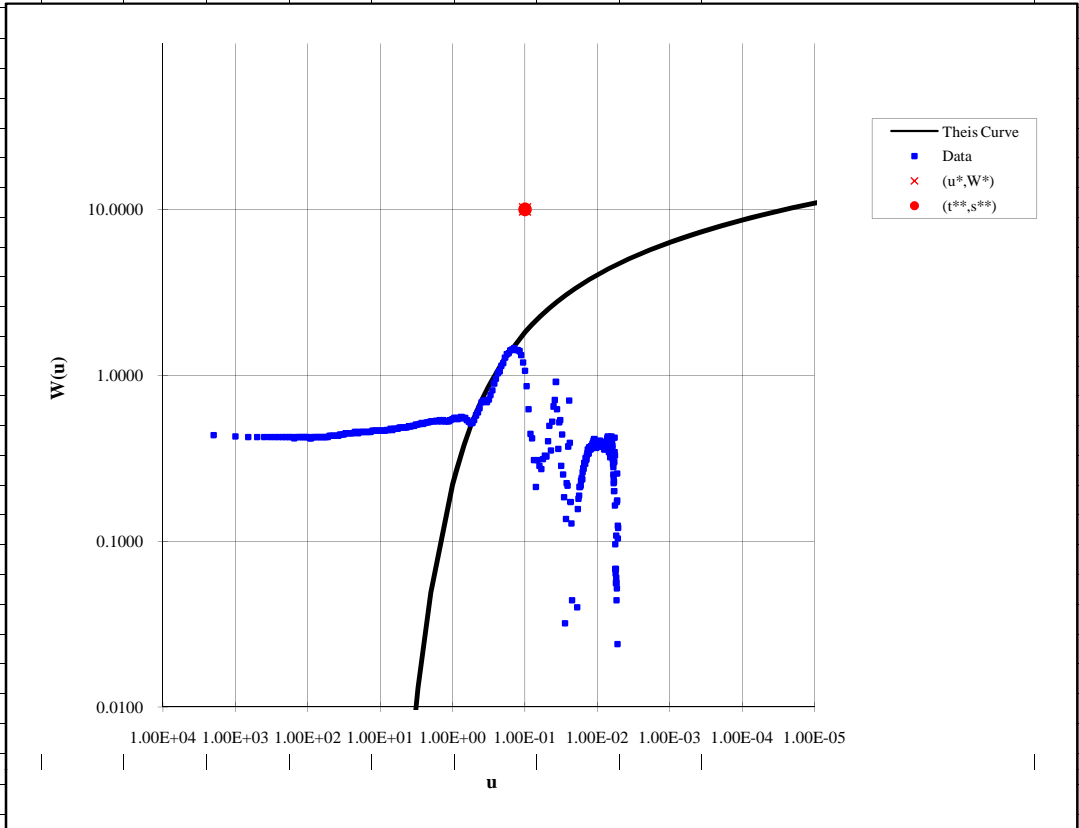
| | |
|---|----------------------------|
| Q | 3.3 gpm |
| | 0.441 ft ³ /min |
| r | 225 ft |

| | | |
|---------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------------------------------------------------------|
| (1) Select convenient $u^{**}, W(u)^{**}$ on type curve (shown as (u^{**}, W^{**})). | | |
| | 0.1 | <- u^{**} |
| | 10 | <- W^{**} |
| (2) Shift data point curve relative to type curve | | |
| | 800 | <- Shift-h (Left-Right Shifting) |
| | 2 | <- Shift-v (Up-Down Shifting) |
| (3) Adjust (t,s) to move match point (on data curve - shown as (t^{**}, s^{**})) | | |
| | 8000 | <- t^{**} 0.10 <- computed u^{**} (should agree with u^{**} in step 1) |
| | 5 | <- s^{**} 10.00 <- computed W^{**} (should agree with W^{**} in step 1) |
| (5) Compute Formation Constants | | |
| T= | 0.070215 ft ² /min | 101.1 ft ² /day |
| S= | 0.004438 | |



| | |
|----------|----------------------------|
| Q | 3.3 gpm |
| | 0.441 ft ³ /min |
| r | 65 ft |

| | | |
|---------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------------------------------|
| (1) Select convenient $u^{**}, W(u)^{**}$ on type curve (shown as (u^{**}, W^{**})). | | |
| | 0.1 <- u^{**} | |
| | 10 <- W^{**} | |
| (2) Shift data point curve relative to type curve | | |
| | 1.5 <- Shift-h (Left-Right Shifting) | |
| | 9 <- Shift-v (Up-Down Shifting) | |
| (3) Adjust (t,s) to move match point (on data curve - shown as (t^{**}, s^{**})) | | |
| | 15 <- t^{**} | 0.10 <- computed u^{**} (should agree with u^{**} in step 1) |
| | 1.11 <- s^{**} | 9.99 <- computed W^{**} (should agree with W^{**} in step 1) |
| (5) Compute Formation Constants | | |
| T= | 0.316286 ft ² /min | 455.5 ft ² /day |
| S= | 0.000449 | |



| | |
|---|----------------------------|
| Q | 3.3 gpm |
| | 0.441 ft ³ /min |
| r | 293 ft |

| | | |
|---------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------------------------------------------------------|
| (1) Select convenient $u^{**}, W(u)^{**}$ on type curve (shown as (u^{**}, W^{**})). | | |
| | 0.1 | <- u^{**} |
| | 10 | <- W^{**} |
| (2) Shift data point curve relative to type curve | | |
| | 10 | <- Shift-h (Left-Right Shifting) |
| | 4 | <- Shift-v (Up-Down Shifting) |
| (3) Adjust (t,s) to move match point (on data curve - shown as (t^{**}, s^{**})) | | |
| | 100 | <- t^{**} 0.10 <- computed u^{**} (should agree with u^{**} in step 1) |
| | 2.5 | <- s^{**} 10.00 <- computed W^{**} (should agree with W^{**} in step 1) |
| (5) Compute Formation Constants | | |
| T= | 0.140431 ft ² /min | 202.2 ft ² /day |
| S= | 6.54E-05 | |

Appendix F

MPE Pilot Study Results

KEMRON

ENVIRONMENTAL SERVICES

1359-A Ellsworth Industrial Boulevard ■ Atlanta, GA 30318 ■ Telephone (404) 636-0928 ■ FAX (404) 636-7162 ■ <http://www.kemron.com>

April 13, 2007

Mr. Mike Lamar, P.E.
Camp Dresser and McKee, Inc.
3715 Northside Parkway, N.W.
Building 300, Suite 400
Atlanta, Georgia 30327

RE: **SVE/Pneumatic Pumping Pilot Test Report**
Former Philip Service Site (PSC site)
2324 Vernsdale Road.
Rock Hill, York County, South Carolina

Dear Mr. Lamar:

KEMRON Environmental Services, Inc. (KEMRON) is pleased to present the above-referenced pilot study report. A total of two multi-phase extraction pilot tests were conducted at the subject site.

If you have any questions, or would like additional information concerning the enclosed information, please contact either of the undersigned at 404-636-0928.

Sincerely,
KEMRON Environmental Services, Inc.



Daniel S. Robinson
Project Scientist



Jeanette L. Hamm, P.E.
Project Manager

**HIGH-VACUUM MULTIPHASE EXTRACTION
PILOT STUDY REPORT**

**Former Philips Service Site (PSC)
2324 Vernsdale Road.
Rock Hill, South Carolina**

Prepared for:

Camp Dresser and McKee, Inc.
3715 Northside Parkway NW, Building 300, Suite 400
Atlanta, GA 30327

March 2007

Prepared by:



KEMRON Environmental Services, Inc.
1359-A Ellsworth Ind. Blvd.
Atlanta, Georgia

A handwritten signature in black ink, appearing to read "D. Robinson", written over a horizontal line.

Daniel S. Robinson
Project Scientist

4/13/07
Date

A handwritten signature in black ink, appearing to read "Jeanette L. Hamm", written over a horizontal line.

Jeanette L. Hamm, P.E.
Project Manager

4/13/07
Date

Table of Contents

| | | |
|-----|--------------------------------------|---|
| 1.0 | INTRODUCTION | 1 |
| 1.1 | Background | 1 |
| 1.2 | Objectives | 1 |
| 2.0 | PROCEDURES | 2 |
| 2.1 | Methods | 2 |
| 2.2 | Equipment | 2 |
| 3.0 | MONITORING AND DATA COLLECTION | 3 |
| 3.1 | Extraction Well | 3 |
| | 3.1.1 Pilot Study 1..... | 3 |
| | 3.1.2 Pilot Study 2..... | 3 |
| 3.2 | Observation Wells | 3 |
| | 3.2.1 Pilot Study 1..... | 4 |
| | 3.2.2 Pilot Study 2..... | 4 |
| 3.3 | MPE System Results..... | 5 |
| | 3.3.1 Pilot Study 1..... | 5 |
| | 3.3.2 Pilot Study 2..... | 6 |
| 4.0 | CONCLUSIONS | 7 |
| 4.1 | Pilot Study 1..... | 7 |
| | 4.1.1 Vadose Zone Information..... | 7 |
| | 4.1.2. Recommendations..... | 7 |
| 4.2 | Pilot Study 2..... | 8 |
| | 4.1.1 Vadose Zone Information..... | 8 |
| | 4.1.2. Recommendations..... | 9 |

FIGURES

| | |
|----------|-------------------------------------------------------------------------------|
| Figure 1 | Site Map |
| Figure 2 | Process Flow Diagram MPE Equipment |
| Figure 3 | Test Well Manifold Assembly |
| Figure 4 | Pilot Study 1 - Distance from Extraction Point vs. Drawdown |
| Figure 5 | Pilot Study 2 - Distance from Extraction Point vs. Drawdown |
| Figure 6 | Pilot Study 1 - Distance from Extraction Point vs. 6.5 in Hg at Blower Inlet |
| Figure 7 | Pilot Study 1 - Distance from Extraction Point vs. 17.0 in Hg at Blower Inlet |
| Figure 8 | Pilot Study 2 - Distance from Extraction Point vs. 8.0 in Hg at Blower Inlet |
| Figure 9 | Pilot Study 2 - Distance from Extraction Point vs. 16.5 in Hg at Blower Inlet |

TABLES

| | |
|---------|------------------------------------------------------------------|
| Table 1 | Pilot Study 1, Pre and Post Extraction Potentiometric Elevations |
| Table 2 | Pilot Study 2, Pre and Post Extraction Potentiometric Elevations |

APPENDICES

| | |
|------------|------------------------------------|
| Appendix A | Multi-phase Pilot Study Datasheets |
| Appendix B | References |

1.0 INTRODUCTION

KEMRON Environmental Services, Inc. (KEMRON) has prepared this Pilot Study Report to present site specific data based on the two pilot studies completed at the PSC site on February 20-21, 2007. This report will outline the site background, study objectives, study procedures/equipment, and conclusions based on field data. Data evaluation as a result of the pilot studies will be utilized as a basis of future remedial engineering design.

1.1 Background

The Philip Services Corporation (PSC) site in Rock Hill, South Carolina is a former RCRA hazardous waste treatment, storage, and disposal facility (TSDF). Operations began at the site in 1966 and continued until the bankruptcy of PSC in December 2003. Several previous investigations at the site have identified chemical releases to soil and groundwater, and some remediation has been performed.

1.2 Objectives

In order to determine the overall effectiveness of Multi-Phase Extraction (MPE) at a specific site, field pilot studies should be performed prior to the engineering design of a MPE system. Pilot studies usually measure pressures, flow rates, contaminant levels, and other system parameters. The primary objective of a MPE pilot study is to demonstrate that multi-phase extraction has the potential to perform significant remediation of a contaminant mass when operated over a longer time period.

A second objective of the MPE pilot study is the determination of the zone of influence. The pilot study will indicate the response of both the vadose and saturated zone to varying levels of vacuum. The zone of influence is determined by monitoring the effect of vacuum applied in an extraction well to surrounding observation wells. Additionally, the drawdown recorded in the observation wells can determine a zone of influence, or capture zone, the pumping wells will create on the subsurface.

A third objective of the MPE pilot study is to provide engineers with contaminant levels and flow rates in order to prepare design specifications and cost estimates for remediation equipment. However, long-term trends of removal rates cannot be assumed based on data collected during short-term pilot studies.

2.0 PROCEDURES

2.1 Methods

Multi-phase extraction is a remedial technology that extracts both subsurface liquids and vapors from an extraction well through the application of varying levels of vacuum pressure. To control liquid levels during the pilot study, a drop tube, also known as a stinger, is installed in the extraction well, to obtain static water level depth. The applied vacuum and airflow extracted from the well is conveyed through the drop tube. As the water table begins to rise due to the applied vacuum, both free product and groundwater are extracted through the drop tube. As a result, the static water table can be maintained as the applied vacuum is introduced to the extraction well during the pilot study. The depth of the drop tube can be adjusted to varying depths to optimize vacuum to depress the liquid levels in the extraction well.

To increase airflow and recovery, ambient air (aspiration air) is introduced at the extraction well. An airflow meter is mounted to the test well assembly to measure the additional volume of aspiration air that is added to the well. Additionally, two vacuum gauges are mounted to the test well assembly to measure the induced vacuum of the stinger and the well annulus.

The combined air and liquid extracted from the well is conveyed through a flexible vacuum hose to the MPE unit where the liquid is processed through an air/water separator and contained in a poly tank. The extracted vapors are discharged into the atmosphere. During the pilot study, specific system parameters such as vacuum levels, flow rate, temperature, and vapor concentrations are recorded at regular intervals. Figure 2 illustrates the process flow of the MPE pilot study unit, and Figure 3 illustrates a typical pilot test well manifold assembly.

To monitor the subsurface effects of the extraction, five observation wells are selected within a predetermined radius of the extraction well and monitored during the pilot study at regular intervals. All data collected from the pilot study will be evaluated to determine the effectiveness of MPE as a remedial strategy for the specific site.

2.2 Equipment

The KEMRON MPE Pilot Test Unit is a completely self-contained, trailer-mounted unit equipped with a Siemens 10 hp liquid ring vacuum pump capable of 200 cfm @ 27 in HG vacuum, a 120-gallon capacity knock-out tank with level controls, a 2 hp transfer pump, a MPE unit electrical control panel, an 18 kw, 240 VAC 3-phase power generator, a custom instrument gauge panel, a custom test manifold with gauges, custom observation wellhead plugs, a set of differential pressure gauges, flexible vacuum hose, an interface probe, and a Multi-Rae.

3.0 MONITORING AND DATA COLLECTION

3.1 Extraction Wells

Prior to mobilization, research into the geology of the site, well specifications, and contaminant concentrations can aid in determination of extraction well selection. Final decisions should be made in the field based on accessibility and other site conditions. Field inspection should confirm that the existed extraction and observation wells adhere to the current South Carolina Water Well Standards. For the PSC site in Rock Hill, South Carolina, two pilot studies were conducted in different areas of the facility, which are illustrated in Figure 1. Pilot test extraction wells were selected by CDM at the beginning of the tests.

3.1.1 Pilot Study 1

In the first pilot study conducted February 20, 2007, monitoring well RIMW-8 was utilized as the extraction well and was gauged prior to startup of the pilot study. The depth to water from the top of the well casing was measured at 16.35 feet below ground surface (bgs). A 1" drop tube was installed in RIMW-8 to a depth of approximately 22 feet bgs. Upon pilot study start-up, an induced vacuum of 88.4 inches of water column (in. w.c.) or 6.5 inches of Mercury (in. Hg) was introduced and maintained for approximately 165 minutes. Induced vacuum pressures stabilized in the observation wells after approximately 135 minutes of extraction at 6.5 in. Hg. At this point, the vacuum was increased to 231.1 in. w.c. or 17.0 in. Hg and maintained for approximately 150 minutes. Induced vacuum pressures stabilized in observation wells after approximately 120 minutes of extraction at 17.0 in. Hg. All measured data from this pilot study on the extraction well, RIMW-8, is presented in timed intervals as Table 1 in Appendix A.

3.1.2 Pilot Study 2

The second pilot study conducted on February 21, 2007, utilized PW-2A as the extraction well. Prior to the test liquid levels in this well were gauged. Free phase product was encountered at a depth of 13.64 feet bgs, and water at a depth of 18.78 feet bgs. A 1" drop tube was installed in PW-2A to a depth of 22 feet. Upon pilot study start-up, an induced vacuum of 108.8 inches of water column (in. w.c.) or 8.0 inches of Mercury (in. Hg) was introduced and maintained for approximately 180 minutes. Induced vacuum pressures stabilized in the observation wells after approximately 120 minutes of extraction at 8.0 in. Hg. At this point, the vacuum was increased to 224.3 in. w.c. or 16.5 in. Hg and maintained for approximately 165 minutes. Induced vacuum pressures stabilized in observation wells after approximately 150 minutes of extraction at 16.5 in. Hg. All measured data at timed intervals from this pilot study on extraction well, PW-2A, is presented as Table 2 in Appendix A

3.2 Observation Wells

Observation wells utilized for measuring the subsurface response to the MPE pilot study should be strategically located around the perimeter of the extraction well. Five observation wells were observed during each pilot study. Dependent upon field conditions, observation wells available should be at varying distances from the extraction well and along 90, 120, or 180 degree radials from the extraction well. Additionally, the five observation wells should be placed within a radial distance of less than two times the depth to water table for low permeability sites. For mixed to high permeability sites, a radial distance of one to three times the depth to water table should be utilized dependent upon site conditions. Observation wells should be screened to bracket the static water table. Observation wells for both pilot studies were selected by CDM.

3.2.1 Pilot Study 1

The pilot study on extraction well RIMW-8 utilized five existing wells, including MW-110A, P-1, RIMW-4, RIMW-5, and OB-8A as observation wells. These wells are at distances of 56, 105, 119, 112, and 50 feet from the extraction well, respectively. All observation wells were gauged prior to pilot study start-up to monitor any drawdown caused by the extraction. Observation wells were fitted with well seals and differential pressure gauges to monitor subsurface changes. At 88.4 in. w.c. (6.5 in. Hg) vacuum induced at the extraction well, vacuum influence was noted in all observation wells. Stabilization was achieved in approximately 135 minutes in all five wells. After stabilization was achieved and monitored the induced vacuum was increased to 231.1 in. w.c. (17.0 in. Hg) at the extraction well. Stabilization was achieved after approximately 120 minutes in all five observation wells.

Slight variation was noted in most of the observation wells during the pilot study. These deviations can most likely be attributed naturally occurring preferential pathway development. Given the length of the study and the soil conditions, variation in the observation wells is to be expected. Upon completion of the pilot study, the observation wells were again gauged using an interface probe. Most of the observation wells experienced drawdown due to the extraction from RIMW-8, and this is illustrated in Table 1 and Figure 4.

3.2.2 Pilot Study 2

The pilot study on extraction well PW-2A utilized five existing wells, including PW-2, OB-900, OB-21, OB-22, and OB-23, as observation wells. These wells are at distances of 20.2, 20.0, 6, 11, and 20 feet from the extraction well, respectively. All observation wells were gauged prior to pilot study start-up. Observation wells were fitted with well seals and differential pressure gauges to monitor subsurface changes. At 108.8 in. w.c. (8.0 in. Hg) vacuum induced at the extraction well, vacuum influence was noted in all observation wells. Stabilization was achieved in approximately 120 minutes in all five wells. After stabilization was achieved and monitored, the induced vacuum was increased to 224.3 in. w.c. (16.5 in. Hg) at the extraction well. Stabilization was achieved after approximately 150 minutes in all five observation wells. Follow stabilization at 224.3 in. w.c., the induced vacuum was increased to 312.8 in. w.c. (23.0 in. Hg) to maximize fluid collection.

Slight variation was noted in most of the observation wells during the pilot study. These deviations can most likely be attributed to naturally occurring preferential pathway development. Given the length of the study and the soil conditions, variation in the observation wells is to be expected. Upon completion of the pilot study, the observation wells were again gauged using an interface probe. All observation wells experienced drawdown due to the extraction from PW-2A, and this is illustrated in Table 2 and Figure 5.

3.3 MPE Pilot Test Results

The aboveground portion of the MPE pilot testing system, including a vacuum pump, air/water separator, valves, gauges, and power generator, is trailer-mounted. This type of mounting provides simple connections which are beneficial in areas of limited space. The duration of pilot studies can range from a few hours to multiple days. Upon start-up, MPE systems produce an initial jump in effluent concentrations, followed by a decrease to more stable levels. During each of the pilot studies, specific system parameters were recorded at regular intervals.

3.3.1 Pilot Study 1

During the extraction conducted on RIMW-8, all observation monitoring wells including MW-110A, P-1, RIMW-4, and RIMW-5 experienced decreases in groundwater elevation of 0.03, 0.09, 0.38, and 0.05 feet, respectively. An increase in groundwater elevation of 0.06 feet was seen in well OB-8A. This can be explained by a mounding effect on the water table caused by the induced vacuum for the shallow monitoring well. The distance from the extraction point versus drawdown curve for observation wells is illustrated in Figure 4.

With an applied vacuum of 88.4 in. w.c. (6.5 in. Hg) at the MPE unit, an adjusted well flow rate averaging 3.1 scfm was measured using a Dwyer DS-200 flow sensor. A Multi-Rae was used in measuring VOC vapor concentrations in parts per million (ppm) and Lower Explosive Limit effluent concentrations in percent LEL. At 6.5 in. Hg, the LEL readings were 0% and PID readings ranged from 2.3 to 4.5 ppm. Based on historical data of the nature of constituents, the PID readings were corrected to 1,2-Dichloroethane (DCA). The VOC extraction rate was measured at an average below 0.00 pounds/day at 6.5 in. Hg induced vacuum pressure at the well. A total of 0.00 pounds of VOCs were extracted during this pilot study.

Following stabilization at 6.5 in. Hg, the induced vacuum was increased to 231.1 in. w.c. (17.0 in. Hg) at the MPE unit. The adjusted well flow rate averaged 6.75 scfm, and was measured using a Dwyer DS-200 flow sensor. A Multi-Rae was used in measuring VOC vapor concentrations in ppm and effluent concentrations in percent LEL. At 17.0 in. Hg, the LEL readings were 0% and PID readings ranged from 6.9 to 9.4 ppm. Based on historical data of the nature of constituents, the PID readings were corrected to 1,2-Dichloroethane (DCA). The VOC extraction rate was measured at an average of 0.012 pounds/day at 17.0 in. Hg induced vacuum pressure at the well. A total of 0.00 pounds of VOCs were extracted during this pilot study.

During the first pilot study on extraction well RIMW-8, 262 gallons of fluids were recovered. At 6.5 in. Hg, the calculated flowrate is 0.38 gallons per minute (gpm), and at 17.0 in. Hg the calculated flowrate is 1.33 gpm. Free phase fluids were noticeable in the sight tube on the MPE unit's recovery tank during the pilot study. A clear fluid separated above the water in the tank. The total amount of this free phase fluid was not recorded at the end of the pilot study, and all fluids recovered were disposed in the onsite water treatment system. All measured data from the MPE unit is presented in Appendix A.

3.3.2 Pilot Study 2

During the extraction conducted on PW-2A, monitoring wells including PW-2 and OB-900 experienced decreases in groundwater potentiometric elevation of 1.20 and 3.91 feet, respectively. An increase in potentiometric elevation of 6.38, 1.76, and 0.48 feet was observed in wells OB-21, OB-22, and OB-23. This can be explained by a mounding effect on the water table for the shallow monitoring well. The distance from the extraction point versus drawdown curve for observation wells is illustrated in Figure 4.

With an applied vacuum of 108.7 in. w.c. (8.0 in. Hg) at the MPE unit, an adjusted well flow rate averaging 11.3 scfm was measured using a Dwyer DS-200 flow sensor. A Multi-Rae was used in measuring VOC vapor concentrations in ppm and effluent concentrations in percent LEL. At 8.0 in. Hg, the LEL readings were 0% and PID readings ranged from 0.3 to 0.9 ppm. Based on historical data of the nature of constituents, the PID readings were corrected to diesel fuel. The VOC extraction rate was measured at an average below 0.00 pounds/day at 8.0 in. Hg induced vacuum pressure at the well. A total of 0.00 pounds of VOCs were extracted during this pilot study.

Following stabilization at 8.0 in. Hg the induced vacuum was increased to 224.3 in. w.c. (16.5 in. Hg) at the MPE unit. The adjusted well flow rate averaged 10.7 scfm, and was measured using a Dwyer DS-200 flow sensor. A Multi-Rae was used in measuring VOC vapor concentrations in ppm and effluent concentrations in percent LEL. At 16.5 in. Hg, the LEL readings ranged from 7 to 11% and PID readings ranged from 0.4 to 0.5 ppm. Based on historical data of the nature of constituents, the PID readings were corrected to diesel fuel. The VOC extraction rate was measured at an average of 3.82 pounds/day at 16.5 in. Hg induced vacuum pressure at the well. A total of 0.64 pounds of VOCs were extracted during this pilot study.

During the second pilot study on extraction well PW-2A, 169 gallons of fluids were recovered, at an average rate of 0.43 gallons per minute. At 6.5 in. Hg, the calculated flowrate was 0.29 gpm, and at 16.5 the calculated flowrate was 0.49 gpm. Free phase fluids were noticeable in the sight tube on the MPE unit's recovery tank during the pilot study. A dark brown liquid separated above the water in the tank. The total amount of this free phase fluid was not recorded at the end of the pilot study, and all fluids recovered were disposed in the onsite water treatment system. All measured data from the MPE unit is presented in Appendix A.

4.0 CONCLUSIONS

Groundwater elevation measurements taken in the extraction and observation wells before and after the pilot study exhibit the drawdown results of the two pilot studies. The drawdown observed during the pilot study was plotted versus horizontal distance from the extraction well, as illustrated in Figures 4 and 5. In addition, the vacuum radius of influence or is determined by plotting distance from the extraction point versus the induced the vacuum pressures. This is illustrated in Figures 6 through 9.

4.1 Pilot Study 1

4.1.1 Vadose Zone Information

In a homogeneous lithology, recorded vacuum readings should exponentially decline with distance from the extraction well at a rate dependent upon the horizontal permeability. Thus, the vadose zone vacuum radius of influence can be determined for any desired vacuum pressure. Based on the results of Pilot Study 1, the extraction and observation wells utilized are likely installed in a relatively homogeneous lithology. The graphs produced show an extrapolated best-fit line gradually declining over time, and by expanding the scale an estimated radius of influence can be determined.

Utilizing the 0.10 in. w.c. engineering standard as an indication of induced vacuum pressure's radius of influence in the vadose zone, a radius of influence of 130 feet was extrapolated at an extraction well vacuum pressure of 88.4 in. w.c. or 6.5 in. Hg. A radius of influence of 130 feet is not realistic. Due to varying soil permeability and discontinuities in the subsurface, a conservative vacuum pressure of 1.0 in. w.c. is typically utilized as an indication of induced vacuum pressure in the vadose zone. Based on a standard of 1.0 in. w.c., a radius of influence of 100 feet was extrapolated at a vacuum pressure of 88.4 in. w.c. or 6.5 in Hg. A radius of influence of 100 feet is not realistic. Additionally, air and water extraction rates at this vacuum show little effect on the subsurface.

Utilizing the 0.10 in. w.c. engineering standard as an indication of induced vacuum pressure's radius of influence in the vadose zone, a radius of influence of 150 feet was extrapolated at an extraction well vacuum pressure of 231.1 in. w.c. or 17.0 in. Hg. A radius of influence of 150 feet is not realistic. Due to varying soil permeability and discontinuities in the subsurface, a conservative vacuum pressure of 1.0 in. w.c. is typically utilized as an indication of induced vacuum pressure in the vadose zone. Based on a standard of 1.0 in. w.c., a radius of influence of approximately 90 feet was extrapolated at a vacuum pressure of 231.1 in. w.c. or 17.0 in Hg. A radius of influence of 90 feet is not realistic. A conservative radius of influence of 50 feet would ensure the capture of VOCs in the vadose zone and increase the air exchange in the subsurface around RIMW-8. However, during full scale implementation the radius may decline due to the formation of preferential pathways.

4.1.2 Recommendations

Pilot study 1 activities conducted at RIMW-8, were performed to determine if multiphase extraction would be an effective means of remediation. Based on evaluation of the data outlined above, it appears that MPE technology would not be an effective means of remediation of the site contamination. During the pilot study, the total fluids and vapor recovery was low, VOC vapor extraction rates were 0.00 pounds/day and 1.33 gpm at 17.0 in. Hg. Additionally, the relatively low observed induced vacuum pressure on the subsurface would limit the ability to remove VOCs in the vadose zone.

A typical multiphase extraction system would include utilizing drop tubes to effectively remove total fluids, including free product and groundwater, and vapor phase VOCs for treatment above ground. This technology would also require a large vacuum blower to overcome the pressure head and distance to the available remediation system locations. A vacuum enhanced pump and treat system would provide a higher flowrate of total fluids for treatment, assuming a sustained yield from the aquifer.

4.2 Pilot Study 2

4.2.1 Vadose Zone Information

In a homogeneous lithology, recorded vacuum readings should exponentially decline with distance from the extraction well at a rate dependent upon the horizontal permeability. Thus, the vadose zone vacuum radius of influence can be determined for any desired vacuum pressure. Based on the results of Pilot Study 2, the extraction and observation wells utilized are likely installed in a relatively homogeneous lithology. The graphs produced which show an extrapolated best-fit line gradually declining over time, and by expanding the scale an estimated radius of influence can be determined. Results obtained from observation well monitoring do not surround the well perimeter and may have skewed results.

Utilizing the 0.10 in. w.c. engineering standard as an indication of induced vacuum pressure's radius of influence in the vadose zone, a radius of influence of 40 feet was extrapolated at an extraction well vacuum pressure of 108.8 in. w.c. or 8.0 in. Hg. A radius of influence of 40 feet is realistic. However, due to varying soil permeability and discontinuities in the subsurface, a conservative vacuum pressure of 1.0 in. w.c. is typically utilized as an indication of induced vacuum pressure in the vadose zone. Based on a standard of 1.0 in. w.c., a radius of influence of 25 feet was extrapolated at a vacuum pressure of 108.8 in. w.c. or 8.0 in Hg. A radius of influence of 25 feet is realistic, however during long-term extractions the radius may decrease due to formation of preferential pathways.

Utilizing the 0.10 in. w.c. engineering standard as an indication of induced vacuum pressure's radius of influence in the vadose zone, a radius of influence of 148 feet was extrapolated at an extraction well vacuum pressure of 224.4 in. w.c. or 16.5 in. Hg. A radius of influence of 148 feet is not realistic. Due to varying soil permeability and discontinuities in the subsurface, a conservative vacuum pressure of 1.0 in. w.c. is typically utilized as an indication of induced vacuum pressure. Based on a standard of 1.0 in. w.c., a radius of influence of 74 feet was extrapolated at a vacuum pressure of 224.4 in. w.c. or 16.5 in Hg. A radius of influence of 74 feet is realistic; however during

long-term extractions the radius may decrease due to formation of preferential pathways.

A conservative radius of influence of 50 feet would ensure the capture of VOCs in the vadose zone and increase the air exchange in the subsurface around PW-2A.

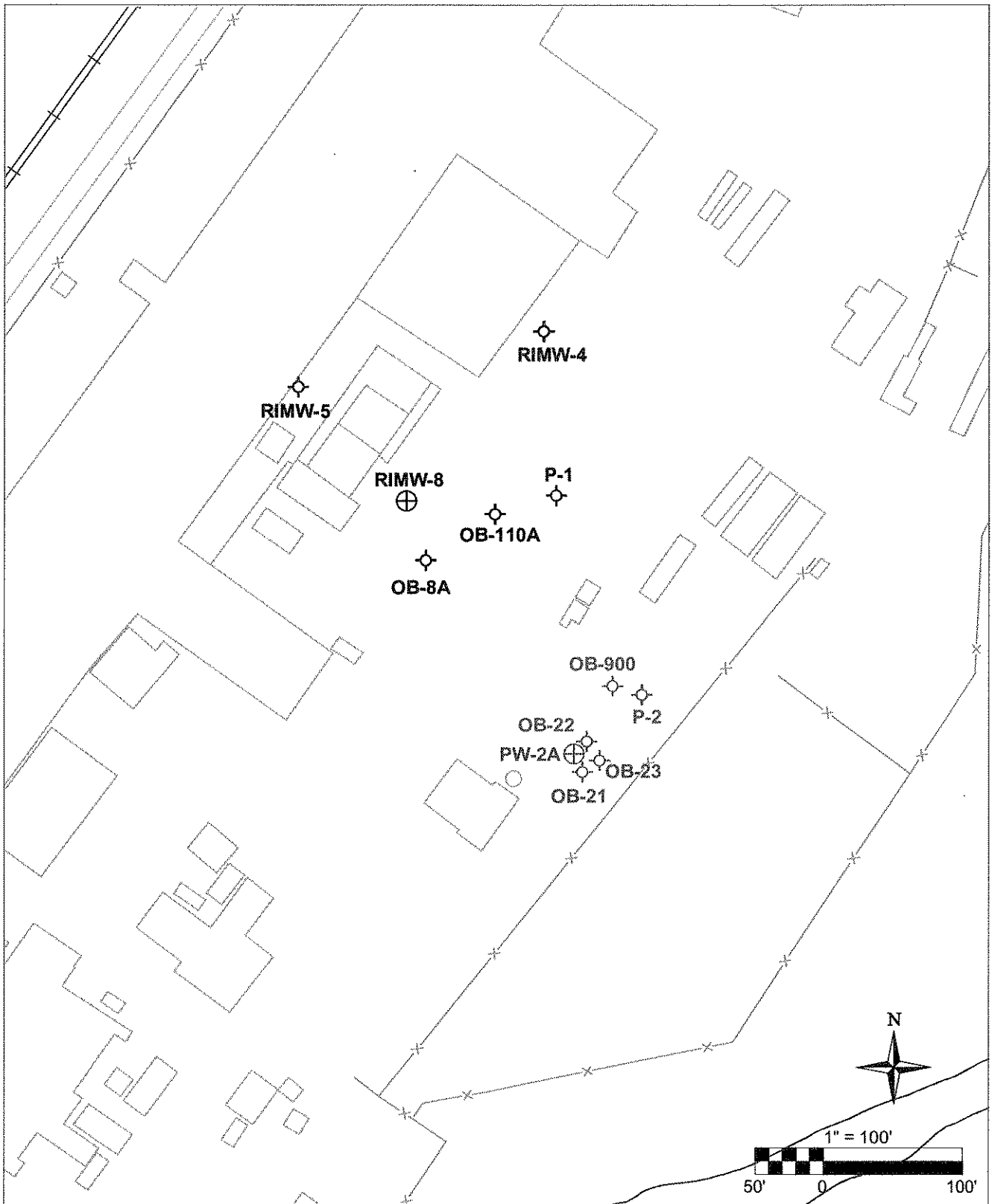
4.2.2 Recommendations

Pilot study 2 activities conducted at PW-2A were performed to determine if multi-phase extraction would be an effective means of remediation. Based on evaluation of the data outlined above, it appears that MPE technology would be an effective means of remediation of the site contamination. The potential to remove large quantities of total fluids, including groundwater and free product, and vapor phase VOCs would be an efficient remediation alternative. Additionally, application of vacuum pressure to the subsurface would increase the ability to remove VOCs in the vadose zone by air exchanges.

Based on the data collected during the pilot study, MPE well data calculated includes the following: At 8.0 in. Hg, an average scfm of 11.3, VOC extraction rates of 0.00 lbs/day, total fluid recovery of 0.29 gpm, and a radius of influence of 25 feet. At 16.5 in. Hg an average scfm of 10.7, VOC extraction rates of 3.82 lbs/day, total fluids recovery of 0.49 gpm, and a radius of influence of 50 feet.

A typical multiphase extraction system would include utilizing drop tubes to effectively remove the total fluids and vapor phase VOCs for treatment above ground. This technology would also require a large vacuum blower to overcome the pressure head and distance to the available remediation system locations. This combination of a vacuum enhanced pump and treat system would provide a higher flowrate of total fluids recovered for treatment, assuming a sustained yield from the aquifer. This vacuum enhanced pump and treat would be better suited at this portion of the PSC site. However, VOC vapor extraction rates will decline during system operation and fluid extraction rates will depend on the yield of the underlying aquifer.

Figures

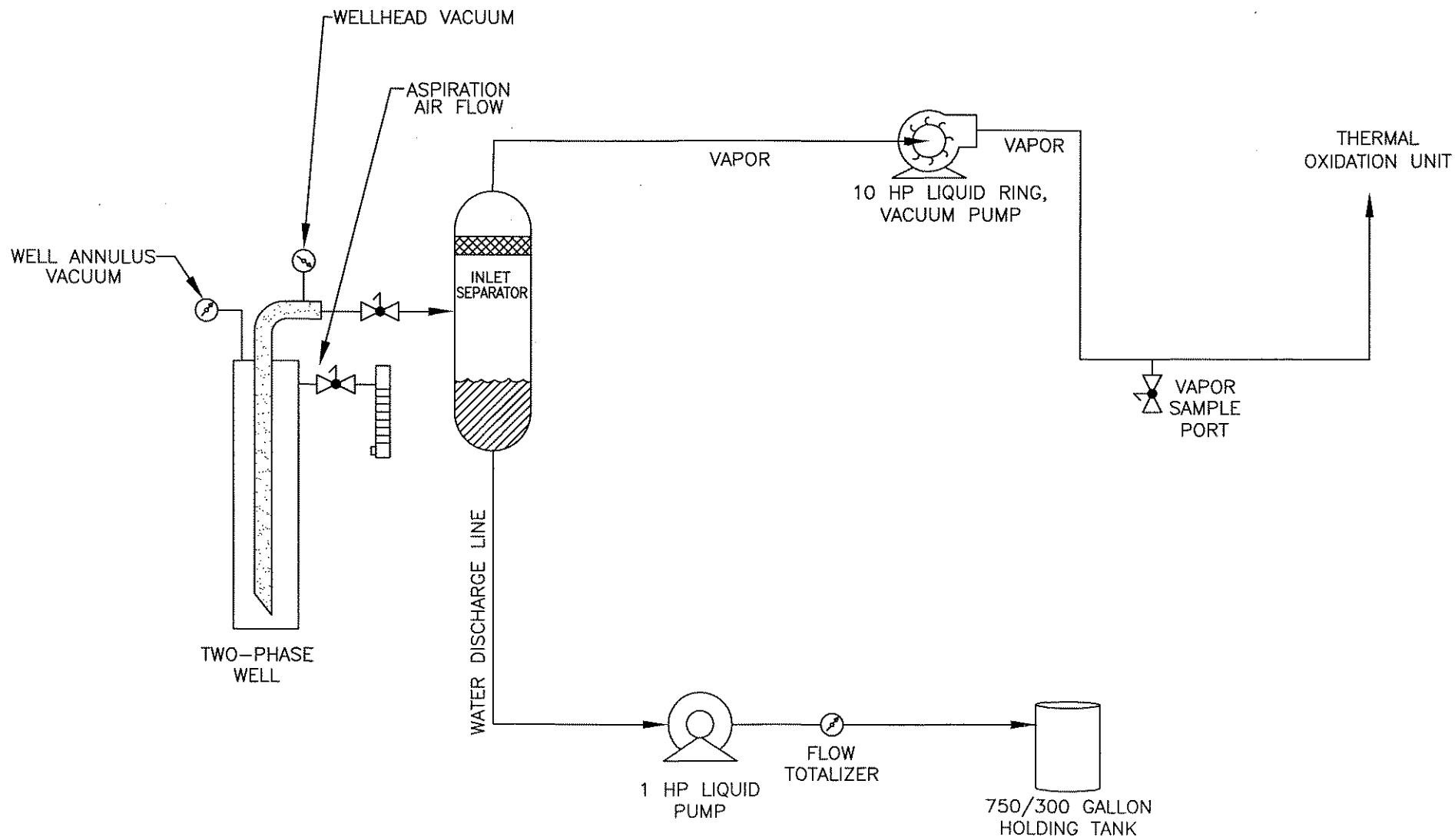


| <u>Chlorinated VOC Area</u> | <u>Fuel Oil Area</u> |
|-----------------------------|------------------------|
| ⊕ MPE Extraction Well | ⊕ MPE Extraction Well |
| ⊙ MPE Observation Well | ⊙ MPE Observation Well |

Figure 1
MPE Pilot Study Locations

RI Phase II
PSC Site
Rock Hill, South Carolina

M:\SE-ATLANTA PROJECTS\0 SE44\SE 4440-001-001\ MPE EQUIP. FIG 2.dwg 03/19/2007 kgfgrnyan CH



KEMRON
ENVIRONMENTAL SERVICES

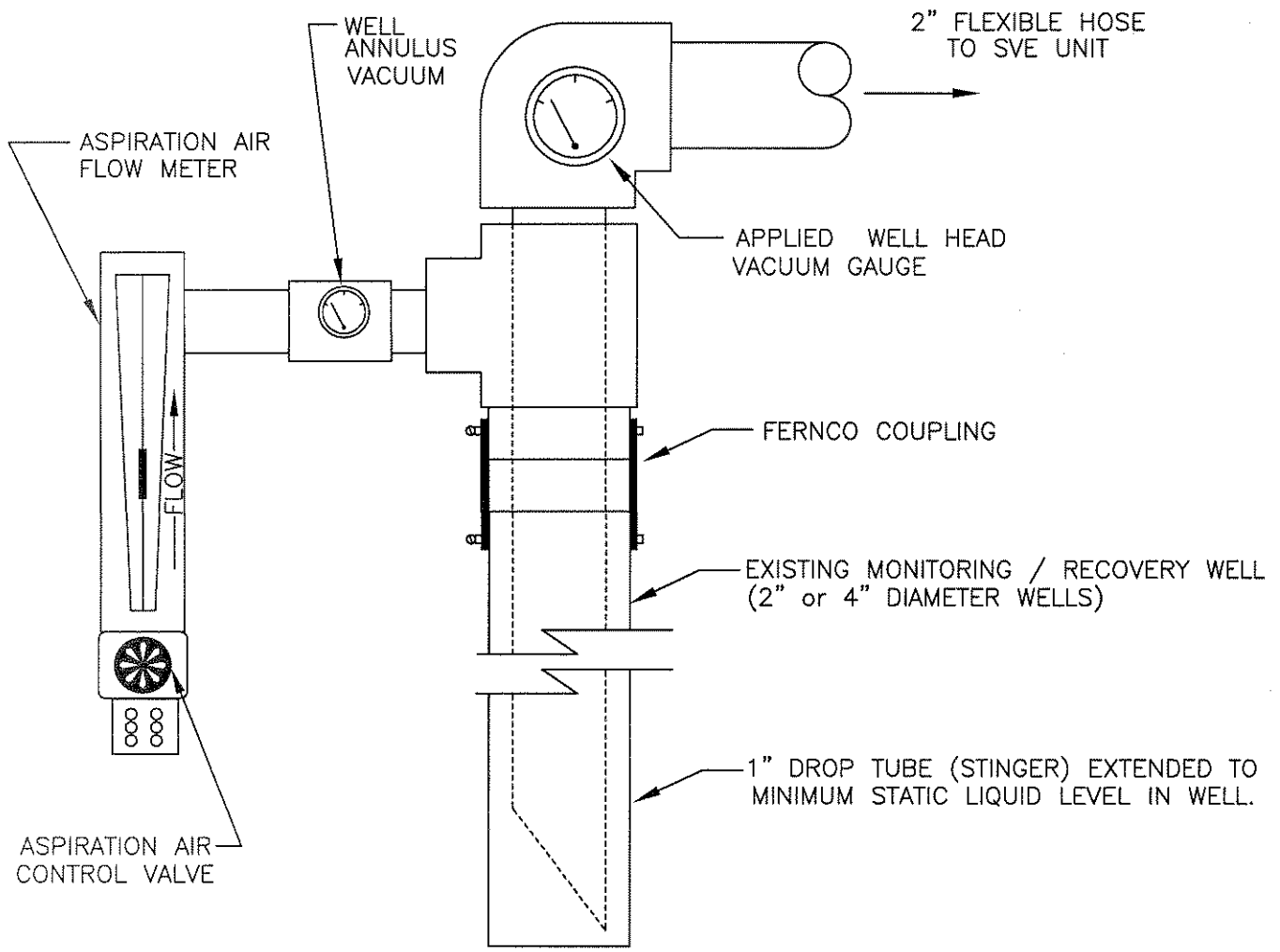
NOT TO SCALE

| | |
|-----------|----------------|
| DRAWN BY: | DATE |
| KG | 19 MARCH 2007 |
| REVIEWED: | PROJECT NO. |
| | SE4440-001-001 |
| APPROVED: | DWG. FILE NO. |
| | MPE EQUIP. |

FIGURE 2

PROCESS FLOW
DIAGRAM
MPE EQUIPMENT

M:\SE-ATLANTA PROJECTS\0 SE44\SE 4440-001-001\TEST WELL FIG 3.dwg 03/19/2007 kggrigoryan CH



KETRON
ENVIRONMENTAL SERVICES

NOT SCALED

| | |
|-----------|----------------|
| DRAWN BY: | DATE |
| KG | 19 MARCH 2007 |
| REVIEWED: | PROJECT NO. |
| | SE4440-001-001 |
| APPROVED: | DWG. FILE NO. |
| | TEST WELL |

FIGURE 3

TEST WELL
MANIFOLD ASSEMBLY

Figure 4. Pilot Study 1. RIMW-8
Distance from Extracion Point versus Drawdown

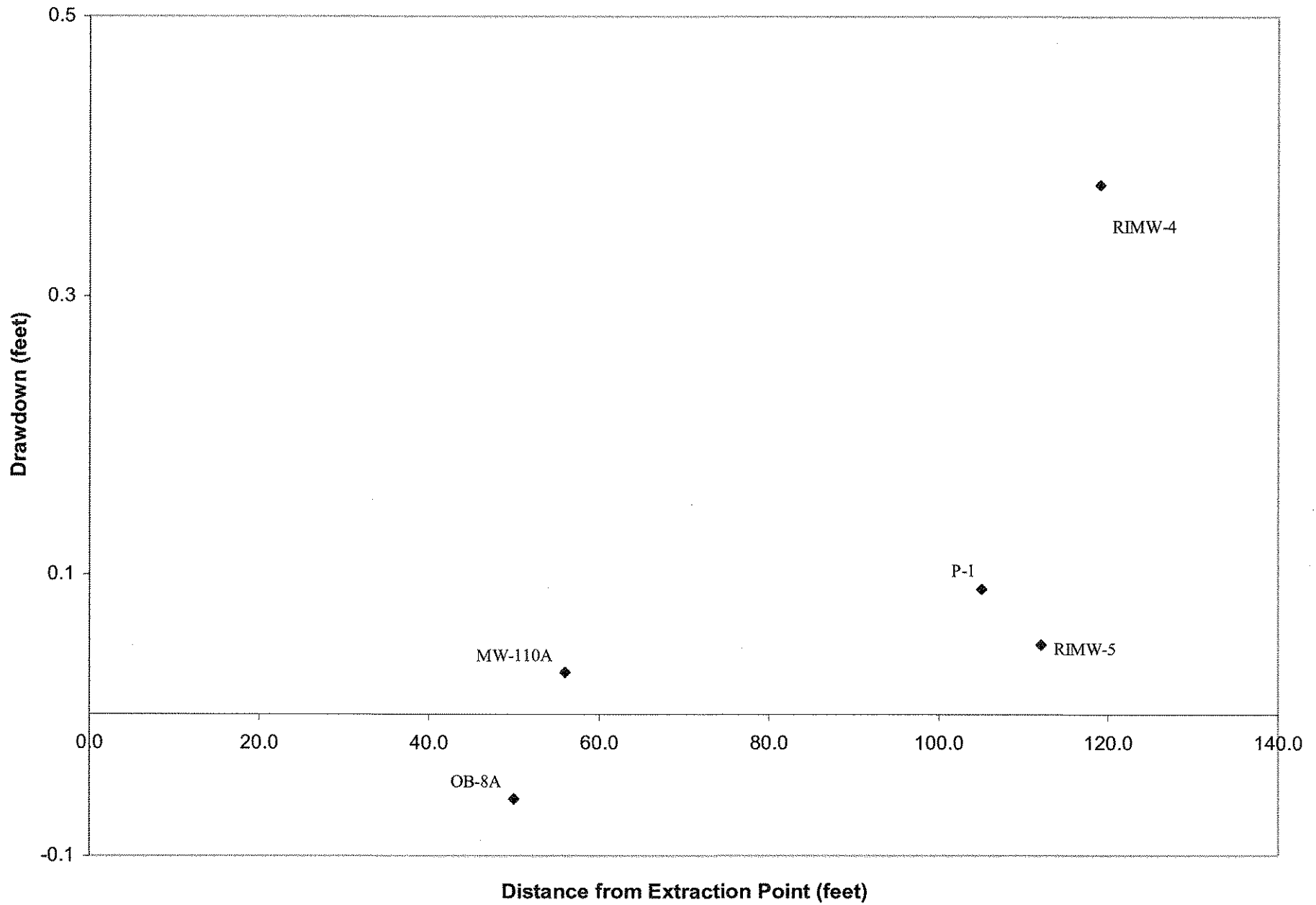


Figure 5. Pilot Study 2, PW-2A
Distance from Extraction Point versus Drawdown

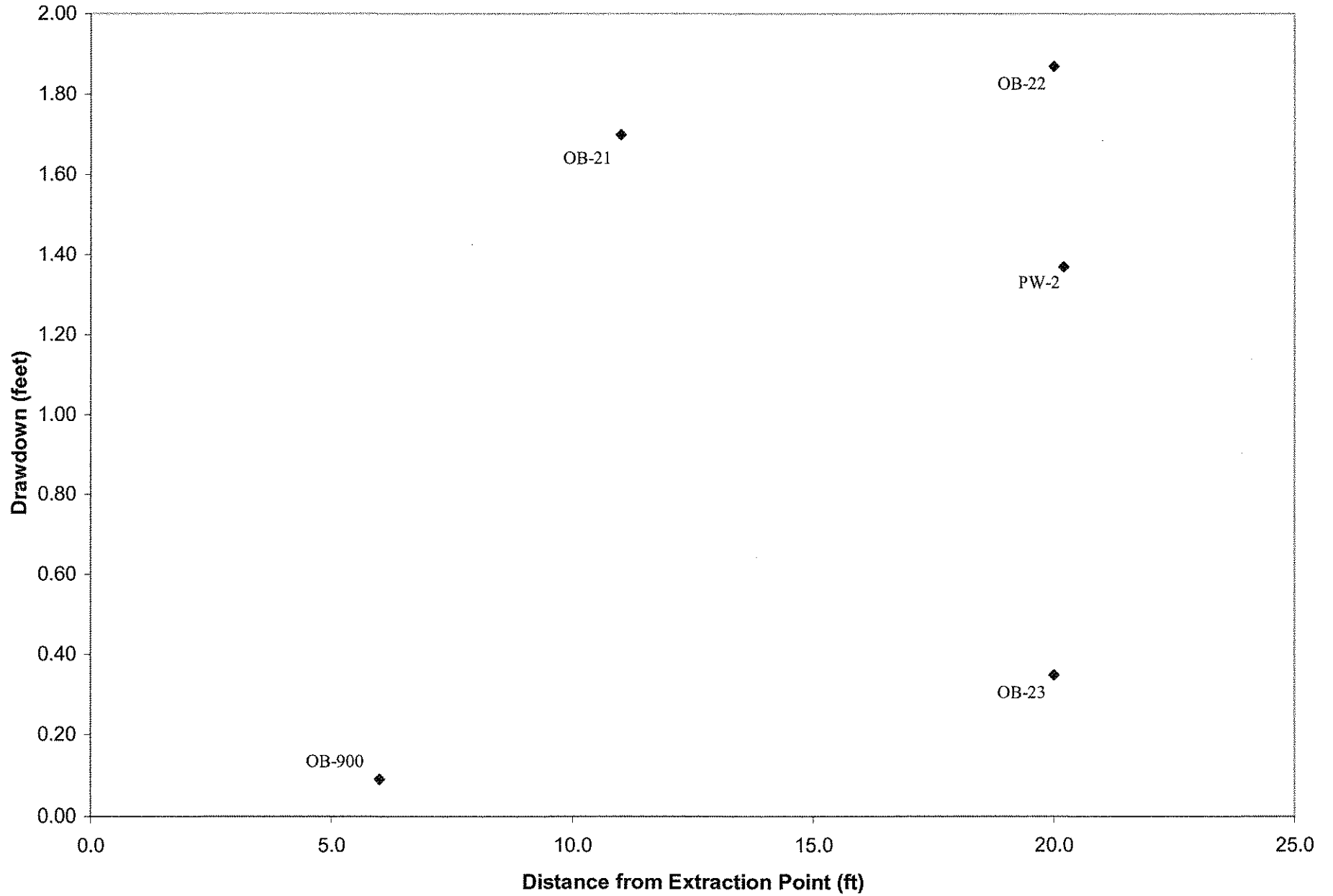


Figure 6: Pilot Study 1, RIMW-8
Distance from Extraction Point verses 6.5 in Hg at Blower Inlet

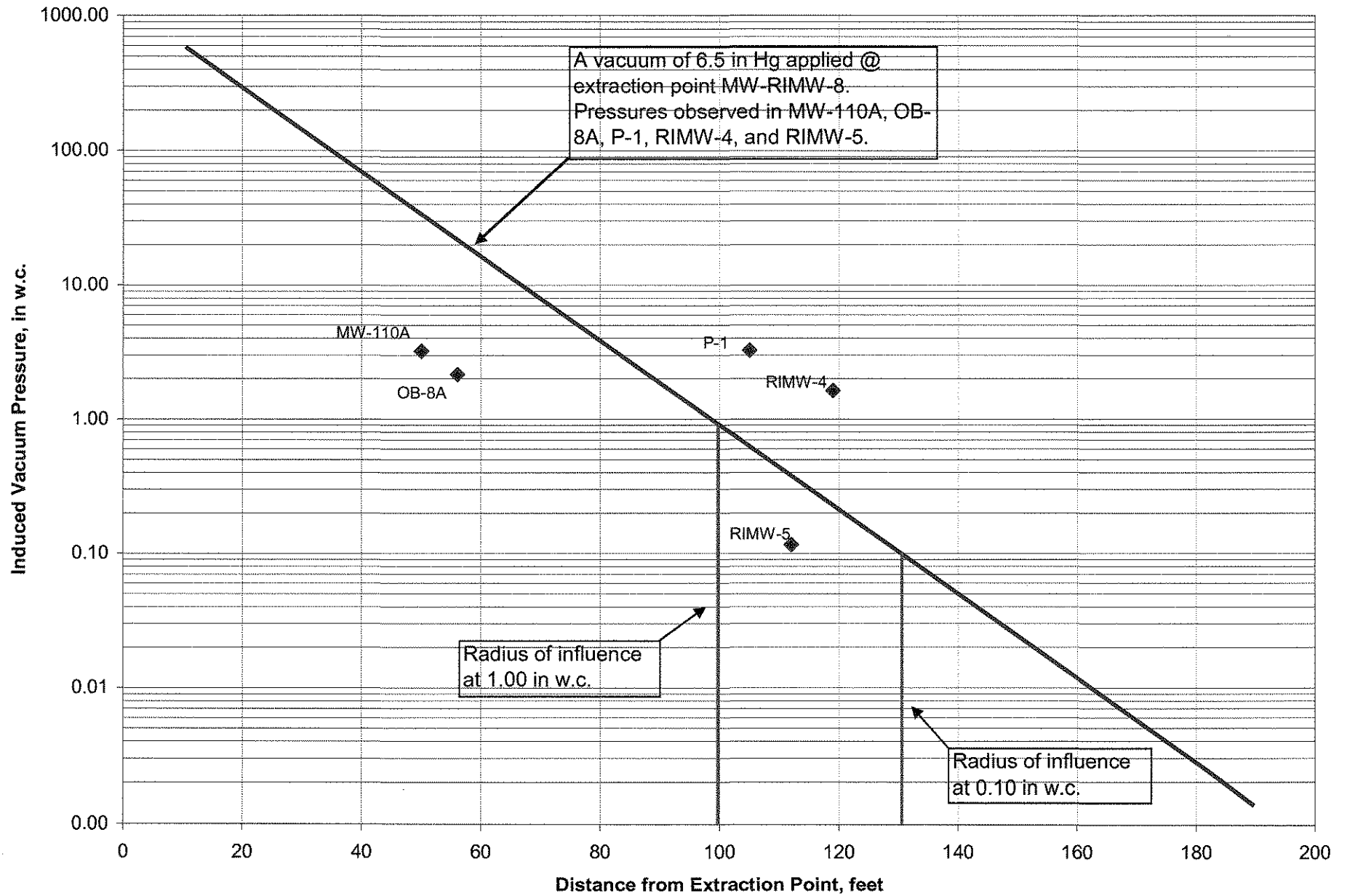


Figure 7: Pilot Study 1, RIMW-8
Distance from Extraction Point versus 17.0 in. Hg at Blower Inlet

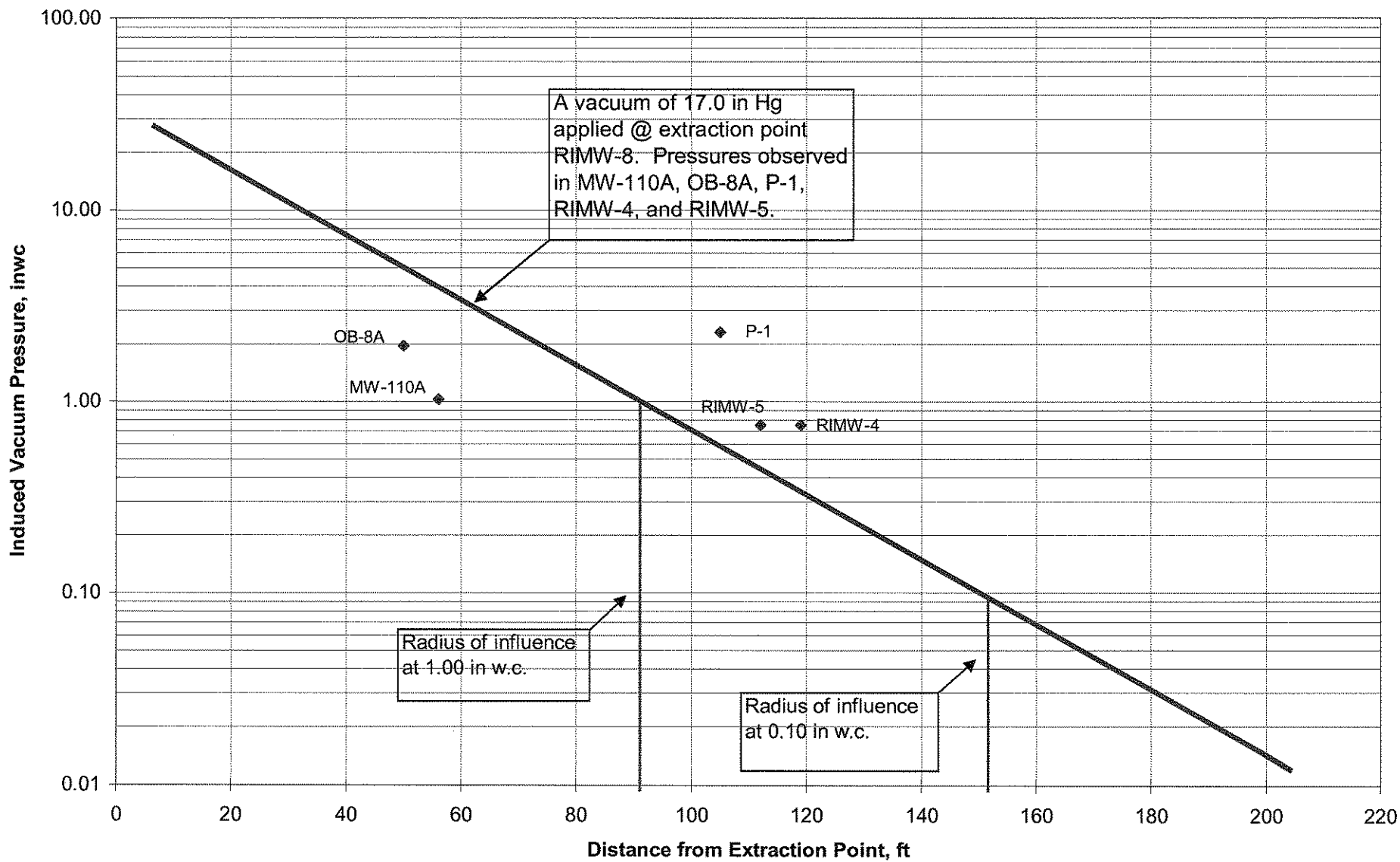


Figure 8: Pilot Study 2, PW-2A
Distance from Extraction Point versus 8.0 in Hg at Blower Inlet

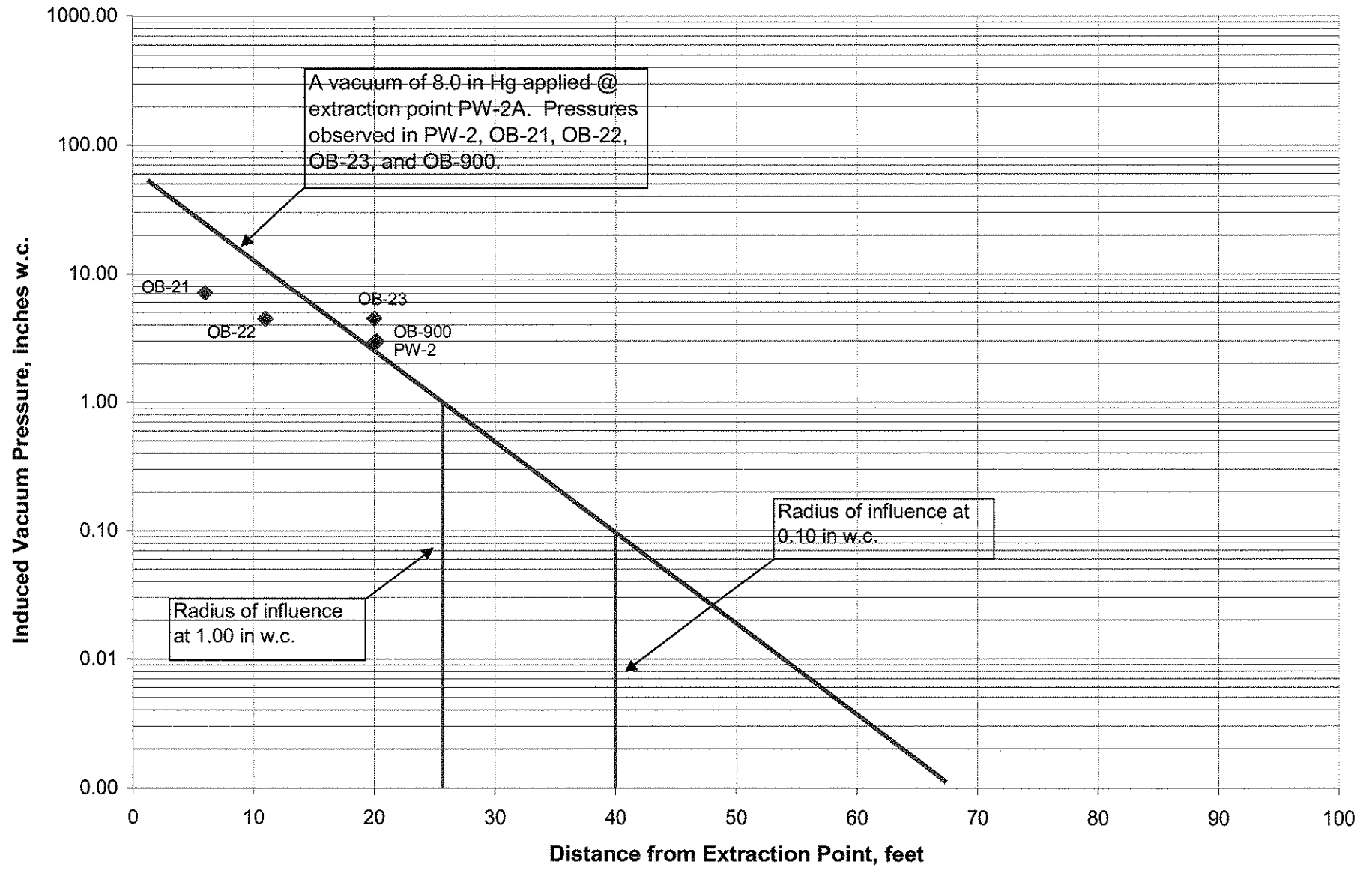
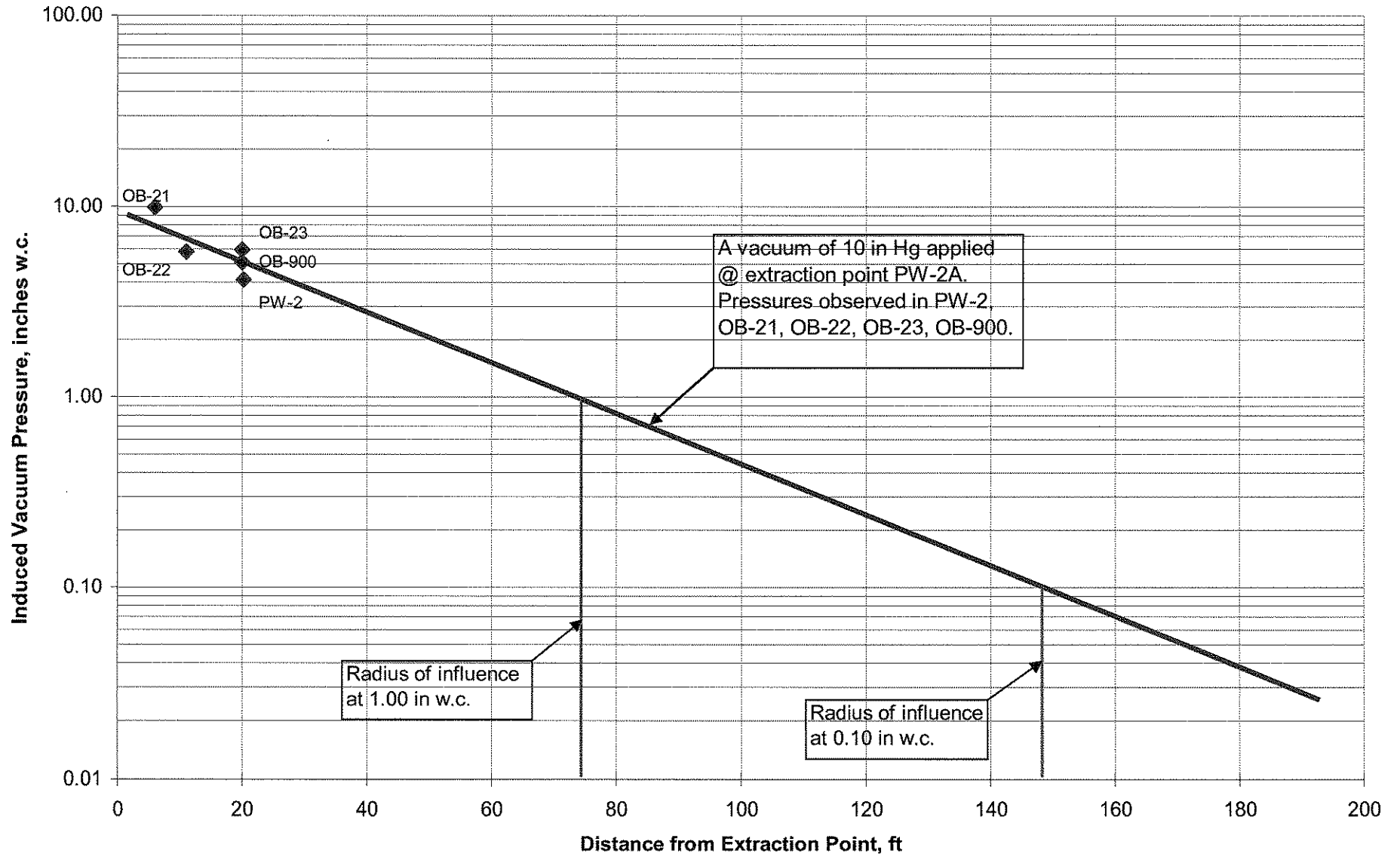


Figure 9: Pilot Study 2, PW-2A
Distance from Extraction Point versus 16.5 in. Hg at Blower Inlet



Tables

Pilot Study 1, RIMW-8
PSC Site, Rock Hill, South Carolina
Table 1. Pre and Post Extraction Potentiometric Elevations

Pre-extraction potentiometric elevations

| Well ID | Distance from Extraction Well (feet) | Depth to Water (feet) | Depth to Product (feet) | Water Elevation (feet) | Product Elevation (feet) | Product Thickness (feet) | Potentiometric Elevation (feet) |
|---------|--------------------------------------|-----------------------|-------------------------|------------------------|--------------------------|--------------------------|---------------------------------|
| RIMW-8 | N/A | 16.35 | - | 83.65 | - | 0.00 | 83.65 |
| MW-110A | 56 | 12.80 | - | 87.20 | - | 0.00 | 87.20 |
| P-1 | 105 | 12.21 | - | 87.79 | - | 0.00 | 87.79 |
| RIMW-4 | 119 | 15.60 | - | 84.40 | - | 0.00 | 84.40 |
| RIMW-5 | 112 | 17.33 | - | 82.67 | - | 0.00 | 82.67 |
| OB-8A | 50 | 12.28 | - | 87.72 | - | 0.00 | 87.72 |

Post-extraction potentiometric elevations

| Well ID | | Depth to Water (ft.) | Depth to Product (ft.) | Water Elevation (ft.) | Product Elevation (ft.) | Product Thickness (ft.) | Potentiometric Elevation (ft.) |
|---------|-----|----------------------|------------------------|-----------------------|-------------------------|-------------------------|--------------------------------|
| RIMW-8 | N/A | N/A | - | N/A | N/A | N/A | N/A |
| MW-110A | 56 | 12.77 | - | 87.23 | - | 0.00 | 87.23 |
| P-1 | 105 | 12.12 | - | 87.88 | - | 0.00 | 87.88 |
| RIMW-4 | 119 | 15.22 | - | 84.78 | - | 0.00 | 84.78 |
| RIMW-5 | 112 | 17.28 | - | 82.72 | - | 0.00 | 82.72 |
| OB-8A | 50 | 12.34 | - | 87.66 | - | 0.00 | 87.66 |

Notes:

N/A = Not Applicable

Pilot Study 2, PW-2A
PSC Site, Rock Hill, South Carolina
Table 2. Pre and Post Extraction Potentiometric Elevations

Pre-extraction potentiometric elevations

| Well ID | Distance from Extraction Well (feet) | Depth to Water (feet) | Depth to Product (feet) | Water Elevation (feet) | Product Elevation (feet) | Product Thickness (feet) | Potentiometric Elevation (feet) |
|---------|--------------------------------------|-----------------------|-------------------------|------------------------|--------------------------|--------------------------|---------------------------------|
| PW-2A | N/A | 18.78 | 13.64 | 81.22 | 86.36 | 5.14 | 85.33 |
| PW-2 | 20 | 13.25 | 11.77 | 86.75 | 88.23 | 1.48 | 87.93 |
| OB-900 | 6 | 9.98 | 7.85 | 90.02 | 92.15 | 2.13 | 91.72 |
| OB-21 | 11 | 12.96 | 12.95 | 87.04 | 87.05 | 0.01 | 87.05 |
| OB-22 | 20 | 12.95 | 12.82 | 87.05 | 87.18 | 0.13 | 87.15 |
| OB-23 | 20 | 15.51 | 12.10 | 84.49 | 87.90 | 3.41 | 87.22 |

Post-extraction potentiometric elevations

| Well ID | Distance from Extraction Well (feet) | Depth to Water (ft.) | Depth to Product (ft.) | Water Elevation (ft.) | Product Elevation (ft.) | Product Thickness (ft.) | Potentiometric Elevation (ft.) |
|---------|--------------------------------------|----------------------|------------------------|-----------------------|-------------------------|-------------------------|--------------------------------|
| PW-2A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| PW-2 | 20 | 14.76 | 13.14 | 85.24 | 86.86 | 1.62 | 86.54 |
| OB-900 | 6 | 9.00 | 7.94 | 91.00 | 92.06 | 1.06 | 91.85 |
| OB-21 | 11 | 14.66 | 14.65 | 85.34 | 85.35 | 0.01 | 85.35 |
| OB-22 | 20 | 14.81 | 14.69 | 85.19 | 85.31 | 0.12 | 85.29 |
| OB-23 | 20 | 16.83 | 12.45 | 83.17 | 87.55 | 4.38 | 86.67 |

Notes:

N/A = Not Applicable

Appendix A
MPE Pilot Study Data Sheets

Pilot Study 1, RIMW-8 Data
PSC, Rock Hill, South Carolina
KEMRON ID:SE4440

| Site: | PSC | | | | | | | | Weather: | 50's, partly cloudy | | | | | | | | Date: | 2/20/2007 | | | | | | | | |
|---------------------------|-------------|-----------------|--------------|---------------|--------------------------|-----------------|------------|-----------------|---------------|------------------------------|--------------|--------------|------------------|-------------|-----------|--------------------------|-----------------|--------------------------------------------|------------------------|--------------|------------------------------------|---------|-----------------|-------------|----------------|----------------|---------------|
| Proj. No.: | SE4440 | | | | Gallons Fluid Recovered: | 262 | | | | Time Arr: | 8:00 | | | | Time Dep: | 18:00 | | | | | | | | | | | |
| Test Well | Time | DTP | DTW | PT | Time | DTP | DTW | PT | Stinger Depth | Remarks: | | | | | | | | | | | | | | | | | |
| RIMW-8 | 8:30 | - | 16.35 | 0.00 | 18:00 | - | N/A | 0.00 | 22 feet | | | | | | | | | | | | | | | | | | |
| Obser. Well | Time | DTP | DTW | PT | Time | DTP | DTW | PT | | Dist. from RIMW-8 (in feet): | | | | | | | | | | | | | | | | | |
| MW-110A | 8:30 | - | 12.80 | 0.00 | 18:00 | - | 12.77 | 0.00 | | 56 | | | | | | | | | | | | | | | | | |
| P-1 | 8:30 | - | 12.21 | 0.00 | 18:00 | - | 12.12 | 0.00 | | 105 | | | | | | | | | | | | | | | | | |
| RIMW-4 | 8:30 | - | 15.60 | 0.00 | 18:00 | - | 15.22 | 0.00 | | 119 | | | | | | | | | | | | | | | | | |
| RIMW-5 | 8:30 | - | 17.33 | 0.00 | 18:00 | - | 17.28 | 0.00 | | 112 | | | | | | | | | | | | | | | | | |
| OB-8A | 8:30 | - | 12.28 | 0.00 | 18:00 | - | 12.34 | 0.00 | | 50 | | | | | | | | | | | | | | | | | |
| Time of Readings hours | RIMW-8 | | | | Air Stream @MPE unit | | | | | | | | | | | Observation Well Vacuums | | | | | Flowmeter/ Totalizer gallons | Remarks | | | | | |
| | MPE inHg | Stinger inHg | Well inHg | Bleed scfm | Pitot inwc | Velocity fpm | Temp °F | pitot vacuum | Conc. %LEL | corrected %LEL | mean %LEL | Conc. ppm | corrected ppm | mean ppm | PPMv | elapsed time hrs | VOCs lbs/day | VOCs extracted during elapsed time(lbs) | cumulative VOCs lbs | Flow scfm | | | MW-110A inwc | P-1 inwc | RIMW-4 inwc | RIMW-5 inwc | OB-8A inwc |
| 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | 318 | Startup |
| 11:15 | 6.5 | 2 | 0 | 11 | 0.50 | 146.7 | 60 | 26 | 0 | 0 | 0 | 4.5 | 2.7 | 1.4 | 1.4 | 0.25 | 0.00 | 0.00 | 0.00 | 3.2 | 2.6 | 2.7 | 1.5 | 0.1 | 3.0 | 318 | |
| 11:30 | 6.5 | 1.5 | 0 | 12 | 0.50 | 100.8 | 60 | 26 | 0 | 0 | 0 | 2.9 | 1.7 | 2.2 | 2.2 | 0.25 | 0.00 | 0.00 | 0.00 | 2.2 | 2.0 | 2.5 | 1.5 | 0.1 | 2.8 | 318 | |
| 11:45 | 6.5 | 1.5 | 0 | 11 | 0.50 | 145.4 | 62 | 26 | 0 | 0 | 0 | 3.3 | 2.0 | 1.9 | 1.9 | 0.25 | 0.00 | 0.00 | 0.00 | 3.2 | 3.4 | 2.5 | 3.0 | 0.2 | 4.0 | 333 | |
| 12:15 | 6.5 | 1.5 | 0 | 11 | 0.50 | 144.2 | 64 | 26 | 0 | 0 | 0 | 3.4 | 2.0 | 2.0 | 2.0 | 0.25 | 0.00 | 0.00 | 0.00 | 3.1 | 5.0 | 4.0 | 4.8 | 0.25 | 5 | 333 | |
| 12:45 | 6.5 | 1.5 | 0 | 11 | 0.50 | 146.7 | 60 | 26 | 0 | 0 | 0 | 3.9 | 2.3 | 2.2 | 2.2 | 0.50 | 0.00 | 0.00 | 0.00 | 3.2 | 3.0 | 4.0 | 1.5 | + | 3.2 | 357 | |
| 13:15 | 6.5 | 1.5 | 0 | 11 | 0.50 | 149.2 | 56 | 26 | 0 | 0 | 0 | 2.7 | 1.6 | 1.8 | 1.8 | 0.50 | 0.00 | 0.00 | 0.00 | 3.3 | 0.2 | 2.5 | 0.2 | 0.0 | 2.8 | 357 | |
| 13:45 | 6.5 | 1.5 | 0 | 11 | 0.50 | 147.9 | 58 | 26 | 0 | 0 | 0 | 2.3 | 1.4 | 1.5 | 1.5 | 0.50 | 0.00 | 0.00 | 0.00 | 3.2 | 0.4 | 2.5 | 0.0 | 0.1 | 1.8 | 381 | |
| 14:00 | 17 | 12 | 11 | 8 | 0.50 | 242.5 | 58 | 26.5 | 0 | 0 | 0 | 7.4 | 4.4 | 3.2 | 3.2 | 0.50 | 0.01 | 0.00 | 0.00 | 5.3 | 0.8 | 2.5 | 0.5 | 0.1 | 1.6 | 404 | |
| 14:30 | 17 | 12 | 11 | 8 | 0.50 | 642.7 | 59 | 20.5 | 0 | 0 | 0 | 8 | 4.8 | 4.6 | 4.6 | 0.50 | 0.02 | 0.00 | 0.00 | 14.0 | 0.8 | 2.5 | 0.25 | 0.1 | 1.4 | 430 | |
| 15:00 | 17 | 12 | 11 | 8 | 0.50 | 241.9 | 59 | 26.5 | 0 | 0 | 0 | 6.9 | 4.1 | 4.5 | 4.5 | 0.50 | 0.01 | 0.00 | 0.00 | 5.3 | 0.8 | 2.5 | 0.25 | 0.0 | 1.6 | 481 | |
| 15:30 | 17 | 12 | 11 | 8 | 0.50 | 241.9 | 59 | 26.5 | 0 | 0 | 0 | 9.1 | 5.5 | 4.8 | 4.8 | 0.50 | 0.01 | 0.00 | 0.00 | 5.3 | 0.8 | 2.5 | 0.5 | 0.1 | 1.8 | 505 | |
| 16:00 | 16.5 | 12 | 11 | 8 | 0.50 | 241.9 | 59 | 26.5 | 0 | 0 | 0 | 8.6 | 5.2 | 5.3 | 5.3 | 0.50 | 0.01 | 0.00 | 0.00 | 5.3 | 1.4 | 2.2 | 1.25 | 0.1 | 2.3 | 555 | |
| 16:30 | 16.5 | 12 | 11 | 8 | 0.50 | 241.9 | 59 | 26.5 | 0 | 0 | 0 | 9.4 | 5.6 | 5.4 | 5.4 | 0.50 | 0.01 | 0.00 | 0.00 | 5.3 | 1.1 | 2.0 | 1.0 | 0.1 | 2.1 | 580 | |
| 17:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | Shutdown |

Notes: +=positive pressure observed
 PID readings were corrected for Dichloroethane per the RAE systems tech guidance.

Multi-phase Pilot Study 2, PW-2A Data
PSC, Rock Hill, South Carolina
KEMRON ID:SE4440

| Site: | PSC | | | | | | | | | | Weather: | 50's, partly cloudy | | | | | | | | | | Date: | 02/21/07 | | | | | | | | | |
|------------------------|----------|--------------|-----------|------------------------------|--------------|-----------|------------|----------------------|-----------------------------|----------|--------------|---------------------|----------------|-----------|-----------|---------------|----------|-------|------------------|--------------|-----------------------------------------|--------------------------|-----------|-----------|-------------|------------|------------------------------|---------|------------|------------|--|--|
| Proj. No.: | SE4440 | | | Gallons Fluid Recovered: 169 | | | | | | | | | | | | | | | | | Time Arr: | 8:00 | | | | | Time Dep: | 19:00 | | | | |
| Test Well | Time | DTP | DTW | PT | Time | DTP | DTW | PT | Stinger Depth | Remarks: | | | | | | | | | | | | | | | | | | | | | | |
| PW-2A | 8:30 | 13.64 | 18.78 | 5.14 | 17:45 | N/A | N/A | N/A | 22 | | | | | | | | | | | | | | | | | | | | | | | |
| PW-2 | 8:30 | 11.77 | 13.25 | 1.48 | 17:45 | N/A | N/A | N/A | 20 | | | | | | | | | | | | | | | | | | | | | | | |
| Obser. Well | Time | DTP | DTW | PT | Time | DTP | DTW | PT | Dist. from PW-2A (in feet): | | | | | | | | | | | | | | | | | | | | | | | |
| PW-2 | 8:30 | 11.77 | 13.25 | 1.48 | 17:45 | N/A | N/A | N/A | 20.2 | | | | | | | | | | | | | | | | | | | | | | | |
| OB-900 | 8:30 | 7.85 | 9.98 | 2.13 | 17:45 | 7.94 | 9.00 | 1.06 | 20 | | | | | | | | | | | | | | | | | | | | | | | |
| OB-21 | 8:30 | 12.95 | 12.96 | 0.01 | 17:45 | 14.65 | 14.66 | 0.01 | 6 | | | | | | | | | | | | | | | | | | | | | | | |
| OB-22 | 8:30 | 12.82 | 12.95 | 0.13 | 17:45 | 14.69 | 14.81 | 0.12 | 11 | | | | | | | | | | | | | | | | | | | | | | | |
| OB-23 | 8:30 | 12.10 | 15.51 | 3.41 | 17:45 | 12.45 | 16.83 | 4.38 | 20 | | | | | | | | | | | | | | | | | | | | | | | |
| Time of Readings hours | PW-2A | | | | PW-2 | | | Air Stream @MPE unit | | | | | | | | | | | | | | Observation Well Vacuums | | | | | Flowmeter/ Totalizer gallons | Remarks | | | | |
| | MPE inHg | Stinger inHg | Well inHg | Bleed scfm | Stinger inHg | Well inHg | Bleed scfm | Pitot inwc | Velocity fpm | Temp °F | pitot vacuum | Conc. %LEL | corrected %LEL | mean %LEL | Conc. ppm | corrected ppm | mean ppm | PPMv | elapsed time hrs | VOCs lbs/day | VOCs extracted during elapsed time(lbs) | cumulative VOCs lbs | Flow scfm | PW-2 inwc | OB-900 inwc | OB-21 inwc | | | OB-22 inwc | OB-23 inwc | | |
| 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 675 | Startup | | |
| 9:45 | 8.5 | 7 | 2.5 | 6 | | | | 1.00 | 521.2 | 58 | 27 | 0 | 0 | 0 | 0.9 | 0.6 | 0.3 | 0 | 0.25 | 0.00 | 0.00 | 0.00 | 11.4 | 0.7 | 0.2 | 2.0 | 1.0 | 1.0 | 675 | | | |
| 10:00 | 8.5 | 6.5 | 2.5 | 6 | | | | 1.00 | 520.4 | 59 | 27 | 0 | 0 | 0 | 0.9 | 0.6 | 0.6 | 1 | 0.25 | 0.00 | 0.00 | 0.00 | 11.4 | 0.8 | 0.2 | 2.8 | 1.1 | 1.5 | 675 | | | |
| 10:15 | 8.5 | 6.5 | 2.5 | 6 | | | | 1.00 | 520.4 | 59 | 27 | 0 | 0 | 0 | 0.6 | 0.4 | 0.5 | 1 | 0.25 | 0.00 | 0.00 | 0.00 | 11.4 | 1.0 | + | 2.75 | 1.5 | 2.0 | 709 | | | |
| 10:30 | 8.5 | 6.5 | 2.5 | 6 | | | | 1.00 | 519.6 | 60 | 27 | 0 | 0 | 0 | 0.6 | 0.4 | 0.4 | 0 | 0.25 | 0.00 | 0.00 | 0.00 | 11.3 | 1.9 | 0.8 | 5.1 | 1.75 | 3.0 | 709 | | | |
| 10:45 | 8 | 6.5 | 2.5 | 6 | | | | 1.00 | 518.1 | 62 | 27 | 0 | 0 | 0 | 0.7 | 0.5 | 0.5 | 0 | 0.50 | 0.00 | 0.00 | 0.00 | 11.3 | 2.3 | 1.3 | 5.1 | 3.25 | 3.6 | 709 | | | |
| 11:00 | 8 | 6.5 | 2.5 | 6 | | | | 1.00 | 517.4 | 63 | 27 | 0 | 0 | 0 | 0.6 | 0.4 | 0.4 | 0 | 0.50 | 0.00 | 0.00 | 0.00 | 11.3 | 2.8 | 2.4 | 6.5 | 4.0 | 4.2 | 709 | | | |
| 11:30 | 8 | 6.5 | 2.5 | 6 | | | | 1.00 | 517.4 | 63 | 27 | 0 | 0 | 0 | 0.3 | 0.2 | 0.3 | 0 | 0.50 | 0.00 | 0.00 | 0.00 | 11.3 | 3.0 | 2.8 | 7.0 | 4.5 | 4.6 | 709 | | | |
| 12:00 | 8 | 6.5 | 2.5 | 6 | | | | 1.00 | 518.1 | 62 | 27 | 0 | 0 | 0 | 0.4 | 0.3 | 0.4 | 0 | 0.50 | 0.00 | 0.00 | 0.00 | 11.3 | 3.1 | 3.0 | 7.1 | 4.6 | 4.75 | 723 | | | |
| 12:30 | 8 | 6.5 | 2.5 | 6 | | | | 1.00 | 517.4 | 63 | 27 | 0 | 0 | 0 | 0.4 | 0.3 | 0.3 | 0 | 0.50 | 0.00 | 0.00 | 0.00 | 11.3 | 2.8 | 2.9 | 7.25 | 4.25 | 4.1 | 723 | | | |
| 12:45 | 16.5 | 15.5 | 13 | 8 | | | | 1.00 | 491.5 | 62 | 26.5 | 10 | 10 | 5 | 0.5 | 0.4 | 0.3 | 650 | 0.50 | 2.44 | 0.05 | 0.05 | 10.7 | 2.7 | 2.9 | 7.25 | 4 | 4.1 | 723 | | | |
| 13:00 | 16.5 | 15.5 | 13 | 8 | | | | 1.00 | 489.9 | 64 | 26.5 | 7 | 7 | 9 | 0.4 | 0.3 | 0.3 | 1105 | 0.50 | 4.13 | 0.09 | 0.14 | 10.7 | 3.1 | 3.4 | 7.9 | 4.6 | 4.75 | 747 | | | |
| 13:15 | 16.5 | 15.5 | 13 | 8 | | | | 1.00 | 490.7 | 63 | 26.5 | 8 | 8 | 8 | 0.4 | 0.3 | 0.3 | 975 | 0.50 | 3.65 | 0.08 | 0.21 | 10.7 | 3.2 | 3.4 | 8 | 4.5 | 4.75 | 747 | | | |
| 13:45 | 17 | 15.5 | 12.5 | 8 | | | | 1.00 | 489.9 | 64 | 26.5 | 9 | 9 | 9 | 0.4 | 0.3 | 0.3 | 1105 | 0.50 | 4.13 | 0.09 | 0.30 | 10.7 | 3.9 | 3.5 | 9.5 | 5 | 5.25 | 771 | | | |
| 14:15 | 16.5 | 15.5 | 13 | 8 | | | | 1.00 | 488.3 | 66 | 26.5 | 10 | 10 | 10 | 0.4 | 0.3 | 0.3 | 1235 | 0.50 | 4.60 | 0.10 | 0.40 | 10.7 | 4.3 | 5.3 | 9.9 | 6 | 6.3 | 771 | | | |
| 14:45 | 16.5 | 15.5 | 13 | 8 | | | | 1.00 | 489.1 | 65 | 26.5 | 9 | 9 | 9 | 0.4 | 0.3 | 0.3 | 1105 | 0.50 | 4.12 | 0.09 | 0.48 | 10.7 | 3.7 | 4.4 | 9.9 | 5.1 | 5.3 | 794 | | | |
| 15:15 | 16.5 | 15.5 | 12.5 | 8 | | | | 1.00 | 489.1 | 65 | 26.5 | 11 | 11 | 10 | 0.4 | 0.3 | 0.3 | 1300 | 0.50 | 4.85 | 0.10 | 0.58 | 10.7 | 4.2 | 5.3 | 9.9 | 5.9 | 6 | 794 | | | |
| 15:45 | 16.5 | 15.5 | 12.5 | 8 | | | | 0.50 | 237.9 | 66 | 26.5 | 11 | 11 | 11 | 0.4 | 0.3 | 0.3 | 1430 | 0.50 | 2.60 | 0.05 | 0.64 | 5.2 | 4.3 | 5.3 | 9.9 | 6.1 | 6.1 | 828 | | | |
| 16:00 | 23 | 24 | 19 | 6 | 23 | 18 | 10 | 1.00 | 346.6 | 62 | 24.5 | 94 | 94 | 53 | 0.8 | 0.6 | 0.4 | 6825 | 0.50 | 18.05 | 0.38 | 1.01 | 7.6 | | 6.9 | 11.25 | 7.5 | 7.25 | 844 | | | |
| 16:15 | 23 | 23 | 19 | 6 | 23 | 19 | 10 | 1.00 | 342.5 | 66 | 24.5 | 99 | 99 | 97 | 0.6 | 0.4 | 0.5 | 12545 | 0.50 | 32.78 | 0.68 | 1.69 | 7.5 | | 8.3 | 12 | 8.5 | 9.25 | 844 | | | |
| 16:45 | 23 | 22 | 17.5 | 10 | 22 | 17 | 12 | 1.00 | 162.4 | 66 | 23.5 | 100 | 100 | 100 | 0.5 | 0.4 | 0.4 | 12935 | 0.50 | 16.03 | 0.33 | 2.03 | 3.5 | | 6.3 | 12.75 | 5.75 | 7.75 | 878 | | | |
| 17:15 | 23 | 20 | 15 | 15 | 20 | 18 | 15 | 2.00 | 528.2 | 62 | 21.5 | 70 | 70 | 85 | 0.3 | 0.2 | 0.3 | 11050 | 0.50 | 44.52 | 0.93 | 2.96 | 11.5 | | 5.3 | 11 | 4.75 | 8.5 | 894 | | | |
| 17:30 | | | | | | | | | | | | | | | | | | | | 10.89 | 2.96 | 5.91 | | | | | | | Shutdown | | | |

Notes: + = positive pressure observed
 PID readings were corrected for Diesel fuel, per the RAE systems tech guidance.

Appendix B

References

References:

- Dwyer Instruments Inc. Manual " Series DS-200 Flow Sensors", 1989
- US EPA, "Air Emissions From Petroleum UST Cleanups", Office of UST, 1989
- US Air Force, AFCEE, " Engineering Evaluation For Bioslurper", March 1997
- US Army Corps of Engineers, "Soil Vapor Extraction And Bioventing", 2002
- US EPA, "Assessing UST Corrective Action Technologies", 1996
- US Army Corps of Engineers, "Multi-Phase Extraction", 1999
- Keet, BA, "Bioremediation of Petroleum Hydrocarbons", 1995

Appendix G
Data Validation Worksheets

PSC
Data Evaluation Worksheet

Sample Delivery Group (SDG) Number: 229079 soil
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 6010B/7471A/%Moisture

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|-------------|----------|--------------|-----------|
| | RISB-30-01 | 229079-1 | RISB-31-01 | 229079-6 |
| | RISB-37-01 | 229079-2 | RISB-38-1721 | 229079-7 |
| | RISB-30-913 | 229079-3 | RISB-31-913 | 229079-8 |
| | RISB-37-913 | 229079-4 | RISB-32-01 | 229079-9 |
| | RISB-38-01 | 229079-5 | RISB-39-01 | 229079-10 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present.

Precision:

| | |
|----------------------------------------------------------------------------------|------------|
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20%) | Yes No N/A |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) | N/A |
| Comments (note deviations): | Yes |

Laboratory Duplicate - Batch 129636 duplicate performed on a for 6010B sample from another SDG.
Batch 128626 duplicate for Hg performed on sample RISB-30-01.

Accuracy:

| | |
|---------------------------------------------------------------------------------------------------|------------|
| Serial Dilutions ± 10% | Yes No N/A |
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | N/A |
| Post Digestion Spike criteria met (if applicable)? | No |
| Laboratory Control Sample criteria met? | N/A |
| Laboratory Control Sample Duplicate? (± 25%) | Yes |
| Laboratory Blanks criteria met (within control limits)? | N/A |
| ICV/CCV % Recoveries within 90-110%? | Yes |
| ICSA/ICSAB % Recoveries acceptable? | N/A |
| CRI % | N/A |

Comments (note deviations): **Matrix Spike** - Batch 129326 sample from another SDG spiked for 6010B.
Batch 128626 sample RISB-30-01 spiked for Hg.

Representativeness:

| | |
|----------------------------------------------------------------------|------------|
| Were sampling procedures and design criteria met? | Yes No N/A |
| Were holding times met? | Yes |
| Were preservation criteria met? ($4^{\circ}C \pm 2^{\circ}C$) | Yes |
| Were Chain-of-Custody records complete and provided in data package? | Yes |
| Were contaminants present in blanks? | Yes |

Comments (note deviations): Sample cooler was received at 4.0 ° C.

Comparability:

| | |
|--------------------------------------------------------|------------|
| Does data compare with similar analysis and data sets? | Yes No N/A |
| Comments (note deviations): | Yes |

Completeness (90%):

| | |
|-----------------------------------|------------|
| Are all data in this SDG useable? | Yes No N/A |
| Comments (note deviations): | Yes |

Precision
 Field Duplicate N/A

| Laboratory Duplicate | %RPD | Qualifier |
|----------------------|------------|------------|
| 129326 6010B | | |
| | diff. SDG | |
| 129421 %moisture | | |
| | diff. SDG | |
| 128626 Hg | | |
| | RISB-30-01 | acceptable |

| Accuracy | %RPD |
|-----------------|--------------|
| Serial Dilution | not included |

| MS/MSD | Analyte | MS/MSD %R | RPD | Post %R | Qualifier | Associated Samples |
|--------------|------------|------------|-----|---------|------------------------------------------------------------|--------------------|
| 129326 6010B | | | | | | All samples in SDG |
| | diff. SDG | | | | | |
| | Aluminum | 999/999% | 7 | 0% | Sample concentration >4x spike - no qualification required | |
| | Calcium | 127/157% | 2 | 18% | Sample concentration >4x spike - no qualification required | |
| | Iron | 0/999% | 8 | 999% | Sample concentration >4x spike - no qualification required | |
| | Potassium | 130/119% | 5 | 82% | Sample concentration >4x spike - no qualification required | |
| | Magnesium | 552/409% | 6 | 0% | Sample concentration >4x spike - no qualification required | |
| | Manganese | 71/52% | 6 | 83% | Sample concentration >4x spike - no qualification required | |
| | Antimony | 30/15% | 64 | 85% | | All samples in SDG |
| | Vanadium | 72/80% | 4 | 87% | Sample concentration >4x spike - no qualification required | |
| 128626 Hg | | | | | | |
| | RISB-30-01 | acceptable | | | | |

Laboratory Control Spike/ Spike Duplicate(90-110);Hg (62-136)

| %R |
|--------------|
| 129326 6010B |
| acceptable |
| 128626 Hg |
| acceptable |

| Blanks | Analyte | Results | Qualifier | Associated Samples |
|------------------|---------|------------|-----------|--------------------|
| 129326 6010B | | non-detect | | |
| 128626 Hg | | non-detect | | |
| 129421 %moisture | | non-detect | | |

| ICV/CCV |
|-------------|
| not present |

| ICSA/ICSAB |
|-------------|
| not present |

| CRI |
|-------------|
| not present |

Do all data in this SDG meet the Data Quality Objectives? Yes

Comments: _____

Validator: Carrie Madrid Date: 4/12/07

Reviewer: Alecia Epes Date: 8/13/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229079
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8270C

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|-------------|----------|--------------|-----------|
| | RISB-30-01 | 229079-1 | RISB-31-01 | 229079-6 |
| | RISB-37-01 | 229079-2 | RISB-38-1721 | 229079-7 |
| | RISB-30-913 | 229079-3 | RISB-31-913 | 229079-8 |
| | RISB-37-913 | 229079-4 | RISB-32-01 | 229079-9 |
| | RISB-38-01 | 229079-5 | RISB-39-01 | 229079-10 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present.

Precision:

| | Yes | No | N/A |
|--------------------------------------------------------------------------------------------------|-----|----|-----|
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) | | | N/A |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) | | | N/A |

Comments (note deviations):

Accuracy:

| | Yes | No | N/A |
|---------------------------------------------------------------------------------------------------|-----|----|-----|
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | Yes | | |
| Laboratory Control Sample criteria met? | Yes | | |
| Laboratory Control Sample Duplicate? | N/A | | |
| Laboratory Blanks criteria met (within control limits)? | Yes | | |
| Trip Blanks/Rinsate Blanks | N/A | | |
| ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? | No | | |
| CCV % Recoveries within 25% and RRF greater than or equal to 0.05? | Yes | | |
| Tuning (abundance criteria and 12 hour time frame)? | N/A | | |
| Surrogate % Recoveries? | Yes | | |
| Internal Standards | N/A | | |

Comments (note deviations): MS/MSD - Batch 129471 sample RISB-30-913 all %R's acceptable.
CCV - Benzidine 27.4% in 6/2/07 ccv. No action taken, benzidine does not appear on target list.

Precision %RPD
 N/A

Laboratory Duplicate %RPD
 N/A

Accuracy

| MS/MSD | MS/MSD | RPD |
|--------------------|------------|-----|
| 129471 RISB-30-913 | acceptable | |

LCS/LCSD %R
 129471 acceptable

| Blanks | Analyte | Qualifier | Associated Sample/ Qualification |
|--------|------------|-----------|----------------------------------|
| 129471 | non-detect | | |

| Rinsate Blank | | Qualifier | Associated sample | | |
|--------------------------|------------------------------|------------|-------------------|-------------------|---------------------------------------------------|
| N/A | | | | | |
| ICV | | Ave. RRF | %RSD | Qualifier | Associated sample |
| | 5/31/06 Benzaldehyde only | acceptable | acceptable | | |
| | 6/1/06 8270C | acceptable | acceptable | | |
| | 6/2/06 TCL | acceptable | acceptable | | Acetophenone, Caprolactam, Biphenyl, and Atrazine |
| CCV | | Ave. RRF | %RSD | Qualifier | Associated sample |
| | 6/2/06 8270C Benzidine | acceptable | 27.4%D | none | not a target compound |
| | 6/2/06 Benzaldehyde only | acceptable | acceptable | | |
| Surr. | | %R | Qualifier | Associated sample | |
| | 129471 | acceptable | | | |
| Internal Standard | not included | | | | |

Representativeness:

| | |
|-------------------------------------------------------------------------------|----------------------------|
| Were sampling procedures and design criteria met? | Yes No N/A |
| Were holding times met? | Yes |
| Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) | Yes |
| Were Chain-of-Custody records complete and provided in data package? | Yes |
| Were contaminants present in blanks? | No |
| Comments (note deviations): | Cooler temperatures 4.0° C |

Comparability:

| | |
|--------------------------------------------------------|------------|
| Does data compare with similar analysis and data sets? | Yes No N/A |
| Comments (note deviations): | Yes |

Completeness (90%):

| | |
|-----------------------------------|------------|
| Are all data in this SDG useable? | Yes No N/A |
| Comments (note deviations): | Yes |

Do all data in this SDG meet the Data Quality Objectives? Yes

Comments: _____

Validator: Carrie Madrid Date: 4/12/07

Reviewer: Alecia Epes Date: 8/13/07

PSC
Data Evaluation Worksheet

Sample Delivery Group (SDG) Number: 229079
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8260B

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|-------------|----------|--------------|-----------|
| | RISB-30-01 | 229079-1 | RISB-31-01 | 229079-6 |
| | RISB-37-01 | 229079-2 | RISB-38-1721 | 229079-7 |
| | RISB-30-913 | 229079-3 | RISB-31-913 | 229079-8 |
| | RISB-37-913 | 229079-4 | RISB-32-01 | 229079-9 |
| | RISB-38-01 | 229079-5 | RISB-39-01 | 229079-10 |
| | | | Trip Blank | 229079-11 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present.

Precision: **Yes No N/A**
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) N/A
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) N/A

Comments (note deviations):

Accuracy: **Yes No N/A**
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) N/A
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? Yes
 Trip Blanks/Rinsate Blanks Yes
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? No
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05? No
 Tuning (abundance criteria and 12 hour time frame)? N/A
 Surrogate % Recoveries? Yes
 Internal Standards N/A

Comments (note deviations): MS/MSD - Several analytes outsited criteria. See below.

Precision

Field Duplicates %RPD
 N/A

Laboratory Duplicate
 N/A

Accuracy

| MS/MSD | MS/MSD | RPD |
|---------------------------|------------|------|
| | (70-130) | |
| 129418 RISB-30-01 | | |
| trans-1,3-Dichloropropene | 66/65% | 2% |
| cis-1,3-Dichloropropene | 66/65% | 2% |
| trichlorofluoromethane | 31/6% | 135% |
| 129419 RISB-31-01 | | |
| trans-1,3-Dichloropropene | 70/66% | 6% |
| cis-1,3-Dichloropropene | 70/66% | 6% |
| Carbon Tetrachloride | 73/70% | 4% |
| 129431 Aqueous | | |
| diff. SDG | acceptable | |

no action taken on MS/MSD data

| LCS/LCSD | %R |
|------------|------------|
| | (70-130) |
| 129418 | acceptable |
| 129419 | acceptable |
| 129431 Aq. | acceptable |

| Blanks | Results in ug/L | Qualifier | Associated Sample/ Qualification |
|------------|-----------------|-----------|----------------------------------|
| 129418 | non-detect | | |
| 129419 | non-detect | | |
| 129431 Aq. | non-detect | | |

| | | |
|-------------------|----------------------|------------|
| Trip Blank | 229079-11 Trip Blank | non-detect |
|-------------------|----------------------|------------|

Holding Blank N/A

| Rinsate Blank | N/A | <u>Qualifier</u> | <u>Associated sample</u> |
|----------------------|-----|------------------|--------------------------|
|----------------------|-----|------------------|--------------------------|

| ICV PT1/PT2 | 4/26/2006 A Files | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|--------------------|----------------------------------|------------|-------------|------------------|---------------------------------------------------------------|
| | | acceptable | | | |
| PT1 | 4/26/2006 A Files Extra 1 | | | | |
| | Methyl Acetate | 0.019 | | R | RISB-30-01, RISB-37-01, RISB-30-913, RISB-37-913, RISB-38-01 |
| PT2 | 4/26/2006 A Files Extra 2 | | | | |
| | Methyl Acetate | 0.017 | | R | RISB-31-01, RISB-38-1721, RISB-31-913, RISB-32-01, RISB-39-01 |
| PT1 | 6/1/2006 Extra D Files | | | | TB |
| | | acceptable | | | |
| PT1 | 5/31/2006 8260 D Files | | | | |
| | | acceptable | | | |

| CCV PT1 | 6/1/2006 0828 A16647 Extra 1 | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|----------------|-------------------------------------|------------|-------------|------------------|--------------------------------------------------------------|
| | Methyl Acetate | | 33.48% | J/UJ | Qual. due to ICV |
| PT2 | 6/1/2006 0850 A16648 Extra 2 | | | | |
| | Methyl Acetate | | 34.26% | J/UJ | Qual. due to ICV |
| PT1 | 6/1/2006 0911 A16649 8260 | | | | |
| | 2-Hexanone | | 29.40% | UJ | RISB-30-01, RISB-37-01, RISB-30-913, RISB-37-913, RISB-38-01 |
| PT2 | 6/1/2006 0932 A16650 8260 | | | | |
| | | acceptable | | | |
| PT1 | 6/1/2006 1146 D2760 Extra 1 | | | | |
| | | acceptable | | | |
| PT1 | 6/1/2006 1245 D2763 8260 | | | | |
| | Acetone | | 54.7%(L) | UJ | TB |
| | 2-Butanone | | 27.3%(L) | UJ | TB |

| Surr. | <u>%R</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|--------------|------------|------------------|--------------------------|
| | (70-130) | | |
| 129418 | acceptable | | |
| 129419 | acceptable | | |
| 129431 Aq. | acceptable | | |

Internal Standard not included

Representativeness:

Were sampling procedures and design criteria met?

Yes No N/A

Yes

Were holding times met?

Yes

Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$)

Yes

Were Chain-of-Custody records complete and provided in data package?

Yes

Were contaminants present in blanks?

No

Comments (note deviations): Cooler temperatures 4.0° C

Comparability:

Does data compare with similar analysis and data sets?

Yes No N/A

Yes

Comments (note deviations): _____

Completeness (90%):

Are all data in this SDG useable?

Yes No N/A

No

Comments (note deviations): _____

Do all data in this SDG meet the Data Quality Objectives?

No

Comments: Some results for methyl acetate were rejected due to initial and continuing calibration.

Validator: Carrie Madrid

Date: 4/12/07

Reviewer: Alecia Epes

Date: 8/17/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229143
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 6010B/7471A/%Moist.

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|--------------|-----------|-------------|-----------|
| | RISB-39-1317 | 229143-1 | RISB-18-15 | 229143-13 |
| | RISB-29-1-S | 229143-2 | RISB-28-5-9 | 229143-14 |
| | RISB-28-913 | 229143-3 | RISB-46-15 | 229143-15 |
| | RISB-29-913 | 229143-4 | RISB-46-01 | 229143-16 |
| | RISB-23-01 | 229143-5 | RISB-946 | 229143-17 |
| | RISB-28-01 | 229143-6 | RISB-27-59 | 229143-18 |
| | RISB-22-01 | 229143-7 | RISB-19-01 | 229143-19 |
| | RISB-24-01 | 229143-8 | RISB-25-913 | 229143-20 |
| | RISB-29-01 | 229143-9 | RISB-26-15 | 229143-22 |
| | RISB-23-911 | 229143-10 | | |
| | RISB-27-01 | 229143-11 | | |
| | RISB-25-1720 | 229143-12 | | |

Full Validation Sample: Raw data not provided, only a cursory validation was performed. Samples are soils.

Precision:

| | Yes | No | N/A |
|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 35%) | | No | |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) | | Yes | |
| Comments (note deviations): | <p>Field Duplicates - Samples RISB-46-01 and RISB-946 were identified as field duplicates. Several %RPD's were outside the 20% criteria, however no action taken on field duplicate data.</p> <p>Laboratory Duplicate - RISB-28-01(metals); RISB-28-5-9(Hg); RISB-39-1317 and RISB-26-15(%moisture). All %RPD's were acceptable. Other laboratory duplicates were analyzed on samples from other SDG's and had RPDs outside of control limits. Associated samples were qualified J/UJ. See below.</p> | | |

Accuracy:

| | Yes | No | N/A |
|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| Serial Dilutions ± 10% | | | N/A |
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | | No | |
| Post Digestion Spike criteria met (if applicable)? | | No | |
| Laboratory Control Sample criteria met? | | Yes | |
| Laboratory Control Sample Duplicate? (± 25%) | | | N/A |
| Laboratory Blanks criteria met (within control limits)? | | Yes | |
| ICV/CCV % Recoveries within 90-110%? | | | N/A |
| ICSA/ICSAB % Recoveries acceptable? | | | N/A |
| CRI % | | | N/A |
| Comments (note deviations): | <p>Matrix Spike - MS/MSD recoveries were outside of appropriate control limits for various analytes. Associated samples have been qualified J/UJ. See below.</p> | | |

Representativeness:

| | Yes | No | N/A |
|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----|-----|
| Were sampling procedures and design criteria met? | | Yes | |
| Were holding times met? | | Yes | |
| Were preservation criteria met? (4° C ± 2° C) | | Yes | |
| Were Chain-of-Custody records complete and provided in data package? | | Yes | |
| Were contaminants present in blanks? | | No | |
| Comments (note deviations): | <p>Sample cooler was received at 1.0 ° C, however no action taken based on temperature.</p> | | |

Comparability:

Does data compare with similar analysis and data sets?

Yes No N/AYes

Comments (note deviations):

Completeness (90%):

Are all data in this SDG useable?

Yes No N/AYes

Comments (note deviations):

Precision**%RPD****Qualifier**

Field Duplicate

| | |
|-----------|---------|
| Beryllium | 161.87% |
| Calcium | 126.32% |
| Chromium | 37.13% |
| Manganese | 142.86% |
| Potassium | 65.49% |

No action taken on field duplicate data.

Laboratory Duplicate

6010B

129326 RISB-28-01 Acceptable

| | | | RPD | Qualifier | Associated Samples | |
|--------|---------------------|----------|------------|------------------|---------------------------|-------------|
| 129330 | Diff. SDG. 229203-9 | Chromium | 37 | J/UJ | RISB-25-1720 | RISB-946 |
| | | Iron | 38 | " | RISB-18-15 | RISB-27-59 |
| | | Vanadium | 47 | " | RISB-28-5-9 | RISB-19-01 |
| | | Antimony | 37 | " | RISB-46-15 | RISB-25-913 |
| | | | | | RISB-46-01 | RISB-26-15 |

129333 Diff. SDG. 229204-10 Acceptable

Hg

128626 Acceptable

128629 Acceptable

128630 Acceptable

Accuracy**%RPD****Qualifier**

Serial Dilution

Not included

MS/MSD**Analyte****MS/MSD RPD****Post %R****Qualifier****Associated Samples**

6010B

| | | | | | | |
|--------|--------------------|----------|-----|------|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 129326 | RISB-28-01 | | | | | RISB-39-1317,RISB-29-1, RISB-28-913,RISB-23-01, RISB-28-01, RIDB-22-01, RISB-24-01, RISB-29-01, RISB-23-911, RISB-27-01 |
| | Aluminum | 999/999% | 7% | 0% | Sample concentration >4x spike - no qualification required | |
| | Calcium | 127/157% | 2% | 18% | Sample concentration >4x spike - no qualification required | |
| | Iron | 0/999% | 8% | 999% | Sample concentration >4x spike - no qualification required | |
| | Potassium | 130/119% | 5% | 82% | Sample concentration >4x spike - no qualification required | |
| | Magnesium | 552/409% | 6% | 0% | Sample concentration >4x spike - no qualification required | |
| | Manganese | 71/52% | 6% | 83% | Sample concentration >4x spike - no qualification required | |
| | Antimony | 30/15% | 64% | 85% | UJ | Samples identified above |
| | Vanadium | 72/80% | 4% | 87% | Sample concentration >4x spike - no qualification required | |
| | | | | | | RISB-25-1720 RISB-946 |
| | | | | | | RISB-18-15 RISB-27-59 |
| | | | | | | RISB-28-5-9 RISB-19-01 |
| | | | | | | RISB-46-15 RISB-25-913 |
| 129330 | Diff. SDG 229203-9 | | | | | RISB-46-01 RISB-26-15 |
| | Aluminum | 999/999% | 4% | 999% | Sample concentration >4x spike - no qualification required | |
| | Calcium | 479/111% | 16% | 393% | Sample concentration >4x spike - no qualification required | |
| | Iron | 999/889% | 11% | 999% | Sample concentration >4x spike - no qualification required | |
| | Potassium | 233/63% | 47% | 123% | Sample concentration >4x spike - no qualification required | |
| | Magnesium | 999/536% | 22% | 999% | Sample concentration >4x spike - no qualification required | |
| | Manganese | 132/58% | 9% | 262% | Sample concentration >4x spike - no qualification required | |
| | Sodium | 136/102% | 15% | 134% | Sample concentration >4x spike - no qualification required | |
| | Thallium | 74/78% | 6% | 92% | Sample concentration >4x spike - no qualification required | |
| | Antimony | 44/39% | 12% | 99% | UJ | Samples identified above |

| | | | | | |
|--------|---------------------|----------|-----|------|------------------------------------------------------------|
| 129333 | Diff. SDG 229204-10 | | | | |
| | Aluminum | 999/999% | 1% | 191% | Sample concentration >4x spike - no qualification required |
| | Calcium | 999/999% | 8% | 833% | Sample concentration >4x spike - no qualification required |
| | Iron | 793/0% | 14% | 0% | Sample concentration >4x spike - no qualification required |
| | Potassium | 135/149% | 3% | 89% | Sample concentration >4x spike - no qualification required |
| | Magnesium | 704/636% | 2% | 0% | Sample concentration >4x spike - no qualification required |
| | Sodium | 213/236% | 5% | 91% | Sample concentration >4x spike - no qualification required |
| | Antimony | 57/53% | 8% | 92% | UJ RISB-26-15 |
| | Vanadium | 81/47% | 12% | 36% | Sample concentration >4x spike - no qualification required |

| | | |
|--------|---------------------|------------|
| Hg | | |
| 129326 | RISB-28-5-9 | Acceptable |
| 128626 | Diff. SDG 229079-1 | Acceptable |
| 128630 | Diff. SDG 229204-20 | Acceptable |
| 128269 | | Acceptable |

Laboratory Control Spike/Spike Duplicate (90-110); Hg(62-136)

| | |
|--------|------------|
| 6010B | <u>%R</u> |
| 129326 | Acceptable |
| 129330 | Acceptable |
| 129333 | Acceptable |
| Hg | |
| 128626 | Acceptable |
| 128629 | Acceptable |
| 128630 | Acceptable |

Blanks

| | <u>Analyte</u> | <u>Results</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|---------|------------------------|----------------|------------------|---------------------------|
| 6010B | All batches non-detect | | | |
| Hg | All batches non-detect | | | |
| %Moist. | All batches non-detect | | | |

ICV/CCV

not included

ICSA/ICSAB

not included

CRI

not included

Do all data in this SDG meet the Data Quality Objectives?

Yes

Comments:

Validator:

Carrie Madrid

Date:

4/15/07

Reviewer:

Cherie Zakowski

Date:

9/19/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229143
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8082

| | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|------------|-----------|-------------|------------|
| Samples in SDG: | RISB-18-15 | 229143-13 | RISB-19-01 | 229143-19 |
| | RISB-46-15 | 229143-15 | RISB-25-913 | 229143-20* |
| | RISB-46-01 | 229143-16 | RISB-26-15 | 229143-22* |
| | RISB-946 | 229143-17 | | |

* Sample were not marked for PCB's on the COC, however they were analyzed for PCB's.

Full Validation Sample: No raw data was present. Only a cursory validation was performed.

Precision:

Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil)
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%)

Yes No N/A
Yes
N/A

Comments (note deviations): Samples RISB-46-01 and RISB-946 were identified as field duplicates. All %RPD's were within the 50% criteria.

Accuracy:

Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined)
 Laboratory Control Sample criteria met?
 Laboratory Control Sample Duplicate?
 Laboratory Blanks criteria met (within control limits)?
 Trip Blanks/Rinsate Blanks
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05?
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05?
 Tuning (abundance criteria and 12 hour time frame)?
 Surrogate % Recoveries?
 Internal Standards

Yes No N/A
Yes
Yes
N/A
Yes
N/A
N/A
N/A
N/A
Yes
N/A

Comments (note deviations):

| Precision | Analyte | %RPD |
|-------------------------|---------------------|------------|
| Field Duplicates | | |
| | RISB-46-01/RISB-946 | acceptable |

| Laboratory Duplicate |
|----------------------|
| Not included |

Accuracy

| MS/MSD | RISB-46-15 | MS/MSD RPD |
|--------|------------|------------|
| | | acceptable |

| LCS/ LCS D | Batch 129538 | acceptable |
|---------------|--------------|------------|
| | | |

| Blanks | Batch 129538 | All non-detect | Qualifier | Associated Sample/ Qualification |
|--------|--------------|----------------|-----------|----------------------------------|
| | | | | |

| Holding Blank | Not included |
|---------------|--------------|
| | |

| Trip Blanks | N/A |
|-------------|-----|
| | |

| Rinsate Blank | N/A | Associated sample |
|---------------|-----|-------------------|
| | | |

ICV Not included

CCV Not included

| Surr. | Qualifier | Associated sample |
|------------------------------------|-----------|-------------------|
| Tetrachloro-m-xylene (0 %recovery) | J/R | RISB-946 |
| Decachlorobiphenyl | J/UJ | RISB-19-01 |

Internal Standard Not included

Representativeness:

Were sampling procedures and design criteria met?

Yes No N/A

Yes

Were holding times met?

Yes

Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$)

Yes

Were Chain-of-Custody records complete and provided in data package?

Yes

Were contaminants present in blanks?

No

Comments (note deviations): Cooler temperatures 1.0° C, however no action taken based on temperature.

Comparability:

Does data compare with similar analysis and data sets?

Yes No N/A

Yes

Comments (note deviations): _____

Completeness (90%):

Are all data in this SDG useable?

Yes No N/A

Yes

Comments (note deviations): _____

Do all data in this SDG meet the Data Quality Objectives?

No

Comments: Due several items missing the data does not meet all of the data quality objectives.

Validator: Carrie Madrid

Date: 4/12/07

Reviewer: Cherie Zakowski

Date: 9/19/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229143
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8270C

| | | | | |
|-----------------|--------------|-----------|--------------|-----------|
| Samples in SDG: | RISB-39-1317 | 229143-1 | RISB-25-1720 | 229143-12 |
| | RISB-29-1-S | 229143-2 | RISB-18-15 | 229143-13 |
| | RISB-28-913 | 229143-3 | RISB-46-15 | 229143-15 |
| | RISB-23-01 | 229143-5 | RISB-46-01 | 229143-16 |
| | RISB-28-01 | 229143-6 | RISB-946 | 229143-17 |
| | RISB-22-01 | 229143-7 | RISB-27-59 | 229143-18 |
| | RISB-24-01 | 229143-8 | RISB-19-01 | 229143-19 |
| | RISB-29-01 | 229143-9 | RISB-25-913 | 229143-20 |
| | RISB-23-911 | 229143-10 | RISB-26-15 | 229143-22 |
| | RISB-27-01 | 229143-11 | | |

Cursory validation no raw data present.

Precision: Yes No N/A
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) Not Provided
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) Not Provided

Comments (note deviations): Field Duplicates - Samples RISB-46-01 and RISB-946 were identified as field duplicates. Several %RPD's were outside the 50% criteria, however no action taken on field duplicate data.

Accuracy: Yes No N/A

Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) Yes
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? Yes
 Trip Blanks/Rinsate Blanks N/A
 ICV% Recoveries within 30.0%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? Yes
 CCV % Recoveries within 25% and RRF greater than or equal to 0.05? Yes
 Tuning (abundance criteria and 12 hour time frame)? N/A
 Surrogate % Recoveries? No
 Internal Standards N/A

Comments (note deviations):

| <u>Precision</u> | <u>%RPD</u> |
|----------------------|------------------------------------------|
| Field Duplicate | RISB-46-01/RISB-946 |
| | 1,1'-Biphenyl |
| | Bis(2-ethylhexyl) phthalate |
| | 65.22% |
| | 81.25% |
| | No action taken on field duplicate data. |
| Laboratory Duplicate | not included |

| <u>Accuracy</u> | <u>MS/MSD</u> | <u>RPD</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|-----------------|---------------|------------|------------------|---------------------------|
| MS/MSD | RISB-27-59 | Acceptable | N/A | |
| | 129483 | Acceptable | | |

| <u>LCS/LCSD</u> | <u>%R</u> |
|-----------------|------------|
| 129471 | Acceptable |
| 129483 | Acceptable |

| <u>Blanks</u> | <u>Analyte</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|---------------|----------------|------------------|---------------------------|
| 129483 | non-detect | none | |

| <u>Rinsate Blank</u> | <u>Analyte</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|----------------------|----------------|------------------|---------------------------|
| N/A | non-detect | N/A | |

| | | Ave. RRF | %RSD | Qualifier | Associated Samples |
|-----|-------------------------------------|------------|------------|-----------|---------------------------------------------------|
| ICV | 5/31/06 Benzaldehyde only | acceptable | acceptable | | |
| | 6/1/06 8270C | acceptable | acceptable | | |
| | 6/2/06 TCL | acceptable | acceptable | | Acetophenone, Caprolactam, Biphenyl, and Atrazine |

| | | Ave. RRF | %RSD | Qualifier | Associated Samples |
|-----|-------------------------------|------------|------------|-----------|--------------------|
| CCV | 6/5/06 Benzaldehyde | acceptable | acceptable | | |
| | 6/5/06 8270C | acceptable | acceptable | | |
| | 6/5/06 TCL | acceptable | acceptable | | |

| Surrogates | | %R | Qualifier | Associated Sample |
|-------------|------------------------|-----|-----------|----------------------------------------------------------------|
| RISB-29-1-S | Nitrobenzene-d5(26-91) | 11% | none | RISB-29-1-S no action; two surrogates allowed out per fraction |

Internal Standard
not included

Representativeness:

| | |
|-------------------------------------------------------------------------------|-----------------------------------|
| Were sampling procedures and design criteria met? | <u>Yes</u> |
| Were holding times met? | <u>Yes</u> |
| Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) | <u>No</u> |
| Were Chain-of-Custody records complete and provided in data package? | <u>Yes</u> |
| Were contaminants present in blanks? | <u>No</u> |
| Comments (note deviations): | <u>Cooler temperatures 1.0° C</u> |

Comparability:

| | |
|--------------------------------------------------------|------------|
| Does data compare with similar analysis and data sets? | <u>Yes</u> |
| Comments (note deviations): | |

Completeness (90%):

| | |
|-----------------------------------|------------|
| Are all data in this SDG useable? | <u>Yes</u> |
| Comments (note deviations): | |

* - Label as SDG or SAMP

| | |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Do all data in this SDG meet the Data Quality Objectives? | <u>No</u> |
| Comments: | <u>Due several items missing the data does not meet all of the data quality objectives.</u> |

Validator: Carrie Madrid
Reviewer: Cherie Zakowski

Date: 4/12/07
Date: 9/19/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229143
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8260B

| | Lab ID | | Lab ID |
|-----------------|--------------|-----------|-------------|
| Samples in SDG: | RISB-39-1317 | 229143-1 | RISB-46-15 |
| | RISB-29-1-S | 229143-2 | RISB-46-01 |
| | RISB-28-913 | 229143-3 | RISB-946 |
| | RISB-29-913 | 229143-4 | RISB-27-59 |
| | RISB-23-01 | 229143-5 | RISB-19-01 |
| | RISB-28-01 | 229143-6 | RISB-25-913 |
| | RISB-22-01 | 229143-7 | TW-38 |
| | RISB-24-01 | 229143-8 | RISB-26-15 |
| | RISB-29-01 | 229143-9 | TW-28 |
| | RISB-23-911 | 229143-10 | TRIP BLANK |
| | RISB-27-01 | 229143-11 | TRIP BLANK |
| | RISB-25-1720 | 229143-12 | RISB-25-01 |
| | RISB-18-15 | 229143-13 | RISB-26-0-1 |
| | RISB-28-5-9 | 229143-14 | RISB-18-0-1 |
| | | | 229143-15 |
| | | | 229143-16 |
| | | | 229143-17 |
| | | 229143-18 | |
| | | 229143-19 | |
| | | 229143-20 | |
| | | 229143-21 | |
| | | 229143-22 | |
| | | 229143-23 | |
| | | 229143-24 | |
| | | 229143-25 | |
| | | 229143-26 | |
| | | 229143-27 | |
| | | 229143-28 | |

Full Validation Sample: No raw data was present. Only a cursory validation was performed.

| Precision: | Yes | No | N/A |
|--------------------------------------------------------------------------------------------------|-----|----|-----|
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) | | | No |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) | | | N/A |

Comments (note deviations): Field Duplicates - Samples RISB-46-01 and RISB-946 were identified as field duplicates. Several %RPD's were outside the 50% criteria, however no action taken on field duplicate data.

| Accuracy: | Yes | No | N/A |
|---------------------------------------------------------------------------------------------------|-----|----|-----|
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | | | No |
| Laboratory Control Sample criteria met? | | | Yes |
| Laboratory Control Sample Duplicate? | | | N/A |
| Laboratory Blanks criteria met (within control limits)? | | | Yes |
| Trip Blanks/Rinsate Blanks | | | Yes |
| ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? | | | No |
| CCV % Recoveries within 30% and RRF greater than or equal to 0.05? | | | No |
| Tuning (abundance criteria and 12 hour time frame)? | | | NA |
| Surrogate % Recoveries? | | | No |
| Internal Standards | | | NA |

Comments (note deviations):

| Precision | Analyte | %RPD | Analyte | %RPD |
|-------------------------|---------------------|---------|------------------------|---------|
| Field Duplicates | RISB-46-01/RISB-946 | | | |
| | Benzene | 80.37% | Ethylbenzene | 118.34% |
| | Chlorobenzene | 112.50% | Methylcyclohexane | 113.92% |
| | 1,3-dichlorobenzene | 112.50% | Toluene | 92.68% |
| | 1,2-dichlorobenzene | 144.50% | 1,2,4-Trichlorobenzene | 131.71% |
| | 1,4-dichlorobenzene | 134.09% | Xylenes | 118.70% |

No action taken on field duplicate data.

Laboratory Duplicate
Not included

Accuracy

| 129452 | | | | 129453 | | | |
|--------|---------------------------|---------|-----|---------------------------|--------|-----|--|
| MS/MSD | RISB-39-1317 | MS/MSD | RPD | RISB-28-5-9 | MS/MSD | RPD | |
| | 1,2-Dichlorobenzene | 59/60 | 2 | 1,1,2,2-Tetrachloroethane | 45/51 | 12 | |
| | 1,3-Dichlorobenzene | 63/66 | 5 | Ethylbenzene | 0/0 | NC | |
| | Bromoform | 57/61 | 7 | Tetrachloroethene | 0/0 | NC | |
| | Ethylbenzene | 74/8 | 161 | 1,1,2-Trichloroethane | 0/0 | NC | |
| | Dibromochloromethane | 55/60 | 9 | trans-1,3-Dichloropropene | 64/63 | 2 | |
| | 1,1,2-Trichloroethane | 173/114 | 41 | Toluene | 0/0 | NC | |
| | trans-1,3-Dichloropropene | 53/56 | 6 | cis-1,3-Dichloropropene | 64/63 | 2 | |
| | Toluene | 28/26 | 7 | Bromodichloromethane | 66/65 | 2 | |
| | cis-1,3-Dichloropropene | 53/56 | 6 | Trichloroethene | 0/0 | NC | |
| | Bromodichloromethane | 54/58 | 7 | 1,2-Dichloroethane | 0/0 | NC | |
| | Chloroethane | 173/98 | 55 | Benzene | 69/66 | 4 | |
| | Chloromethane | 69/76 | 10 | Carbon Tetrachloride | 0/0 | NC | |
| | | | | 1,1,1-Trichloroethane | 0/0 | NC | |
| | | | | Chloroform | 15/18 | 18 | |
| | TW-38 (water) | | | 1,1-Dichloroethane | 0/0 | NC | |
| | Tetachloroethene | 198/195 | 2 | Methylene Chloride | 0/0 | NC | |
| | 1,1-Dichloroethane | 229/260 | 13 | 1,1-Dichloroethene | 0/0 | NC | |
| | 1,1-Dichloroethene | 136/146 | 7 | Trichlorofluoromethane | 0/0 | NC | |
| | | | | Vinyl Chloride | 67/68 | 1 | |
| | | | | Chloromethane | 71/69 | 3 | |

| | | |
|--------------------|---------|----|
| 129455 | | |
| Tetrachloroethene | 198/195 | 2 |
| 1,1-Dichloroethane | 229/260 | 13 |
| 1,1-Dichloroethene | 136/146 | 7 |

No action taken on MS/MSD Data

NC - Not Calculated

| | | |
|-------------|-------------------|------------|
| LCS/ | Batch 129452 | Acceptable |
| LCSD | Batch 129453 | Acceptable |
| | Batch 129455water | Acceptable |

| | | Qualifier | Associated Sample/ Qualification |
|---------------|--------------------|----------------|----------------------------------|
| Blanks | Batch 129452 | All non-detect | |
| | Batch 129453 | All non-detect | |
| | Batch 129455 Water | All non-detect | |

Holding Blank Not included

| | | |
|--------------------|---------------|------------|
| Trip Blanks | Trip Blank | Non-detect |
| | 6/2/2006 1325 | |
| | Trip Blank | |
| | 6/2/2006 1245 | Non-detect |

Rinsate Blank Associated sample

ICV RRF %RSD Qualifier Associated sample

| | | | | |
|----------------|---------------------------------------------|------------|---|-------------|
| PT1/PT2 | 4/26/2006 A Files | acceptable | | |
| PT1 | 4/26/2006 A Files Extra 1 Methyl Acetate | 0.019 | R | All samples |
| PT2 | 4/26/2006 A Files Extra 2 Methyl Acetate | 0.017 | R | All samples |

CCV RRF %RSD Qualifier Associated sample

| | | | | |
|------------|------------------------------------------------------------------|------------------|--------------|--------------------------------------------------------------------------------------|
| PT1 | 6/2/2006 0901 A16687 Extra 1 Methyl Acetate | 28.44% | J/UJ | Qualified due to ICV |
| PT2 | 6/2/2006 0922 A16688 Extra 2 Methyl Acetate | 34.16% | J/UJ | Qualified due to ICV |
| PT1 | 6/2/06 0943 A 16689 acceptable | | | |
| PT2 | 6/2/06 1004 A 16690 4-Methyl-2-pentanone 2-Hexanone | 25.10% 25.90% | J/UJ J/UJ | RISB-21-1-S, RISB-29-01, RISB-25-1720, RISB-18-15, TW-38, TW-28, TB (24), TB (25) |

| | | | | |
|------------|------------------------------------------------------------------------|----------------------|--------------|-----------------------------------------------------------------------------------------------------------------|
| PT1 | 6/2/2006 2307 A16727 Extra 1 acceptable | | | |
| PT2 | 6/2/2006 2328 A16728 Extra 2 Methyl Acetate | 37.70% | J/UJ | Qualified due to ICV |
| PT1 | 6/2/2006 2349 A16729 8260 2-Hexanone Acetone | 31.9%(L) 28.2%(L) | J/UJ J/UJ | RISB-39-1317, RISB-22-01, RISB-28-5-9, RISB-46-15, RISB-46-01, RISB-946, RISB-27-59, RISB-19-01, RISB-25-913 |
| PT2 | 6/2/2006 0010 A16730 8260 2-Hexanone 4-Methyl-2-pentanone | 28.4%(L) 28.30% | J/UJ J/UJ | RISB-39-1317, RISB-22-01, RISB-28-5-9, RISB-46-15, RISB-46-01, RISB-946, RISB-27-59, RISB-19-01, RISB-25-913 |

| | | | | |
|------------|-------------------------------------------------------|--------|------|----------------------|
| PT1 | 6/5/2006 1045 A16761 Extra 1 Methyl Acetate | 71.52% | J/UJ | Qualified due to ICV |
| PT2 | 6/5/2006 1106 A16762 Extra 2 Methyl Acetate | 44.52% | J/UJ | Qualified due to ICV |

| | | | | |
|-----|---------------------------|-----------|------|------------|
| PT1 | 6/5/2006 1209 A16765 8260 | | | |
| | Acetone | 105.2%(L) | J/UJ | RISB-28-01 |
| | 2-Butanone | 48.3%(L) | J/UJ | RISB-28-01 |
| PT2 | 6/5/2006 1230 A16766 8260 | | | |
| | Acetone | 69.3%(L) | J/UJ | RISB-28-01 |
| | 2-Butanone | 37.5%(L) | J/UJ | RISB-28-01 |

PT1 6/5/2006 2243 A16795 Extra 1
Methyl Acetate 27.58% J/UJ Qualified due to ICV

PT2 6/5/2006 2304 A16796 Extra 2
Methyl Acetate 37.90% J/UJ Qualified due to ICV

PT1 6/6/2006 1111 A16827 Extra 1
Methyl Acetate 76.44% J/UJ Qualified due to ICV

PT2 6/6/2006 1101 A16866 Extra 2
Methyl Acetate 40.16% J/UJ Qualified due to ICV

PT2 6/6/2006 1144 A16868 8260
acceptable

PT1 6/6/2006 1153 A16829 8260
acceptable

| Surr. | Toluene-d8 (70-130) | %R | Qualifier | Associated sample |
|-------|----------------------|------|----------------|----------------------|
| | RISB-29-1-S 50x dil. | 169% | J pos. results | RISB-29-1-S 50x dil. |

Internal Standard Not included

Representativeness:

| | Yes | No | N/A |
|-------------------------------------------------------------------------------|--------------------------------------------------|----|-----|
| Were sampling procedures and design criteria met? | Yes | | |
| Were holding times met? | Yes | | |
| Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) | Yes | | |
| Were Chain-of-Custody records complete and provided in data package? | Yes | | |
| Were contaminants present in blanks? | No | | |
| Comments (note deviations): | Cooler temperatures 1.0° C - No action required. | | |

Comparability:

| | Yes | No | N/A |
|--------------------------------------------------------|-----|----|-----|
| Does data compare with similar analysis and data sets? | Yes | | |
| Comments (note deviations): | | | |

Completeness (90%):

| | Yes | No | N/A |
|-----------------------------------|-----|----|-----|
| Are all data in this SDG useable? | Yes | | |
| Comments (note deviations): | | | |

| | |
|-----------------------------------------------------------|-----|
| Do all data in this SDG meet the Data Quality Objectives? | Yes |
| Comments: | |
| | |
| | |

Validator: Carrie Madrid Date: 4/12/07
 Reviewer: Cherie Zakowski Date: 9/19/07

PSC
Data Evaluation Worksheet

Sample Delivery Group (SDG) Number: 229203 soil
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 6010B/7471A/%Moisture

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|------------|----------|-------------|----------|
| | RISB13-59 | 229203-1 | RISB36-1316 | 229203-6 |
| | RISB35-39 | 229203-2 | RISB16-15 | 229203-7 |
| | RISB11-15 | 229203-3 | RISB40-913 | 229203-8 |
| | RISB-92 | 229203-4 | RISB2-913 | 229203-9 |
| | RISB14-913 | 229203-5 | | |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present.

Precision: **Yes No N/A**
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20%) N/A
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) Yes
 Comments (note deviations): **Field Duplicate** - Samples RISB13-59/RISB-92 are identified as field dups. Several %RPD's outside of control limits, see below.
Laboratory Duplicate - Dup. analysis performed on sample RISB2-913 for 6010B all %RPD within limits with the exception of Cr, Fe, V, and Sb.
 Duplicates for Hg and %moisture performed on a sample from another SDG.

Accuracy: **Yes No N/A**
 Serial Dilutions ± 10% N/A
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) No
 Post Digestion Spike criteria met (if applicable)? No
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? (± 25%) N/A
 Laboratory Blanks criteria met (within control limits)? Yes
 ICV/CCV % Recoveries within 90-110%? N/A
 ICSA/ICSAB % Recoveries acceptable? N/A
 CRI % Yes
 Comments (note deviations): **Matrix Spike** - Sample RISB2-913 spiked for 6010B. Hg spike from another SDG.

Representativeness: **Yes No N/A**
 Were sampling procedures and design criteria met? Yes
 Were holding times met? Yes
 Were preservation criteria met? ($4^{\circ}C \pm 2^{\circ}C$) Yes
 Were Chain-of-Custody records complete and provided in data package? No
 Were contaminants present in blanks? No
 Comments (note deviations): Sample cooler was received at 4.0 ° C.

Comparability: **Yes No N/A**
 Does data compare with similar analysis and data sets? Yes
 Comments (note deviations): _____

Completeness (90%): **Yes No N/A**
 Are all data in this SDG useable? Yes
 Comments (note deviations): _____

Precision

Field Duplicate

| RISB13-59/RISB-92 | RPD | | RPD |
|-------------------|---------|-----------|--------|
| %moisture | 146.76% | Manganese | 37.16% |
| Barium | 59.60% | Nickel | 46.15% |
| Beryllium | 73.91% | Potassium | 141% |
| Calcium | 140% | Selenium | 43.90% |
| Iron | 40% | Sodium | 179% |
| Lead | 168.70% | Thallium | 43% |
| Magnesium | 88.14% | Vanadium | 72% |
| Aluminum | 21.28% | | |

| Laboratory Duplicate | %RPD | Qualifier | Associated Samples |
|----------------------|--------------|-----------|--------------------|
| 6010B | | | |
| RISB2-913 | Chromium 37% | J | All samples |
| | Iron 38% | J | All Samples |
| | Vanadium 47% | J | All Samples |
| | Antimony 37% | UJ | All Samples |
| Hg | Diff. SDG | | |
| %Moisture | Diff. SDG | | |

Accuracy

Serial Dilution

%RPD
Not included

| MS/MSD | Analyte | MS/MSD %R | RPD | Post %R | Qualifier | Associated Samples |
|-----------|-----------|-----------|-----|---------|--------------------------------------------------------------------------|--------------------|
| Hg | Diff. SDG | Accep. | | Accep. | | |
| 6010B | (76-124) | | | | | |
| RISB2-913 | Aluminum | 999/999% | 4% | 999% | No Action - Sample concentration greater than 4x the spike concentration | |
| | Calcium | 479/111% | 16% | 393% | No Action - Sample concentration greater than 4x the spike concentration | |
| | Iron | 999/889% | 11 | 999% | No Action - Sample concentration greater than 4x the spike concentration | |
| | Potassium | 233/63% | 47% | 123% | No Action - Sample concentration greater than 4x the spike concentration | |
| | Magnesium | 999/536% | 22% | 999% | No Action - Sample concentration greater than 4x the spike concentration | |
| | Manganese | 132/58% | 9% | 262% | No Action - Sample concentration greater than 4x the spike concentration | |
| | Sodium | 136/102% | 15% | 134% | No Action - Sample concentration greater than 4x the spike concentration | |
| | Thallium | 74/68% | 6% | 92% | No Action - Sample concentration greater than 4x the spike concentration | |
| | Antimony | 44/39% | 12% | 92% | No Action - Sample concentration greater than 4x the spike concentration | |

Laboratory Control Spike/ Spike Duplicate(90-110);Hg (62-136)

%R

| | |
|-------|------------|
| 6010B | acceptable |
| Hg | acceptable |

Blanks

| | Analyte | Results | Qualifier | Associated Samples |
|-----------|------------|---------|-----------|--------------------|
| 6010B | non-detect | | | |
| Hg | non-detect | | | |
| %Moisture | non-detect | | | |

ICV/CCV

not present

ICSA/ICSAB

not present

CRI

not present

Do all data in this SDG meet the Data Quality Objectives?

Yes

Comments:

Validator:

Carrie Madrid

Date: 4/12/07

Reviewer:

Alecia Epes

Date: 5/12/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229203
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8270C

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|------------|----------|-------------|----------|
| | RISB13-59 | 229203-1 | RISB36-1316 | 229203-6 |
| | RISB35-39 | 229203-2 | RISB16-15 | 229203-7 |
| | RISB11-15 | 229203-3 | RISB40-913 | 229203-8 |
| | RISB-92 | 229203-4 | RISB2-913 | 229203-9 |
| | RISB14-913 | 229203-5 | | |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present.

Precision:
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) Yes
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) N/A

Comments (note deviations): **Field Duplicate** - Samples RISB13-59/RISB-92 are identified as field dups.
Laboratory Duplicate - Sample RISB13-59 listed as a duplicate however no sample result given.

Accuracy:
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) Yes
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? Yes
 Trip Blanks/Rinsate Blanks N/A
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? Yes
 CCV % Recoveries within 25% and RRF greater than or equal to 0.05? Yes
 Tuning (abundance criteria and 12 hour time frame)? N/A
 Surrogate % Recoveries? Yes
 Internal Standards N/A

Comments (note deviations): MS/MSD - Batch 129512 sample from a different SDG spiked.

| <u>Precision</u> | <u>%RPD</u> |
|---------------------------------------|------------------------------|
| Field Duplicates RISB13-59/RISB-92 | acceptable |
| Laboratory Duplicate RISB13-59 | <u>%RPD</u> No data given |

| <u>Accuracy</u> | <u>MS/MSD</u> | <u>RPD</u> |
|-----------------|---------------|------------------------|
| | Batch 129512 | Diff. SDG - acceptable |

| | <u>%R</u> |
|---------------------------------|------------|
| LCS/LCSD Batch 129512 | acceptable |

| | <u>Analyte</u> | <u>Qualifier</u> | <u>Associated Sample/ Qualification</u> |
|-------------------------------|----------------|------------------|-----------------------------------------|
| Blanks Batch 129512 | | non-detect | |

| | <u>Qualifier</u> | <u>Associated sample</u> |
|--------------------------------|------------------|--------------------------|
| Rinsate Blank | N/A | |

| | | Ave. RRF | %RSD | Qualifier | Associated Sample |
|-----|--------------|------------|------------|-----------|---------------------------------------------------|
| ICV | 6/5/06 | | | | |
| | 8270C | acceptable | acceptable | | |
| | 6/5/06 | | | | |
| | Benzaldehyde | acceptable | acceptable | | |
| | 6/6/06 | | | | |
| | TCL | acceptable | acceptable | | Acetophenone, Caprolactam, Biphenyl, and Atrazine |

| | | Ave. RRF | %RSD | Qualifier | Associated Sample |
|-----|--------------|------------|------------|-----------|-------------------|
| CCV | 6/7/06 | | | | |
| | 8270C | acceptable | acceptable | | |
| | 6/7/06 | | | | |
| | Benzaldehyde | acceptable | acceptable | | |
| | 6/7/06 | | | | |
| | TCL | acceptable | acceptable | | |

| Surr. | %R | Qualifier | Associated sample |
|--------------|------------|-----------|-------------------|
| Batch 129512 | acceptable | | |

Internal Standard not included

Representativeness:

| | | | |
|-------------------------------------------------------------------------------|-------------------------------------------|----|-----|
| Were sampling procedures and design criteria met? | Yes | No | N/A |
| Were holding times met? | Yes | | |
| Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) | Yes | | |
| Were Chain-of-Custody records complete and provided in data package? | Yes | | |
| Were contaminants present in blanks? | No | | |
| Comments (note deviations): | Cooler temperatures 4.0°C | | |

Comparability:

| | | | |
|--------------------------------------------------------|-----|----|-----|
| Does data compare with similar analysis and data sets? | Yes | No | N/A |
| Comments (note deviations): | | | |

Completeness (90%):

| | | | |
|-----------------------------------|-----|----|-----|
| Are all data in this SDG useable? | Yes | No | N/A |
| Comments (note deviations): | | | |

* - Label as SDG or SAMP

| | |
|-----------------------------------------------------------|-----|
| Do all data in this SDG meet the Data Quality Objectives? | Yes |
| Comments: | |

Validator: Carrie Madrid Date: 4/12/07
 Reviewer: Alecia Epes Date: 5/12/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229203
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8260B

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|------------|----------|-------------|-----------|
| | RISB13-59 | 229203-1 | RISB36-1316 | 229203-6 |
| | RISB35-39 | 229203-2 | RISB16-15 | 229203-7 |
| | RISB11-15 | 229203-3 | RISB40-913 | 229203-8 |
| | RISB-92 | 229203-4 | RISB2-913 | 229203-9 |
| | RISB14-913 | 229203-5 | Trip Blank | 229203-10 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present.

| Precision: | Yes | No | N/A |
|--------------------------------------------------------------------------------------------------|-----|-----|-----|
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) | | No | |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) | | N/A | |

Comments (note deviations): **Field Duplicate** - Samples RISB13-59/RISB-92 are identified as field dups. Several analytes were outside the 50% criteria see below. No action taken on field duplicate data.

| Accuracy: | Yes | No | N/A |
|---------------------------------------------------------------------------------------------------|-----|-----|-----|
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | | No | |
| Laboratory Control Sample criteria met? | | Yes | |
| Laboratory Control Sample Duplicate? | | N/A | |
| Laboratory Blanks criteria met (within control limits)? | | Yes | |
| Trip Blanks/Rinsate Blanks | | N/A | |
| ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? | | No | |
| CCV % Recoveries within 30% and RRF greater than or equal to 0.05? | | No | |
| Tuning (abundance criteria and 12 hour time frame)? | | N/A | |
| Surrogate % Recoveries? | | No | |
| Internal Standards | | N/A | |

Comments (note deviations): **MS/MSD** - Batch 129488 soil sample RISB35-39 (Ethylbenzene and Toluene out).
 Aqueous Batch 129500 spike performed on a sample from another SDG.

Surrogate - 4-Bromofluorobenzene out in sample RISB-92 RR1

Precision

| Field Duplicates | %RPD | %RPD |
|---------------------|------|----------------------|
| RISB13-59/RISB-92 | | |
| Benzene | 177% | Toluene 145% |
| 1,2-Dichlorobenzene | 144% | Trichloroethene 188% |
| 1,4-Dichlorobenzene | 182% | Xylenes 155% |
| 1,2-Dichloroethane | 191% | |

Laboratory Duplicate
N/A

Accuracy

| MS/MSD | MS/MSD | RPD |
|-------------------------|------------------------|-----|
| | (70-130) | |
| Batch 129488 soil | | |
| RISB35-39 Ethyl Benzene | 69/70% | 1% |
| Toluene | 67/66% | 2% |
| Batch 129500 Aq. | Diff. SDG - acceptable | |

No action taken on MS/MSD data.

| LCS/LCSD | %R |
|-------------------|------------|
| | (70-130) |
| Batch 129488 soil | acceptable |
| Batch 129500 Aq. | acceptable |

| Blanks | Results in ug/L | Qualifier | Associated Sample/ Qualification |
|-------------------|-----------------|-----------|----------------------------------|
| Batch 129488 soil | acceptable | | |
| Batch 129500 Aq. | acceptable | | |
| Trip Blank | N/A | | |

Holding Blank N/A

Rinsate Blank N/A

| ICV | RRF | %RSD | Qualifier | Associated sample |
|---------|-----------------------------------------------|-------------|-----------|--------------------|
| PT1/PT2 | 4/26/2006 A Files | acceptable | | |
| PT1 | 4/26/2006 A Files Extra 1/2 Methyl Acetate | 0.019/0.017 | R | All Samples in SDG |

| CCV | RRF | %RSD | Qualifier | Associated sample |
|------------------------------|---------------------------|------------|-----------|-------------------------|
| 6/5/2006 1045 A16761 Extra 1 | | | | |
| Methyl Acetate | | 71.52% | J/UJ | Qual. due to ICV |
| 6/5/2006 1106 A16762 Extra 2 | | | | |
| Methyl Acetate | | 44.52% | J/UJ | Qual. due to ICV |
| PT1 | 6/5/2006 1209 A16765 8260 | | | |
| Acetone | | 105.20% | UJ | No samples |
| 2-Butanone | | 48.30% | J UJ | No samples |
| PT2 | 6/5/2006 1230 A16766 8260 | acceptable | | All samples - no action |

| CCV | RRF | %RSD | Qualifier | Associated sample |
|------------------------------|---------------------------|------------|-----------|---------------------------------------------------------------------|
| 6/6/2006 1111 A16827 Extra 1 | | | | |
| Methyl Acetate | | 76.44% | J/UJ | Qual. due to ICV |
| 6/6/2006 1132 A16828 Extra 2 | | | | |
| Methyl Acetate | | 48.12% | J/UJ | Qual. due to ICV |
| PT1 | 6/6/2006 1153 A16829 8260 | acceptable | | |
| PT2 | 6/6/2006 1214 A16830 8260 | | | |
| Acetone | | 36.9%(L) | J UJ | RISB13-59, RISB35-39, RISB11-15 RISB16-15, RISB40-913, RISB2-913 |

| Surr. | %R (70-130) | Qualifier | Associated sample |
|----------------------|-------------|--------------------|-------------------|
| RISB-92 | | | |
| 4-Bromofluorobenzene | 144% | J detected results | RISB-92 |

Internal Standard not included

Representativeness:
Were sampling procedures and design criteria met? Yes **Yes No N/A**
Were holding times met? Yes
Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) Yes
Were Chain-of-Custody records complete and provided in data package? Yes
Were contaminants present in blanks? No
Comments (note deviations): Cooler temperatures 4.0° C

Comparability:
Does data compare with similar analysis and data sets? Yes **Yes No N/A**
Comments (note deviations): _____

Completeness (90%):
Are all data in this SDG useable? Yes **Yes No N/A**
Comments (note deviations): _____

Do all data in this SDG meet the Data Quality Objectives? No
Comments: The nondetect methyl acetate results were rejected due to initial calibration criteria.

Validator: Carrie Madrid Date: 4/12/07
Reviewer: Alecia Epes Date: 5/15/07

PSC
Data Evaluation Worksheet

Sample Delivery Group (SDG) Number: 229204
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: TCLP 6010B

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|------------|-----------|-------------|-----------|
| | RISB25-01 | 229204-1 | RISB35-01 | 229204-16 |
| | RISB3-01 | 229204-2 | RISB40-01 | 229204-17 |
| | RISB5-01 | 229204-3 | RISB1-01 | 229204-18 |
| | RISB41-01 | 229204-4 | RISB43-01 | 229204-19 |
| | RISB15-01 | 229204-5 | RISB47-01 | 229204-20 |
| | RISB914 | 229204-6 | RISB02-01 | 229204-21 |
| | RISB913 | 229204-7 | RISB36-01 | 229204-22 |
| | RISB16-01 | 229204-8 | RISB935 | 229204-23 |
| | RISB14-01 | 229204-9 | RISB5-5-9 | 229204-24 |
| | RISB14-59 | 229204-10 | RISB2-17-21 | 229204-25 |
| | RISB42-01 | 229204-11 | RISB3-9-13 | 229204-26 |
| | RISB11-01 | 229204-12 | RISB15-9-13 | 229204-27 |
| | RISB47-913 | 229204-13 | RISB-11-59 | 229204-28 |
| | RISB13-01 | 229204-14 | | |

Full Validation Sample: Level III evaluation performed on all samples. No raw data was present. Samples are soils.

Precision:

| | Yes | No | N/A |
|-------------------------------------------------------------------------------------------------|-----|----|-----|
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20%, 35% for soils) | | No | |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%, 35% for soils) | | No | |

Comments (note deviations): Field Duplicate - Samples RISB14-59/RISB914 are field duplicates.
Laboratory Duplicates - See below.

Accuracy:

| | Yes | No | N/A |
|---------------------------------------------------------------------------------------------------|-----|-----|-----|
| Serial Dilutions ± 10% | | | N/A |
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | | No | |
| Post Digestion Spike criteria met (if applicable)? | | No | |
| Laboratory Control Sample criteria met? | | Yes | |
| Laboratory Control Sample Duplicate? (± 25%) | | N/A | |
| Laboratory Blanks criteria met (within control limits)? | | Yes | |
| ICV/CCV % Recoveries within 90-110%? | | N/A | |
| ICSA/ICSAB % Recoveries acceptable? | | N/A | |
| CRI % | | N/A | |

Comments (note deviations): Matrix Spike - See below.

Representativeness:

| | Yes | No | N/A |
|----------------------------------------------------------------------|-----|-----|-----|
| Were sampling procedures and design criteria met? | | Yes | |
| Were holding times met? | | Yes | |
| Were preservation criteria met? (4° C ± 2° C) | | Yes | |
| Were Chain-of-Custody records complete and provided in data package? | | Yes | |
| Were contaminants present in blanks? | | No | |

Comments (note deviations): Sample cooler was received at 4.0° C.

Comparability:

| | Yes | No | N/A |
|--------------------------------------------------------|-----|-----|-----|
| Does data compare with similar analysis and data sets? | | Yes | |

Comments (note deviations): _____

Completeness (90%):

| | Yes | No | N/A |
|-----------------------------------|-----|-----|-----|
| Are all data in this SDG useable? | | Yes | |

Comments (note deviations): _____

| Precision | %RPD |
|-------------------|--------|
| Field Duplicate | |
| RISB14-59/RISB914 | |
| Barium | 37.04% |
| Cobalt | 38.96% |
| Manganese | 73.97% |
| Potassium | 55.32 |

No action taken on field duplicate data.

| Laboratory Duplicate | %RPD | Qualifier | Associated Samples |
|-------------------------------|------------|-----------|---------------------|
| 6010B | | | |
| 129330 Diff. SDG 229203-9 | | | |
| Chromium | 37% | J/UJ | RISB25-01, RISB3-01 |
| Iron | 38% | J/UJ | " |
| Vanadium | 47% | J/UJ | " |
| Antimony | 37% | J/UJ | " |
| 129333 RISB14-59 | acceptable | | |
| 129340 RISB-5-9 | acceptable | | |
| Hg | | | |
| 128629 Diff. SDG 229143-14 | acceptable | | |
| 128630 RISB47-01 | acceptable | | |
| 128634 Diff. SDG 229143-1 | acceptable | | |
| %Moist. | | | |
| 129486 RISB47-913 | | | |
| Diff. SDG 229203-1 | acceptable | | |
| 129487 Diff. SDG 229206-3 & 4 | acceptable | | |

Accuracy

| Serial Dilution | %RPD |
|-----------------|------|
| | N/A |

| MS/MSD | Analyte | MS/MSD %R | RPD | Post %R | Qualifier | Associated Samples |
|--------|--------------------|-----------|-----|---------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6010B | (76-124) | | | | | |
| 129330 | Diff. SDG 229203-9 | | | | | |
| | Aluminum | 999/999% | 4% | 0% | | Sample concentration >4x spike - no qualification required |
| | Calcium | 479/111% | 16% | 0% | | Sample concentration >4x spike - no qualification required |
| | Iron | 999/889% | 11% | 0% | | Sample concentration >4x spike - no qualification required |
| | Magnesium | 999/536% | 22% | 0% | | Sample concentration >4x spike - no qualification required |
| | Manganese | 132/58% | 9% | 0% | | Sample concentration >4x spike - no qualification required |
| | Sodium | 136/102% | 15% | 0% | J | RISB25-01, RISB3-01 |
| | Thallium | 74/68% | 6% | 0% | J-/UJ | " |
| | Antimony | 44/39% | 12% | 0% | J-/UJ | " |
| | Potassium | 233/63% | 47% | 0% | J | " |
| 129333 | RISB14-59 | | | | | |
| | Aluminum | 999/999% | 1% | 191% | | Sample concentration >4x spike - no qualification required |
| | Calcium | 999/999% | 8% | 833% | | Sample concentration >4x spike - no qualification required |
| | Iron | 793/0% | 14% | 0% | | Sample concentration >4x spike - no qualification required |
| | Magnesium | 704/636% | 2% | 0% | | Sample concentration >4x spike - no qualification required |
| | Potassium | 135/149% | 3% | 89% | J | RISB5-01, RISB41-01, RISB15-01, RISB914, RISB913, RISB16-01, RISB14-01, RISB14-59, RISB42-01, RISB11-01, RISB47-913, RISB13-01, RISB35-01, RISB40-01, RISB1-01, RISB43-01, RISB47-01, RISB02-01, RISB36-01 |
| | Sodium | 213/236% | 5% | 159% | J+ | " |
| | Antimony | 57/53% | 8% | 92% | UJ | " |
| | Vanadium | 81/47% | 12% | 36% | J- | " |

| | | | | | | |
|--------|-----------|----------|-----|------|------------------------------------------------------------|------------------------------------------------------------------------|
| 129340 | RISB5-5-9 | | | | | |
| | Aluminum | 999/999% | 4% | 999% | Sample concentration >4x spike - no qualification required | |
| | Calcium | 999/999% | 3% | 999% | Sample concentration >4x spike - no qualification required | |
| | Iron | 999/999% | 2% | 999% | Sample concentration >4x spike - no qualification required | |
| | Magnesium | 960/723% | 4% | 86% | Sample concentration >4x spike - no qualification required | |
| | Manganese | 0/28% | 10% | 124% | Sample concentration >4x spike - no qualification required | |
| | Potassium | 80/47% | 9% | 13% | J- | RISB935, RISB-5-9, RISB2-17-21, RISB3-9-13, RISB15-9-13, RISB-11-59 |
| | Antimony | 42/43% | 2% | 77% | UJ | " |

| | | |
|--------|---------------------|------------|
| Hg | | |
| 128629 | Diff. SDG 229143-14 | acceptable |
| 128630 | RISB47-01 | acceptable |
| 128634 | Diff. SDG 229312-1 | acceptable |

LCS/ LSD(90-110)

| | | <u>%R</u> |
|-------|-------------------------|------------|
| 6010B | 129330/129333 129340 | acceptable |
| Hg | 128629/128630 128634 | acceptable |

Blanks

| | <u>Analyte</u> | <u>Results</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|---------|-------------------------|----------------|------------------|---------------------------|
| 6010B | 129330/129333 129340 | non-detect | | |
| Hg | 128629/128630 128634 | non-detect | | |
| %Moist. | 129486/129487 | non-detect | | |

ICV/CCV

not present

ICSA/ICSAB

not present

CRI

not present

Do all data in this SDG meet the Data Quality Objectives?

Yes

Comments:

Validator:
Reviewer:

Carrie Madrid
Cherie Zakowski

Date: 4/21/07
Date: 5/10/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229204
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8270C

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|------------|-----------|-------------|-----------|
| | RISB25-01 | 229204-1 | RISB35-01 | 229204-16 |
| | RISB3-01 | 229204-2 | RISB40-01 | 229204-17 |
| | RISB5-01 | 229204-3 | RISB1-01 | 229204-18 |
| | RISB41-01 | 229204-4 | RISB43-01 | 229204-19 |
| | RISB15-01 | 229204-5 | RISB47-01 | 229204-20 |
| | RISB914 | 229204-6 | RISB02-01 | 229204-21 |
| | RISB913 | 229204-7 | RISB36-01 | 229204-22 |
| | RISB16-01 | 229204-8 | RISB935 | 229204-23 |
| | RISB14-01 | 229204-9 | RISB5-5-9 | 229204-24 |
| | RISB14-59 | 229204-10 | RISB2-17-21 | 229204-25 |
| | RISB42-01 | 229204-11 | RISB3-9-13 | 229204-26 |
| | RISB11-01 | 229204-12 | RISB15-9-13 | 229204-27 |
| | RISB47-913 | 229204-13 | RISB-11-59 | 229204-28 |
| | RISB13-01 | 229204-14 | | |

Full Validation Sample: Level III evaluation performed on all samples. No raw data was present. Samples are soils.

Precision: Yes No N/A
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) Yes
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) N/A

Comments (note deviations): Field Duplicate - Samples RISB14-59/RISB914 are field duplicates.

Accuracy: Yes No N/A
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) Yes
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? Yes
 Trip Blanks/Rinsate Blanks N/A
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? Yes
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05? No
 Tuning (abundance criteria and 12 hour time frame)? N/A
 Surrogate % Recoveries? Yes
 Internal Standards N/A

Comments (note deviations): MS/MSD - Matrix spike performed on sample R-84607.
 Calibrations - See Below.

Precision %RPD
 Field Duplicates
 RISB14-59/RISB914 acceptable

Laboratory Duplicate %RPD
 N/A

Accuracy
 MS/MSD MS/MSD RPD
 129511 RISB14-01 acceptable
 129512 acceptable
 129579 acceptable

LCS/LCSD %R
 129511 acceptable
 129512 acceptable
 129579 acceptable

| | Analyte | Qualifier | Associated Sample/ Qualification |
|---------------|------------|-----------|----------------------------------|
| Blanks | | | |
| 129511 | non-detect | | |
| 129512 | non-detect | | |
| 129579 | non-detect | | |

| Rinsate Blank | N/A | Qualifier | Associated sample |
|---------------|-----|-----------|-------------------|
| | | | |

| ICV | RRF | %RSI | Qualifier | Associated sample |
|--------------------------------------|------------|------|-----------|-------------------|
| 5/31/06 | | | | |
| Benzaldehyde | acceptable | | | |
| 6/2/07 | | | | |
| TCL compounds | acceptable | | | |
| 6/5/07 | | | | |
| 8270C/Benzaldehyde/ TCL compounds | acceptable | | | |

| CCV | RRF | %C | Qualifier | Associated sample |
|--------------------------------------|----------------------|----|-----------|-------------------|
| 6/6/07 | | | | |
| 8270C/Benzaldehyde/ TCL compounds | acceptable | | | |
| 6/7/07 | | | | |
| 8270C/Benzaldehyde/ TCL compounds | acceptable | | | |
| 6/9/07 | | | | |
| 8270C/Benzaldehyde TCL Atrazine | acceptable 27.40% | | UJ | RISB935 |

| Surr. | %R | Qualifier | Associated sample |
|--------|------------|-----------|-------------------|
| 129511 | acceptable | | |
| 129512 | acceptable | | |
| 129579 | acceptable | | |

Internal Standard not included

| Representativeness: | Yes | No | N/A |
|----------------------------------------------------------------------|------------------------------------|-----------|-----|
| Were sampling procedures and design criteria met? | <u>Yes</u> | | |
| Were holding times met? | <u>Yes</u> | | |
| Were preservation criteria met? (4° C ± 2° C) | <u>Yes</u> | | |
| Were Chain-of-Custody records complete and provided in data package? | <u>Yes</u> | | |
| Were contaminants present in blanks? | | <u>No</u> | |
| Comments (note deviations): | <u>Cooler temperatures 4.0° C.</u> | | |

| Comparability: | Yes | No | N/A |
|--------------------------------------------------------|------------|----|-----|
| Does data compare with similar analysis and data sets? | <u>Yes</u> | | |
| Comments (note deviations): | _____ | | |

| Completeness (90%): | Yes | No | N/A |
|-----------------------------------|------------|----|-----|
| Are all data in this SDG useable? | <u>Yes</u> | | |
| Comments (note deviations): | _____ | | |

Do all data in this SDG meet the Data Quality Objectives? Yes

Comments: _____

Validator: Carrie Madrid Date: 4/21/07

Reviewer: Cherie Zakowski Date: 5/10/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229204
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: TCLP 8260B

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|------------|-----------|-------------|-----------|
| | | | Trip Blank | 229204-15 |
| | RISB3-01 | 229204-2 | RISB35-01 | 229204-16 |
| | RISB5-01 | 229204-3 | RISB40-01 | 229204-17 |
| | RISB41-01 | 229204-4 | RISB1-01 | 229204-18 |
| | RISB15-01 | 229204-5 | RISB43-01 | 229204-19 |
| | RISB914 | 229204-6 | RISB47-01 | 229204-20 |
| | RISB913 | 229204-7 | RISB02-01 | 229204-21 |
| | RISB16-01 | 229204-8 | RISB36-01 | 229204-22 |
| | RISB14-01 | 229204-9 | RISB935 | 229204-23 |
| | RISB14-59 | 229204-10 | RISB5-5-9 | 229204-24 |
| | RISB42-01 | 229204-11 | RISB2-17-21 | 229204-25 |
| | RISB11-01 | 229204-12 | RISB3-9-13 | 229204-26 |
| | RISB47-913 | 229204-13 | RISB15-9-13 | 229204-27 |
| | RISB13-01 | 229204-14 | RISB-11-59 | 229204-28 |

Full Validation Sample: Level III evaluation performed on all samples. No raw data was present. Samples are soils.

Precision: **Yes No N/A**
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) Yes
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) N/A

Comments (note deviations): Field Duplicates - RISB14-59/RISB914 are field duplicates.

Accuracy: **Yes No N/A**
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) No
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? Yes
 Trip Blanks/Rinsate Blanks Yes
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? No
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05? No
 Tuning (abundance criteria and 12 hour time frame)? N/A
 Surrogate % Recoveries? Yes
 Internal Standards N/A

Comments (note deviations): Matrix Spike - See below.

Precision **%RPD**

Field Duplicates acceptable
 RISB14-59/RISB914

Laboratory Duplicate N/A

Accuracy **MS/MSD RPD**
(70-130)

| MS/MSD | MS/MSD | RPD | MS/MSD | MS/MSD | RPD |
|--------|----------------------------|----------|--------|----------------------------|----------|
| | | (70-130) | | | (70-130) |
| 129497 | RISB913 | | 129498 | RISB35-01 | |
| | trans-1,3-Dichloro propene | 66/66% | | 1,2-Dichlorobenzene | 56/67% |
| | Carbon Tetrachloride | 69/71% | | 1,3-Dichlorobenzene | 58/69% |
| | Methylene Chloride | 90/116% | | Bromoform | 60/63% |
| | Chloroethane | 126/136 | | Ethylbenzene | 58/76% |
| | | | | Chlorobenzene | 66/78% |
| | | | | Dibromochloro methane | 57/63% |
| | | | | 1,1,2-Trichloroethane | 49/61% |
| | | | | trans-1,3-Dichloro propene | 39/43% |
| | | | | Toluene | 68/79% |
| | | | | cis-1,3-Dichloro propene | 38/40% |
| | | | | Carbon Tetrachloride | 62/69% |

No action taken based solely on MS/MSD data.

| LCS/ LCSD | <u>%R</u> (70-130) |
|--------------|-----------------------|
| 129497 | acceptable |
| 129498 | acceptable |
| 129500Aq | acceptable |

| | | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|---------------|------------|------------------------|------------------|---------------------------|
| Blanks | | | | |
| 129497 | non-detect | | | |
| 129498 | non-detect | | | |
| 129500Aq | non-detect | | | |

| | | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|-------------------|------------|------------------------|------------------|---------------------------|
| Trip Blank | Trip Blank | non-detect | | |

Holding Blank N/A

| | | <u>Qualifier</u> | <u>Associated sample</u> |
|----------------------|-----|------------------|--------------------------|
| Rinsate Blank | N/A | | |

| ICV | 6/2/06 | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|----------------|-----------------------------|------------|-------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Batch's | 129498/129497 | | | | |
| PT1 | Bromomethane | 0.035 | | R | RISB3-01, RISB913, RISB16-01, RISB14-01, RISB14-59, RISB42-01, RISB11-01, RISB47-913, RISB13-01 |
| PT2 | Bromomethane | 0.037 | | R | RISB5-01, RISB41-01, RISB914, RISB35-01, RISB40-01, RISB1-01, RISB43-01, RISB47-01, RISB-02-01, RISB36-01, RISB935, RISB-5-9, RISB2-17-21, RISB3-9-13, RISB15-9-13, RISB-11-59 |
| | 5/26/2006 Extra list | | | | |
| PT1 | Methyl Acetate | 0.034 | | R | RISB3-01, RISB913, RISB16-01, RISB14-01, RISB14-59, RISB42-01, RISB11-01, RISB47-913, RISB13-01 |
| PT2 | Methyl Acetate | 0.026 | | R | RISB5-01, RISB41-01, RISB914, RISB35-01, RISB40-01, RISB1-01, RISB43-01, RISB47-01, RISB-02-01, RISB36-01, RISB935, RISB-5-9, RISB2-17-21, RISB3-9-13, RISB15-9-13, RISB-11-59 |

Batch 129500
129500 4/26/2006 8260
PT1/PT2 acceptable

PT1 **4/26/2006 Extra**
Methyl Acetate 0.019 R **Trip Blank**

PT2 Methyl Acetate 0.017 **Not used**

| CCV | | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|----------------|-------------------------------------------|------------|-------------|------------------|------------------------------------|
| Batch's | 129498/129497 | | | | |
| PT1 | 6/5/2006 8260 1208 Bromomethane | 0.037 | | R | No action already qual. due to ICV |
| | 6/5/2006 Extra 1126 | acceptable | | | |
| PT2 | 6/5/2006 8260 1228 Bromomethane | 0.036 | | | Not used |
| | 6/5/2006 Extra 1147 | acceptable | | | Not used |

| | | | | | |
|------------|----------------------------|------------|---------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PT2 | 6/6/2006 8260 0131 | | | | |
| | Bromomethane | 0.047 | 26.3% | R | No action already qual. due to ICV RISB35-01, RISB40-01, RISB1-01 |
| | Methylene Chloride | | 28.60% | UJ | |
| | 6/6/2006 Extra 0050 | | | | |
| | Methyl Acetate | | 133% | J/UJ | No action already qual. due to ICV |
| PT2 | 6/6/2006 8260 0953 | | | | No action already qual. due to ICV RISB5-01, RISB41-01, RISB914, RISB47-01, RISB02-01, RISB36-01, RISB935, RISB2-17-21, RISB3-9-13, RISB15-9-13, RISB-11-59 |
| | Bromomethane | | 33.60% | J/UJ | |
| | Methylene Chloride | | 34.60% | UJ | |
| | 2-Hexanone | | 25.90% | UJ | |
| | 6/6/2006 Extra 0909 | acceptable | | | RISB5-01, RISB41-01, RISB914, RISB47-01, RISB02-01, RISB36-01, RISB935, RISB2-17-21, RISB3-9-13, RISB15-9-13, RISB-11-59 |
| PT1 | 6/6/2006 8260 1054 | | | | No action already qual. due to ICV |
| | Bromomethane | 0.041 | | R | |
| | 6/6/2006 Extra 1013 | acceptable | | | |
| PT1 | 6/5/2006 Extra 1045 | | | | No action already qual. due to ICV |
| | Methyl Acetate | | 71.50% | J/UJ | |
| | 6/5/2006 8260 1209 | | | | |
| | Acetone | | 105.20% | UJ | |
| | 2-Butanone | | 48.30% | UJ | Trip Blank |

| <u>Surr.</u> | <u>%R</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|--------------|-----------------|------------------|--------------------------|
| | (70-130) | | |
| 129497 | acceptable | | |
| 129498 | acceptable | | |
| 129500Aq | acceptable | | |

Internal Standard not included

Representativeness:

| | |
|-------------------------------------------------------------------------------|-----------------------------|
| Were sampling procedures and design criteria met? | Yes |
| Were holding times met? | Yes |
| Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) | Yes |
| Were Chain-of-Custody records complete and provided in data package? | Yes |
| Were contaminants present in blanks? | No |
| Comments (note deviations): | Cooler temperatures 4.0° C. |

Comparability:

| | |
|--------------------------------------------------------|-----|
| Does data compare with similar analysis and data sets? | Yes |
| Comments (note deviations): | |

Completeness (90%):

| | |
|-----------------------------------|-----|
| Are all data in this SDG useable? | Yes |
| Comments (note deviations): | |

Do all data in this SDG meet the Data Quality Objectives? Yes

Comments: _____

Validator: Carrie Madrid Date: 4/21/07
 Reviewer: Cherie Zakowski Date: 5/10/07

PSC
Data Evaluation Worksheet

Sample Delivery Group (SDG) Number: 229206
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 6010B/7471A/%Moist.

| Samples in SDG: | Client ID | Lab ID |
|-----------------|-------------|----------|
| | RISB20-59 | 229206-1 |
| | RISB50-913 | 229206-2 |
| | RISB21-59 | 229206-3 |
| | RISB21-01 | 229206-4 |
| | RISB17-01 | 229206-5 |
| | RISB49-1317 | 229206-6 |
| | RISB17-913 | 229206-7 |
| | RISB49-01 | 229206-8 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils.

Precision: **Yes No N/A**
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20%, 35% for soils) N/A
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%, 35% for soils) Yes
 Comments (note deviations): **Laboratory Duplicate** - Lab. Dup. for Hg and metals was performed on another SDG, all %RPD's were within limits. % Moisture duplicate was performed on samples RISB21-59, RISB21-01, RISB17-01, and RISB49-1317 all %RPD's were within limits.

Accuracy: **Yes No N/A**
 Serial Dilutions ± 10% N/A
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) No
 Post Digestion Spike criteria met (if applicable)? No
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? (± 25%) N/A
 Laboratory Blanks criteria met (within control limits)? Yes
 ICV/CCV % Recoveries within 90-110%? N/A
 ICSA/ICSAB % Recoveries acceptable? N/A
 CRI % N/A
 Comments (note deviations): **Matrix Spike** - MS/MSD from another SDG for metals and Hg.

Representativeness: **Yes No N/A**
 Were sampling procedures and design criteria met? Yes
 Were holding times met? Yes
 Were preservation criteria met? (4° C ± 2° C) Yes
 Were Chain-of-Custody records complete and provided in data package? Yes
 Were contaminants present in blanks? No
 Comments (note deviations): Sample cooler was received at 4.0 ° C.

Comparability: **Yes No N/A**
 Does data compare with similar analysis and data sets? Yes
 Comments (note deviations): _____

Completeness (90%): **Yes No N/A**
 Are all data in this SDG useable? Yes
 Comments (note deviations): _____

Precision

Field Duplicate N/A

Laboratory Duplicate %RPD

| | |
|---------------------|------------|
| 6010B, Hg Diff. SDG | acceptable |
| %Moisture R1SB21-59 | acceptable |
| R1SB21-01 | acceptable |
| R1SB17-01 | acceptable |
| R1SB49-1317 | acceptable |

Accuracy

Serial Dilution %RPD

not present

MS/MSD Analytes %R RPD Post %R Qualifier Associated Samples

| | | | | | | |
|-----------------------|---------|----|-----|------------------------------------------------------------|-------------------------|-------------------------|
| 6010B | | | | | | All samples in this SDG |
| Diff. SDG 229204-24 | | | | | | |
| Aluminum | 999/999 | 4 | 999 | Sample concentration >4x spike - no qualification required | | |
| Calcium | 999/999 | 3 | 999 | Sample concentration >4x spike - no qualification required | | |
| Iron | 999/999 | 2 | 999 | Sample concentration >4x spike - no qualification required | | |
| Potassium | 80/47 | 9 | 13 | Sample concentration >4x spike - no qualification required | | |
| Magnesium | 960/723 | 4 | 86 | Sample concentration >4x spike - no qualification required | | |
| Manganese | 0/28 | 10 | 124 | Sample concentration >4x spike - no qualification required | | |
| Antimony | 42/43 | 2 | 77 | UJ | All samples in this SDG | |
| Hg Diff. SDG 229312-1 | | | | | | |
| %Moisture | N/A | | | | | |

Laboratory Control Spike/ Spike Duplicate

%R

| | |
|--------------|------------|
| Hg 128634 | acceptable |
| 6010B 129340 | acceptable |

Blanks Result

| | |
|--------------|------------|
| 6010B 129340 | non-detect |
| Hg 128634 | non-detect |
| %Moisture | non-detect |

ICV/CCV

not included

ICSA/ICSAB

not included

CRI

not included

Do all data in this SDG meet the Data Quality Objectives?

Yes

Comments:

Validator: Carrie Madrid
 Reviewer: Cherie Zakowski

Date: 4/14/07
 Date: 10/3/07

PSC
Data Evaluation Worksheet

Sample Delivery Group (SDG) Number: 229206
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8270C

| | Client ID | Lab ID |
|-----------------|-------------|----------|
| Samples in SDG: | RISB20-59 | 229206-1 |
| | RISB50-913 | 229206-2 |
| | RISB21-59 | 229206-3 |
| | RISB21-01 | 229206-4 |
| | RISB17-01 | 229206-5 |
| | RISB49-1317 | 229206-6 |
| | RISB17-913 | 229206-7 |
| | RISB49-01 | 229206-8 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils.

Precision:

| | Yes | No | N/A |
|--------------------------------------------------------------------------------------------------|-----|----|-----|
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) | | | N/A |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) | | | N/A |

Comments (note deviations): **Laboratory Duplicate** - Sample RISB20-59 listed as a duplicate on the batch information sheet, however no results were present.

Accuracy:

| | Yes | No | N/A |
|---------------------------------------------------------------------------------------------------|-----|----|-----|
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | Yes | | |
| Laboratory Control Sample criteria met? | Yes | | |
| Laboratory Control Sample Duplicate? | | | N/A |
| Laboratory Blanks criteria met (within control limits)? | Yes | | |
| Trip Blanks/Rinsate Blanks | | | N/A |
| ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? | Yes | | |
| CCV % Recoveries within 30% and RRF greater than or equal to 0.05? | No | | |
| Tuning (abundance criteria and 12 hour time frame)? | | | N/A |
| Surrogate % Recoveries? | No | | |
| Internal Standards | | | N/A |

Comments (note deviations): **MS/MSD - 8270C** sample RISB50-913 was spiked.
CCV - Atrazine 27.5% outside limits on 6/9/06 at 0825, associated samples qualified as "UJ".
Surrogate - RISB49-1317(10x) - Nitrobenzene-d5 out. No action one surrogate per fraction allowed out.

Precision

Field Duplicates %RPD
 N/A

Laboratory Duplicate
 RISB20-59 listed as dup. no results

Accuracy

MS/MSD MS/MSD RPD
 Batch 129579 acceptable

%R
LCS/LCSD
 Batch 129579 acceptable

| | Qualifier | Associated Sample/ Qualification |
|---------------|------------|----------------------------------|
| Blanks | | |
| Batch 129579 | non-detect | |

| | | <u>Qualifier</u> | <u>Associated samples</u> |
|--------------------------|---------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------|
| Rinsate Blank | N/A | | |
| ICV | All ICV's acceptable | | |
| CCV | 6/9/2006 0825 Atrazine | <u>%R</u> 27.50% | <u>Qualifier</u> UJ |
| | | | <u>Associated Samples</u> RISB20-59 RISB50-913 RISB21-59 RISB21-01 RISB17-01 RISB49-1317 RISB17-913 |
| Surr. | | <u>%R</u> | <u>Associated samples</u> |
| RISB49-1317(10x) | Nitrobenzene-d5 | 131%(26-91) | none one surrogate per fraction allowed out. |
| Internal Standard | not included | | |

Representativeness:

| | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|-------------------------------------------------------------------------------|-----------------------------------|-----------|------------|
| Were sampling procedures and design criteria met? | <u>Yes</u> | | |
| Were holding times met? | <u>Yes</u> | | |
| Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) | <u>Yes</u> | | |
| Were Chain-of-Custody records complete and provided in data package? | <u>Yes</u> | | |
| Were contaminants present in blanks? | | <u>No</u> | |
| Comments (note deviations): | <u>Cooler temperatures 4.0° C</u> | | |

Comparability:

| | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|--------------------------------------------------------|------------|-----------|------------|
| Does data compare with similar analysis and data sets? | <u>Yes</u> | | |
| Comments (note deviations): | _____ | | |

Completeness (90%):

| | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|-----------------------------------|------------|-----------|------------|
| Are all data in this SDG useable? | <u>Yes</u> | | |
| Comments (note deviations): | _____ | | |

| | <u>Yes</u> |
|-----------------------------------------------------------|------------|
| Do all data in this SDG meet the Data Quality Objectives? | <u>Yes</u> |
| Comments: | _____ |
| | _____ |

Validator: Carrie Madrid
 Reviewer: Cherie Zakowski

Date: 4/15/07
 Date: 10/3/07

PSC
Data Evaluation Worksheet

Sample Delivery Group (SDG) Number: 229206
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8260B

| | Client ID | Lab ID |
|-----------------|-------------|----------|
| Samples in SDG: | RISB20-59 | 229206-1 |
| | RISB50-913 | 229206-2 |
| | RISB21-59 | 229206-3 |
| | RISB21-01 | 229206-4 |
| | RISB17-01 | 229206-5 |
| | RISB49-1317 | 229206-6 |
| | RISB17-913 | 229206-7 |
| | RISB49-01 | 229206-8 |
| | Trip Blank | 229206-9 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils.

Precision:

Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil)
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%)

| Yes | No | N/A |
|-----|----|-----|
| | | N/A |
| | | N/A |

Comments (note deviations):

Accuracy:

Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined)
 Laboratory Control Sample criteria met?
 Laboratory Control Sample Duplicate?
 Laboratory Blanks criteria met (within control limits)?
 Trip Blanks/Rinsate Blanks
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05?
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05?
 Tuning (abundance criteria and 12 hour time frame)?
 Surrogate % Recoveries?
 Internal Standards

| Yes | No | N/A |
|-----|-----|-----|
| | No | |
| | Yes | |
| | N/A | |
| | Yes | |
| | Yes | |
| | No | |
| | No | |
| | N/A | |
| | No | |
| | N/A | |

Comments (note deviations): **MS/MSD** - Batch 129501 sample RISB20-59 spiked. Chloroethane outside %R limits.
Surrogate - RISB21-59 - Toluene-d8 and 4-bromofluorbenzene out.

Precision

Field Duplicates %RPD
 N/A

Laboratory Duplicate
 N/A

Accuracy

| MS/MSD | MS/MSD | RPD | Associated Sample |
|--------------------------------|--------------------|-------------|-------------------|
| 129501 | RISB20-59 | | |
| | Chloroethane | 150/123% 20 | |
| 129500 | Diff. SDG 229207-1 | acceptable | |
| (water) | | | |
| No action taken on MS/MSD Data | | | |

| | | %R |
|-------------|---------------------|------------|
| LCS/ | Batch 129500(water) | acceptable |
| LCSD | Batch 129501 | acceptable |

| | | Qualifier | Associated Sample/ Qualification |
|---------------|---------------------|------------|----------------------------------|
| Blanks | Batch 129500(water) | non-detect | |
| | Batch 129501 | non-detect | |
| | Trip blank | non-detect | |

Holding Blank N/A

| Rinsate | N/A | <u>Qualifier</u> | | Associated sample |
|------------------------------------------------------------------|----------------------------------|------------------|------------------|-----------------------------------------------------------------------------|
| Blank | | | | |
| ICV | | RRF | %RSC | Qualifier |
| PT1/PT2 | 4/26/2006 A Files | acceptable | | |
| PT1 | 4/26/2006 A Files Extra 1 | | | |
| | Methyl Acetate | 0.019 | R | RISB50-913, RISB21-01, RISB17-01, RISB49-1317, RISB17-913, RISB49-01, TB |
| PT2 | 4/26/2006 A Files Extra 2 | | | |
| | Methyl Acetate | 0.017 | R | RISB20-59, RISB21-59 |
| CCV | | RRF | %RSC | Qualifier |
| 6/5/2006 1045 A16761 Extra 1 | Methyl Acetate | | 71.52% | J/UJ |
| | | | | Qual. due to ICV |
| 6/5/2006 1106 A16762 Extra 2 | Methyl Acetate | | 44.52% | J/UJ |
| | | | | Qual. due to ICV |
| PT1 | 6/5/2006 1209 A16765 8260 | | | |
| | Acetone | 105.20% | UJ | RISB17-913, TB |
| | 2-Butanone | 48.30% | J | RISB17-913 |
| | | | UJ | RISB21-01, RISB17-01, TB |
| PT2 | 6/5/2006 1230 A16766 8260 | acceptable | | |
| CCV | | RRF | %RSC | Qualifier |
| 6/6/2006 1111 A16827 Extra 1 | Methyl Acetate | | 76.44% | J/UJ |
| | | | | Qual. due to ICV |
| 6/6/2006 1132 A16828 Extra 2 | Methyl Acetate | | 48.12% | J/UJ |
| | | | | Qual. due to ICV |
| PT1 | 6/6/2006 1153 A16829 8260 | acceptable | | |
| PT2 | 6/6/2006 1214 A16830 8260 | | | |
| | Acetone | 36.9%(L) | J | RISB49-01, RISB-59 |
| | | | UJ | RISB20-59, RISB17-01 |
| Surr. | | %R | Qualifier | Associated sample |
| RISB21-59 | | (70-130) | | |
| | Toluene-d8 | 1016% | J pos. results | RISB21-59 |
| | 4-bromofluorobenzene | 259% | J pos. results | RISB21-59 |
| Raw data not provided. No further evaluation could be performed. | | | | |
| Internal Standard | not included | | | |

Representativeness:

Were sampling procedures and design criteria met?
 Were holding times met?
 Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$)
 Were Chain-of-Custody records complete and provided in data package?
 Were contaminants present in blanks?
 Comments (note deviations):

Yes No N/A

Yes

Yes

Yes

Yes

No

Cooler temperatures 4.0° C

Comparability:

Does data compare with similar analysis and data sets?

Yes No N/A

Yes

Comments (note deviations): _____

Completeness (90%):

Are all data in this SDG useable?

Yes No N/A

Yes

Comments (note deviations): _____

Do all data in this SDG meet the Data Quality Objectives?

Yes

Comments: _____

Validator:

Carrie Madrid

Date:

4/15/07

Reviewer:

Cherie Zakowski

Date:

10/3/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229312
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 6010B/7471A/%Moist

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|-----------|----------|-----------|-----------|
| | SB6-1315 | 229312-1 | SB7-01 | 229312-7 |
| | SB7-15 | 229312-2 | SB12-01 | 229312-8 |
| | SB45-01 | 229312-3 | SB12-1721 | 229312-9 |
| | SB6-01 | 229312-4 | SB48-01 | 229312-10 |
| | SB45-15 | 229312-5 | SB48-1315 | 229312-11 |
| | SB12-15 | 229312-6 | | |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils.

Precision:

| | Yes | No | N/A |
|----------------------------------------------------------------------------------|-----|----|-----|
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20%) | | | N/A |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) | | | Yes |

Comments (note deviations): Sample Duplicates - Sample duplicates performed on samples from different SDG's.

Accuracy:

| | Yes | No | N/A |
|---------------------------------------------------------------------------------------------------|-----|----|-----|
| Serial Dilutions ± 10% | | | N/A |
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | | | No |
| Post Digestion Spike criteria met (if applicable)? | | | No |
| Laboratory Control Sample criteria met? | | | Yes |
| Laboratory Control Sample Duplicate? (± 25%) | | | N/A |
| Laboratory Blanks criteria met (within control limits)? | | | Yes |
| ICV/CCV % Recoveries within 90-110%? | | | N/A |
| ICSA/ICSAB % Recoveries acceptable? | | | N/A |
| CRI % | | | N/A |

Comments (note deviations): Matrix Spike - 6010B matrix spikes analyzed on samples from different SDG's. sample 229312-1 and a sample from another SDG 229401-3 were spiked for Hg.

Representativeness:

| | Yes | No | N/A |
|----------------------------------------------------------------------|-----|----|-----|
| Were sampling procedures and design criteria met? | | | Yes |
| Were holding times met? | | | Yes |
| Were preservation criteria met? ($4^{\circ}C \pm 2^{\circ}C$) | | | Yes |
| Were Chain-of-Custody records complete and provided in data package? | | | Yes |
| Were contaminants present in blanks? | | | No |

Comments (note deviations): Sample cooler was received at 4.0 ° C.

Comparability:

| | Yes | No | N/A |
|--------------------------------------------------------|-----|----|-----|
| Does data compare with similar analysis and data sets? | | | Yes |

Comments (note deviations): _____

Completeness (90%):

| | Yes | No | N/A |
|-----------------------------------|-----|----|-----|
| Are all data in this SDG useable? | | | Yes |

Comments (note deviations): _____

| Precision | %RPD |
|-----------------|------|
| Field Duplicate | N/A |

| Laboratory Duplicate | | <u>%RPD</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|----------------------|------------------------------------|-------------|------------------|---------------------------|
| 6010B | | | | |
| 129350 | diff. SDG 229403-3 | | | |
| 129340 | diff. SDG 229204-24 | | | |
| Hg | | | | |
| 128634 | SB6-1315 | acceptable | | |
| 128636 | diff. SDG 229401-3 | acceptable | | |
| %Moist. | | | | |
| 129541 | diff. SDG 229206-6 and 229206-6 | acceptable | | |
| 129606 | SB45-15 | acceptable | | |

Accuracy

| Serial Dilution | <u>%RPD</u> |
|-----------------|-------------|
| | N/A |

| <u>MS/MSD</u> | <u>Analyte</u> | <u>MS/MSD %R</u> | <u>RPD</u> | <u>Post %R</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|---------------|---------------------|------------------|------------|----------------|------------------|------------------------------------------------------------|
| 6010B | (76-124) | | | | | |
| 129340 | diff. SDG 229204-24 | | | | | SB6-1315, SB7-15, SB45-01, SB6-01, SB45-15, SB12-15 |
| | Aluminum | 999/999% | 4 | 999% | | Sample concentration >4x spike - no qualification required |
| | Calcium | 999/999% | 3 | 999% | | Sample concentration >4x spike - no qualification required |
| | Iron | 999/999% | 2 | 999% | | Sample concentration >4x spike - no qualification required |
| | Magnesium | 960/723% | 4 | 86% | | Sample concentration >4x spike - no qualification required |
| | Manganese | 0/28% | 10 | 124% | | Sample concentration >4x spike - no qualification required |
| | Antimony | 42/43% | 2 | 77% | UJ | |
| 129350 | diff. SDG 229403-3 | | | | | SB7-01, SB12-01, SB12-1721, SB48-01, SB48-1315 |
| | Aluminum | 999/999% | 8 | 999% | | Sample concentration >4x spike - no qualification required |
| | Barium | 125/112% | 6 | 110% | | Sample concentration >4x spike - no qualification required |
| | Calcium | 247/999% | 14 | 999% | | Sample concentration >4x spike - no qualification required |
| | Copper | 110/129% | 9 | 118% | | Sample concentration >4x spike - no qualification required |
| | Iron | 999/999% | 8 | 999% | | Sample concentration >4x spike - no qualification required |
| | Magnesium | 999/999% | 11 | 996% | | Sample concentration >4x spike - no qualification required |
| | Manganese | 0/50% | 25 | 0% | | Sample concentration >4x spike - no qualification required |
| | Sodium | 429/524% | 6 | 227% | | Sample concentration >4x spike - no qualification required |
| | Antimony | 45/47% | 4 | 77% | UJ | |
| Hg | | | | | | |
| 128634 | SB6-1315 | acceptable | | | | |
| 128636 | diff. SDG 229401-3 | acceptable | | | | |

LCS/ LSD(90-110)

| | | <u>%R</u> |
|--------|----------|------------|
| 137461 | 6010B | acceptable |
| 137456 | Thallium | acceptable |
| 137458 | Hg | acceptable |

Blanks

| | <u>Analyte</u> | <u>Results</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|--------|----------------|----------------|------------------|---------------------------|
| 6010B | | | | |
| 129340 | non-detect | | | |
| Hg | | | | |
| 128634 | non-detect | | | |
| 128636 | non-detect | | | |

%Moist.
129541 non-detect
129606 non-detect

ICV/CCV
_____ not present

ICSA/ICSAB
_____ not present

CRI
_____ not present

Do all data in this SDG meet the Data Quality Objectives? Yes
Comments: _____

Validator: Carrie Madrid Date: 4/19/07
Reviewer: Alecia Epes Date: 6/14/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229312
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8270C

| Samples in SDG: | Client ID | Lab ID | | |
|-----------------|-----------|----------|-----------|-----------|
| | SB6-1315 | 229312-1 | SB7-01 | 229312-7 |
| | SB7-15 | 229312-2 | SB12-01 | 229312-8 |
| | SB45-01 | 229312-3 | SB12-1721 | 229312-9 |
| | SB6-01 | 229312-4 | SB48-01 | 229312-10 |
| | SB45-15 | 229312-5 | SB48-1315 | 229312-11 |
| | SB12-15 | 229312-6 | | |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are waters.

Precision: **Yes No N/A**
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) N/A
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) N/A

Comments (note deviations):

Accuracy: **Yes No N/A**
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) Yes
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? Yes
 Trip Blanks/Rinsate Blanks N/A
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? Yes
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05? No
 Tuning (abundance criteria and 12 hour time frame)? N/A
 Surrogate % Recoveries? Yes
 Internal Standards N/A

Comments (note deviations): **MS/MSD - Matrix spike performed on sample SB48-1315.**
CCV - 8270 CCV standard analyzed at 0825 Atrazine out.

Precision **%RPD**
 Field Duplicates N/A

Laboratory Duplicate **%RPD**
N/A

Accuracy
MS/MSD **MS/MSD RPD**
 129580 SB48-1315 acceptable

LCS/LCSD **%R**
 129580 acceptable

| Blanks | Analyte | Qualifier | Associated Sample/ Qualification |
|---------------|----------------|------------------|-----------------------------------------|
| 129580 | | non-detect | |

| Rinsate | N/A | <u>Qualifier</u> | | <u>Associated sample</u> |
|--------------------------------------------|--------------|------------------|--------------------------|--------------------------|
| Blank | | | | |
| <hr/> | | | | |
| ICV | <u>RRF</u> | <u>%RSI</u> | <u>Qualifier</u> | <u>Associated sample</u> |
| 6/5/06 8270/Benzaldehyde/ TCL ICV's | | acceptable | | |
| 6/12/06 8270/Benzaldehyde/ TCL ICV's | | acceptable | | |
| <hr/> | | | | |
| CCV | <u>RRF</u> | <u>%C</u> | <u>Qualifier</u> | <u>Associated sample</u> |
| 6/9/06 8270/Benzaldehyde | | acceptable | | |
| TCL - Atrazine | | 27.50% | none | All samples non-detect |
| 6/12/06 8270/Benzaldehyde/ TCL CCV's | | acceptable | | |
| <hr/> | | | | |
| Surr. | <u>%R</u> | <u>Qualifier</u> | <u>Associated sample</u> | |
| 129580 | | acceptable | | |
| <hr/> | | | | |
| Internal Standard | not included | | | |

Representativeness:

| | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|-------------------------------------------------------------------------------|------------------------------------|-----------|------------|
| Were sampling procedures and design criteria met? | Yes | | |
| Were holding times met? | Yes | | |
| Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) | Yes | | |
| Were Chain-of-Custody records complete and provided in data package? | Yes | | |
| Were contaminants present in blanks? | No | | |
| Comments (note deviations): | <u>Cooler temperatures 4.0° C.</u> | | |

Comparability:

| | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|--------------------------------------------------------|------------|-----------|------------|
| Does data compare with similar analysis and data sets? | Yes | | |
| Comments (note deviations): | | | |

Completeness (90%):

| | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|-----------------------------------|------------|-----------|------------|
| Are all data in this SDG useable? | Yes | | |
| Comments (note deviations): | | | |

| | |
|-----------------------------------------------------------|------------|
| Do all data in this SDG meet the Data Quality Objectives? | <u>Yes</u> |
| Comments: | |

Validator: Carrie Madrid Date: 4/19/07
 Reviewer: Alecia Epes Date: 6/11/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229312
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8260B

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|-----------|----------|------------|-----------|
| | SB6-1315 | 229312-1 | SB7-01 | 229312-7 |
| | SB7-15 | 229312-2 | SB12-01 | 229312-8 |
| | SB45-01 | 229312-3 | SB12-1721 | 229312-9 |
| | SB6-01 | 229312-4 | SB48-01 | 229312-10 |
| | SB45-15 | 229312-5 | SB48-1315 | 229312-11 |
| | SB12-15 | 229312-6 | Trip Blank | 229312-12 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils.

| Precision: | Yes | No | N/A |
|------------------------------------------------------------------------------------------------------------|-----|----|-----|
| Field Duplicates RPD criteria met? (frequency 10% and control limits $\pm 20\%$ water and $\pm 50\%$ soil) | | | N/A |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits $\pm 20\%$) | | | N/A |

Comments (note deviations):

| Accuracy: | Yes | No | N/A |
|---------------------------------------------------------------------------------------------------|-----|-----|-----|
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | | No | |
| Laboratory Control Sample criteria met? | | Yes | |
| Laboratory Control Sample Duplicate? | | N/A | |
| Laboratory Blanks criteria met (within control limits)? | | No | |
| Trip Blanks/Rinsate Blanks | | No | |
| ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? | | No | |
| CCV % Recoveries within 30% and RRF greater than or equal to 0.05? | | No | |
| Tuning (abundance criteria and 12 hour time frame)? | | N/A | |
| Surrogate % Recoveries? | | Yes | |
| Internal Standards | | N/A | |

Comments (note deviations): **MS/MSD - Samples 229312-2(129551) and 229312-7(129552) were spiked for soils. A sample from a different SDG 229288-1 was spiked for water batch 129557.**

| Precision | %RPD |
|----------------------|------|
| Field Duplicates | N/A |
| Laboratory Duplicate | N/A |

| Accuracy | MS/MSD | RPD |
|---------------|----------------------------|-------------|
| | (70-130) | |
| MS/MSD | | |
| SB7-15 | | |
| 129551 | trans-1,3-Dichloro propene | 69/69% 0% |
| | cis-1,3-Dichloro propene | 69/69% 0% |
| 129552 | | Acceptable |
| 129557 | diff. SDG 229288-1 | |
| | 1,1,2,2-Tetrachloroethane | 66/75% 13% |
| | Trichlorofluoromethane | 131/139% 6% |
| | Chloroethane | 139/144% 4% |

No action taken based solely on MS/MSD data.

| LCS/ LCSD | %R |
|--------------|------------|
| | (70-130) |
| 129551 | acceptable |
| 129552 | acceptable |
| 129557 Aq. | acceptable |

| | | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|---------------|------------|------------------------|------------------|---------------------------|
| Blanks | | | | |
| | 129551 | non-detect | | |
| | 129552 | non-detect | | |
| | 129557 Aq. | non-detect | | |

| <u>Trip</u> | <u>Trip Blank</u> | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|--------------|-------------------|------------------------|------------------------------------|---------------------------|
| Blank | Toluene | 0.56ug/L | Raise to the reporting limit and U | SB6-1315, SB7-15 |

| | | | | |
|----------------------|-----|--|--|--|
| Holding Blank | N/A | | | |
|----------------------|-----|--|--|--|

| <u>Rinsate Blank</u> | <u>N/A</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|----------------------|------------|------------------|--------------------------|
| | | | |

| <u>ICV</u> | <u>PT1/PT2</u> | <u>4/26/2006 A Files</u> | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|------------|----------------|----------------------------------|------------|-------------|------------------|----------------------------------------------------------------|
| | | | acceptable | | | |
| PT1 | | 4/26/2006 A Files Extra 1 | | | | |
| | | Methyl Acetate | | 0.019 | R | SB6-1315, SB7-15, SB45-01, SB6-01, SB45-15, SB12-15, SB12-1721 |
| PT2 | | 4/26/2006 A Files Extra 2 | | | | |
| | | Methyl Acetate | | 0.017 | R | SB7-01, SB12-01, SB48-01, SB48-1315 |

| <u>CCV</u> | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|------------|-------------------------------------|-------------|------------------|--------------------------------------------------------------|
| | | | | |
| | 6/7/2006 1040 A16865 Extra 1 | | | |
| | Methyl Acetate | 54.08% | | Already qual. due to ICV |
| | 6/7/2006 1101 A16866 Extra 2 | | | |
| | Methyl Acetate | 40.16% | | Already qual. due to ICV |
| PT2 | 6/7/2006 1144 A16868 8260 | | | |
| | | acceptable | | |
| PT1 | 6/7/2006 1122 A16867 8260 | | | |
| | Chloromethane | 25.5%(L) | UJ | SB6-1315, SB7-15, SB45-01, SB6-01, SB45-15, SB12-15, SB12-01 |

| <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|------------|-------------------------------------|------------------|--------------------------|
| | | | |
| | 6/8/2006 0958 A16911 Extra 1 | | |
| | Methyl Acetate | 53.50% | Already qual. due to ICV |
| | 6/8/2006 1020 A16912 Extra 2 | | |
| | Methyl Acetate | 32.00% | Already qual. due to ICV |
| PT1 | 6/8/2006 1041 A16913 8260 | | |
| | | acceptable | |
| PT2 | 6/8/2006 1102 A16914 8260 | | |
| | | acceptable | |

| <u>Surr.</u> | <u>%R</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|--------------|-----------------|------------------|--------------------------|
| | | | |
| | (70-130) | | |
| | 129551 | acceptable | |
| | 129552 | acceptable | |
| | 129557Aq. | acceptable | |

| | | | |
|--------------------------|--------------|--|--|
| Internal Standard | not included | | |
|--------------------------|--------------|--|--|

| Representativeness: | Yes | No | N/A |
|----------------------------------------------------------------------|------------|-----------|------------|
| Were sampling procedures and design criteria met? | Yes | | |
| Were holding times met? | Yes | | |
| Were preservation criteria met? (4° C ± 2° C) | Yes | | |
| Were Chain-of-Custody records complete and provided in data package? | Yes | | |

Were contaminants present in blanks?

Yes

Comments (note deviations):

Cooler temperatures 4.0° C.

Comparability:

Yes No N/A

Does data compare with similar analysis and data sets?

Yes

Comments (note deviations):

Completeness (90%):

Yes No N/A

Are all data in this SDG useable?

No

Comments (note deviations):

Do all data in this SDG meet the Data Quality Objectives?

No

Comments:

Some results for methyl acetate were rejected due to initial and continuing calibration criteria.

Validator:

Carrie Madrid

Date:

4/19/07

Reviewer:

Alecia Epes

Date:

6/13/07

PSC
Data Evaluation Worksheet

Sample Delivery Group (SDG) Number: 229401 soil
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 6010B/7471A/%Moisture

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|--------------|----------|-------------|-----------|
| | RISB-8-01 | 229401-1 | RISB-52-913 | 229401-7 |
| | RISB-9-01 | 229401-2 | RISB-9-59 | 229401-8 |
| | RISB-33-1720 | 229401-3 | RISB-8-58 | 229401-9 |
| | RISB-533 | 229401-4 | RISB-44-01 | 229401-10 |
| | RISB-34-1113 | 229401-5 | RI-Waste | 229401-11 |
| | RISB-10-59 | 229401-6 | RISB-33-59 | 229401-12 |

Full Validation Sample: A Level III evaluation was performed on all samples. No raw data was present. Samples are soils.

Precision:

| | |
|-------------------------------------------------------------------------------------------------|-------------------|
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20%, 35% for soils) | Yes No N/A |
| | <u>Yes</u> |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%, 35% for soils) | Yes No N/A |
| | <u>No</u> |

Comments (note deviations): **Field Duplicate** - Samples RISB-33-1720 and RISB-533 are identified as field dups.
Laboratory Duplicate - Dup. analysis performed on sample RISB-33-1720 for Hg all %RPD within limits.
 Duplicates for 6010B and %moisture performed on a sample from another SDG.

Accuracy:

| | |
|---------------------------------------------------------------------------------------------------|-------------------|
| Serial Dilutions ± 10% | Yes No N/A |
| | <u>N/A</u> |
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | Yes No N/A |
| | <u>No</u> |
| Post Digestion Spike criteria met (if applicable)? | Yes No N/A |
| | <u>No</u> |
| Laboratory Control Sample criteria met? | Yes No N/A |
| | <u>Yes</u> |
| Laboratory Control Sample Duplicate? (± 25%) | Yes No N/A |
| | <u>N/A</u> |
| Laboratory Blanks criteria met (within control limits)? | Yes No N/A |
| | <u>Yes</u> |
| ICV/CCV % Recoveries within 90-110%? | Yes No N/A |
| | <u>N/A</u> |
| ICSA/ICSAB % Recoveries acceptable? | Yes No N/A |
| | <u>N/A</u> |
| CRI % | Yes No N/A |
| | <u>N/A</u> |

Comments (note deviations): **Matrix Spike** - Sample RISB-33-1720 spiked for Hg. Metals spike from another SDG.

Representativeness:

| | |
|----------------------------------------------------------------------|-------------------|
| Were sampling procedures and design criteria met? | Yes No N/A |
| | <u>Yes</u> |
| Were holding times met? | Yes No N/A |
| | <u>Yes</u> |
| Were preservation criteria met? (4° C ± 2° C) | Yes No N/A |
| | <u>Yes</u> |
| Were Chain-of-Custody records complete and provided in data package? | Yes No N/A |
| | <u>Yes</u> |
| Were contaminants present in blanks? | Yes No N/A |
| | <u>No</u> |

Comments (note deviations): Sample cooler was received at 4.0 ° C.

Comparability:

| | |
|--------------------------------------------------------|-------------------|
| Does data compare with similar analysis and data sets? | Yes No N/A |
| | <u>Yes</u> |

Comments (note deviations): _____

Completeness (90%):

| | |
|-----------------------------------|-------------------|
| Are all data in this SDG useable? | Yes No N/A |
| | <u>Yes</u> |

Comments (note deviations): _____

| Precision | | %RPD |
|-----------------|--------------|------------|
| Field Duplicate | | |
| | RISB-33-1720 | acceptable |
| | RISB-533 | |

| Laboratory Duplicate | | %RPD | Qualifier | Associated Samples |
|----------------------|---------------------|------------|-----------|-----------------------------|
| Hg | | | | |
| 128636 | RISB-33-1720 | acceptable | | |
| 6010B | | Diff. SDG | | |
| 129350 | Diff. SDG 229403-3 | | | |
| | Cadmium | 41% | J/UJ | All samples except RI-Waste |
| | Chromium | 80% | J/UJ | " |
| | Vanadium | 66% | J/UJ | " |
| 129358 | Diff. SDG 229404-26 | | | |
| | Barium | 58% | J/UJ | RI-Waste |
| | Cobalt | 51% | J/UJ | " |
| | Copper | 36% | J/UJ | " |
| | Manganese | 92% | J/UJ | " |
| | Lead | 41% | J/UJ | " |
| %Moisture | | Diff. SDG | | |
| 129585 | | Acceptable | | |
| 129606 | | Acceptable | | |
| 129664 | | Acceptable | | |

| Accuracy | | %RPD |
|-----------------|--------------|------|
| Serial Dilution | | |
| | not included | N/A |

| MS/MSD | Analyte | MS/MSD %R | RPD | Post %R | Qualifier | Associated Samples |
|------------|---------------------|------------|-----|------------|-----------|------------------------------------------------------------|
| Hg(85-115) | | | | | | |
| 128636 | RISB-33-1720 | Acceptable | | Acceptable | | |
| 6010B | 6010B | Diff. SDG | | | | |
| 129350 | Diff. SDG 229403-3 | | | | | |
| | Aluminum | 999/999% | 8 | 999% | | Sample concentration >4x spike - no qualification required |
| | Calcium | 247/999% | 14 | 999% | | Sample concentration >4x spike - no qualification required |
| | Iron | 999/999% | 8 | 999% | | Sample concentration >4x spike - no qualification required |
| | Magnesium | 999/999% | 11 | 966% | | Sample concentration >4x spike - no qualification required |
| | Manganese | 0/50% | 25 | 0 | | Sample concentration >4x spike - no qualification required |
| | Sodium | 429/524% | 6 | 227% | | Sample concentration >4x spike - no qualification required |
| | Antimony | 45/47% | 4 | 77% | J/UJ | All samples except RI-Waste |
| 129358 | Diff. SDG 229404-26 | | | | | |
| | Aluminum | 999/999% | 6 | 0% | | Sample concentration >4x spike - no qualification required |
| | Barium | 433/75% | 54 | 0% | | Sample concentration >4x spike - no qualification required |
| | Calcium | 156/143% | 1 | 67% | | Sample concentration >4x spike - no qualification required |
| | Iron | 999/999% | 1 | 0% | | Sample concentration >4x spike - no qualification required |
| | Potassium | 363/144% | 5 | 0% | | Sample concentration >4x spike - no qualification required |
| | Magnesium | 667/413% | 4 | 0% | | Sample concentration >4x spike - no qualification required |
| | Manganese | 999/0% | 77 | 0% | | Sample concentration >4x spike - no qualification required |
| | Antimony | 43/41% | 5 | 73% | J-/UJ | RI-Waste |

LCS/ LSD(90-110)

| | %R |
|--------|------------|
| 6010B | |
| 129350 | acceptable |
| Hg | |
| 128636 | acceptable |

| Blanks | | Qualifier | Associated Samples |
|-------------------|----------------|------------------|---------------------------|
| | Analyte | Results | |
| 6010B | non-detect | | |
| Hg | non-detect | | |
| %Moisture | non-detect | | |
| ICV/CCV | | | |
| | not present | | |
| ICSA/ICSAB | | | |
| | not present | | |
| CRI | | | |
| | not present | | |

Do all data in this SDG meet the Data Quality Objectives?

Yes

Comments:

Validator:

Carrie Madrid

Date:

4/15/07

Reviewer:

Cherie Zakowski

Date:

6/9/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229401
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8270C

| | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|--------------|----------|-------------|-----------|
| Samples in SDG: | RISB-8-01 | 229401-1 | RISB-52-913 | 229401-7 |
| | RISB-9-01 | 229401-2 | RISB-9-59 | 229401-8 |
| | RISB-33-1720 | 229401-3 | RISB-8-58 | 229401-9 |
| | RISB-533 | 229401-4 | RISB-44-01 | 229401-10 |
| | RISB-34-1113 | 229401-5 | RI-Waste | 229401-11 |
| | RISB-10-59 | 229401-6 | RISB-33-59 | 229401-12 |

Full Validation Sample: A Level III evaluation was performed on all samples. No raw data was present. Samples are soils.

Precision: **Yes No N/A**
 Field Duplicates RPD criteria met? (frequency 10% and control limits $\pm 20\%$ water and $\pm 50\%$ soil) Yes
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits $\pm 20\%$) N/A
 Comments (note deviations): Field Duplicates - Samples RISB-33-1720/RISB-533 are field duplicates.

Accuracy: **Yes No N/A**
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) Yes
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? Yes
 Trip Blanks/Rinsate Blanks N/A
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? Yes
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05? Yes
 Tuning (abundance criteria and 12 hour time frame)? N/A
 Surrogate % Recoveries? Yes
 Internal Standards N/A
 Comments (note deviations): MS/MSD - Batch 129667 sample RISB-8-01

Precision %RPD
 Field Duplicates
 RISB-33-1720/RISB-533 acceptable
 Laboratory Duplicate %RPD
 RISB-9-59

Accuracy
MS/MSD MS/MSD RPD
 Batch 129667
 RISB-8-01 acceptable

%R
LCS/LCSD
 Batch 129667 acceptable

| | Analyte | Qualifier | Associated Sample/ Qualification |
|---------------|---------|------------|----------------------------------|
| Blanks | | | |
| Batch 129667 | | non-detect | |

| Rinsate | Qualifier | Associated sample | |
|--------------------------|--------------|-------------------|-------------------|
| Blank | N/A | | |
| ICV | Acceptable | | |
| CCV | Acceptable | | |
| Surr. | %R | Qualifier | Associated sample |
| Batch 129667 | acceptable | | |
| Internal Standard | not included | | |

Representativeness:

| Question | Yes | No | N/A |
|-------------------------------------------------------------------------------|-------------------------------------------|----|-----|
| Were sampling procedures and design criteria met? | Yes | | |
| Were holding times met? | Yes | | |
| Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) | Yes | | |
| Were Chain-of-Custody records complete and provided in data package? | Yes | | |
| Were contaminants present in blanks? | No | | |
| Comments (note deviations): | Cooler temperatures 4.0°C | | |

Comparability:

| Question | Yes | No | N/A |
|--------------------------------------------------------|-----|----|-----|
| Does data compare with similar analysis and data sets? | Yes | | |
| Comments (note deviations): | | | |

Completeness (90%):

| Question | Yes | No | N/A |
|-----------------------------------|-----|----|-----|
| Are all data in this SDG useable? | Yes | | |
| Comments (note deviations): | | | |

| Question | Yes |
|-----------------------------------------------------------|-----|
| Do all data in this SDG meet the Data Quality Objectives? | Yes |
| Comments: | |

Validator: Carrie Madrid Date: 4/15/07
 Reviewer: Cherie Zakowski Date: 6/9/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229401
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8260B

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|--------------|----------|-------------|-----------|
| | RISB-8-01 | 229401-1 | RISB-52-913 | 229401-7 |
| | RISB-9-01 | 229401-2 | RISB-9-59 | 229401-8 |
| | RISB-33-1720 | 229401-3 | RISB-8-58 | 229401-9 |
| | RISB-533 | 229401-4 | RISB-44-01 | 229401-10 |
| | RISB-34-1113 | 229401-5 | RI-Waste | 229401-11 |
| | RISB-10-59 | 229401-6 | RISB-33-59 | 229401-12 |

Full Validation Sample: A Level III evaluation was performed on all samples. No raw data was present. Samples are soils.

Precision: **Yes No N/A**
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) Yes
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) N/A

Comments (note deviations): Field Duplicates - Samples RISB-33-1720/RISB-533 are field duplicates.

Accuracy: **Yes No N/A**
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) Yes
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? Yes
 Trip Blanks/Rinsate Blanks N/A
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? No
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05? No
 Tuning (abundance criteria and 12 hour time frame)? N/A
 Surrogate % Recoveries? No
 Internal Standards N/A

Comments (note deviations): MS/MSD - Batch 129582 sample RISB-8-01
Surrogate - Toluene-d8 and 4-Bromofluorobenzene out in sample RISB-34-1113

Precision

Field Duplicates %RPD
 RISB-33-1720/RISB-533 acceptable

Laboratory Duplicate
 N/A

Accuracy

MS/MSD MS/MSD RPD
 (70-130)
 129582 RISB-8-01 acceptable

LCS/LSCD %R
 (70-130)
 129582 acceptable

Blanks Results in ug/L Qualifier Associated Sample/ Qualification
 129582 acceptable

Trip Blank N/A

Holding Blank N/A

| Rinsate | N/A | Qualifier | Associated sample |
|---------|-----|-----------|-------------------|
| Blank | | | |

| ICV | | RRF | %RSD | Qualifier | Associated sample |
|---------|---------------------------------------------|------------|-------|-----------|-------------------------------------|
| PT1/PT2 | 4/26/2006 A Files | acceptable | | | |
| PT1 | 4/26/2006 A Files Extra 1 Methyl Acetate | | 0.019 | R | All Samples except for RI-Waste(11) |
| PT2 | 4/26/2006 A Files Extra 2 Methyl Acetate | | 0.017 | J | RI-Waste(11) |

| CCV | | RRF | %RSD | Qualifier | Associated sample |
|-----|------------------------------------------------|------------|--------|-----------|--------------------------|
| PT1 | 6/8/2006 0958 A16911 Extra 1 Methyl Acetate | | 53.50% | UJ | Already qual. due to ICV |
| PT1 | 6/8/2006 1041 A16913 8260 | acceptable | | | |

| | | RRF | %RSD | Qualifier | Associated sample |
|-----|------------------------------------------------|------------|--------|-----------|--------------------------|
| PT1 | 6/8/2006 2157 A16945 Extra 1 Methyl Acetate | | 46.60% | UJ | Already qual. due to ICV |
| PT2 | 6/8/2006 2239 A16947 8260 | acceptable | | | |

| | | RRF | %RSD | Qualifier | Associated sample |
|-----|------------------------------------------------|------------|--------|-----------|--------------------------|
| PT2 | 6/9/2006 1015 A16978 Extra 2 Methyl Acetate | | 35.62% | J | Already qual. due to ICV |
| PT2 | 6/9/2006 1057 A16980 8260 | acceptable | | | |

| Surr. | | %R | Qualifier | Associated sample |
|--------|----------------------|----------|-----------|-------------------|
| 129582 | | (70-130) | | |
| | RISB-34-1113 | | | |
| | Toluene-d8 | 687% | J | RISB-34-1113 |
| | 4-Bromofluorobenzene | 178% | J | |

Internal Standard not included

Representativeness:

| | |
|--------------------------------------------------------------------------------|-----------------------------------|
| Were sampling procedures and design criteria met? | <u>Yes</u> |
| Were holding times met? | <u>Yes</u> |
| Were preservation criteria met ? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) | <u>Yes</u> |
| Were Chain-of-Custody records complete and provided in data package? | <u>Yes</u> |
| Were contaminants present in blanks? | <u>No</u> |
| Comments (note deviations): | <u>Cooler temperatures 4.0° C</u> |

Comparability:

| | |
|--------------------------------------------------------|------------|
| Does data compare with similar analysis and data sets? | <u>Yes</u> |
| Comments (note deviations): | |

Completeness (90%):

| | |
|-----------------------------------|------------|
| Are all data in this SDG useable? | <u>Yes</u> |
| Comments (note deviations): | |

Do all data in this SDG meet the Data Quality Objectives?

| | |
|-----------|------------|
| Comments: | <u>Yes</u> |
| | |
| | |

Validator: Carrie Madrid Date: 4/15/07
Reviewer: Cherie Zakowski Date: 6/9/07

PSC
Data Evaluation Worksheet

Sample Delivery Group (SDG) Number: 229403
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 6010B/7470/%Moist

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|---------------|----------|------------|----------|
| | RISB-4-01 | 229403-1 | RISB-4-59 | 229403-4 |
| | RISB-44-5-8.5 | 229403-2 | RISB-951 | 229403-5 |
| | RISB-51-913 | 229403-3 | RISB-52-01 | 229403-6 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils.

Precision:

| | |
|-------------------------------------------------------------------------------------------------|------------|
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20%, 35% for soils) | Yes No N/A |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%, 35% for soils) | <u>No</u> |

Comments (note deviations): Field Duplicates - Samples RISB-51-913/RISB-951 are field duplicates.
Sample Duplicates - See below.

Accuracy:

| | |
|---------------------------------------------------------------------------------------------------|------------|
| Serial Dilutions ± 10% | Yes No N/A |
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | <u>N/A</u> |
| Post Digestion Spike criteria met (if applicable)? | <u>No</u> |
| Laboratory Control Sample criteria met? | <u>No</u> |
| Laboratory Control Sample Duplicate? (± 25%) | <u>Yes</u> |
| Laboratory Blanks criteria met (within control limits)? | <u>N/A</u> |
| ICV/CCV % Recoveries within 90-110%? | <u>No</u> |
| ICSA/ICSAB % Recoveries acceptable? | <u>N/A</u> |
| CRI % | <u>N/A</u> |

Comments (note deviations): Matrix Spike - See below.

Representativeness:

| | |
|----------------------------------------------------------------------|------------|
| Were sampling procedures and design criteria met? | Yes No N/A |
| Were holding times met? | <u>Yes</u> |
| Were preservation criteria met? (4° C ± 2° C) | <u>Yes</u> |
| Were Chain-of-Custody records complete and provided in data package? | <u>Yes</u> |
| Were contaminants present in blanks? | <u>Yes</u> |

Comments (note deviations): Sample cooler was received at 4.0 ° C.

Comparability:

| | |
|--------------------------------------------------------|------------|
| Does data compare with similar analysis and data sets? | Yes No N/A |
| Comments (note deviations): | <u>Yes</u> |

Completeness (90%):

| | |
|-----------------------------------|------------|
| Are all data in this SDG useable? | Yes No N/A |
| Comments (note deviations): | <u>Yes</u> |

| Precision | %RPD |
|----------------------|--------|
| Field Duplicate | |
| RISB-51-913/RISB-951 | |
| Chromium | 57.14% |
| Vanadium | 55.67% |

No action taken on field duplicate data.

| Laboratory Duplicate | | <u>%RPD</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|----------------------|---------------------|-------------|------------------|---------------------------------------|
| 6010B | | | | |
| 129350 | RISB-51-913 | | | |
| | Cadmium | 41% | none | sample amount < 5x's the R.L. |
| | Chromium | 80% | J | RISB-4-01, RISB-44-5-8.5, RISB-51-913 |
| | Vanadium | 66% | J | RISB-4-01, RISB-44-5-8.5, RISB-51-913 |
| 129357 | RISB-951 | acceptable | | |
| Hg | | | | |
| 128636 | diff. SDG 229401-3 | acceptable | | |
| 128638 | diff. SDG 229404-1 | acceptable | | |
| %Moist | | | | |
| 129664 | diff. SDG 229404-12 | | | |
| | diff. SDG 229403-4 | | | |

Accuracy

| Serial Dilution | <u>%RPD</u> |
|-----------------|-------------|
| | N/A |

| <u>MS/MSD</u> | <u>Analyte</u> | <u>MS/MSD %R</u> | <u>RPD</u> | <u>Post %R</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|---------------|--------------------|------------------|------------|----------------|-------------------------------------------------------------------|---------------------------------------|
| 6010B | (76-124) | | | | | |
| 129350 | RISB-51-913 | | | | | |
| | Aluminum | 999/999% | 8% | 999% | No action - sample result greater than 4x the spike concentration | |
| | Barium | 125/112% | 6% | 110% | No action - sample result greater than 4x the spike concentration | |
| | Calcium | 247/999% | 14% | 999% | No action - sample result greater than 4x the spike concentration | |
| | Copper | 110/129% | 9% | 118% | No action - sample result greater than 4x the spike concentration | |
| | Iron | 999/999% | 8% | 999% | No action - sample result greater than 4x the spike concentration | |
| | Magnesium | 999/999% | 11% | 966% | No action - sample result greater than 4x the spike concentration | |
| | Manganese | 0/50% | 25% | 0% | No action - sample result greater than 4x the spike concentration | |
| | Sodium | 429/524% | 6% | 227% | No action - sample result greater than 4x the spike concentration | |
| | Antimony | 45/47% | 4% | 77% | UJ | RISB-4-01, RISB-44-5-8.5, RISB-51-913 |
| 129357 | RISB-951 | | | | | |
| | Aluminum | 999/999% | 4% | 470% | No action - sample result greater than 4x the spike concentration | |
| | Barium | 117/125% | 3% | 97% | No action - sample result greater than 4x the spike concentration | |
| | Calcium | 999/999% | 9% | 360% | No action - sample result greater than 4x the spike concentration | |
| | Iron | 999/999% | 2% | 0% | No action - sample result greater than 4x the spike concentration | |
| | Potassium | 153/148% | 2% | 111% | No action - sample result greater than 4x the spike concentration | |
| | Magnesium | 999/873% | 2% | 0% | No action - sample result greater than 4x the spike concentration | |
| | Manganese | 0/88% | 24% | 0% | No action - sample result greater than 4x the spike concentration | |
| | Sodium | 670/633% | 2% | 212% | No action - sample result greater than 4x the spike concentration | |
| | Antimony | 47/47% | 1% | 87% | UJ | RISB-4-59, RISB-951, RISB-52-1 |
| Hg | | | | | | |
| 128636 | diff. SDG 229401-3 | acceptable | | | | |
| 128638 | diff. SDG 229404-1 | acceptable | | | | |

LCS/ LSD(90-110)

| | | <u>%R</u> |
|-------|---------------|------------|
| 6010B | 129350/129357 | acceptable |
| Hg | 128636/128638 | acceptable |

Blanks

| | <u>Analyte</u> | <u>Results</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|-----------|----------------|----------------|------------------|------------------------------|
| 6010B | | | | |
| 129350 | non-detect | | | |
| 129357 | Aluminum | 2.4mg/Kg | no action | all results > 5x's the blank |
| | Zinc | 0.30mg/Kg | no action | all results > 5x's the blank |
| Hg | | | | |
| 128636 | non-detect | | | |
| 128638 | non-detect | | | |

%Moist
129664 non-detect

ICV/CCV
_____ not present

ICSA/ICSAB
_____ not present

CRI
_____ not present

Do all data in this SDG meet the Data Quality Objectives? Yes
Comments: _____

Validator: Carrie Madrid Date: 4/20/07
Reviewer: Cherie Zakowski Date: 10/20/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229403
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8270C

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|---------------|----------|------------|----------|
| | RISB-4-01 | 229403-1 | RISB-4-59 | 229403-4 |
| | RISB-44-5-8.5 | 229403-2 | RISB-951 | 229403-5 |
| | RISB-51-913 | 229403-3 | RISB-52-01 | 229403-6 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils.

| Precision: | Yes | No | N/A |
|------------------------------------------------------------------------------------------------------------|-----|----|-----|
| Field Duplicates RPD criteria met? (frequency 10% and control limits $\pm 20\%$ water and $\pm 50\%$ soil) | | | Yes |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits $\pm 20\%$) | | | N/A |

Comments (note deviations): Field Duplicates - Samples RISB-51-913/RISB-951 are field duplicates.

| Accuracy: | Yes | No | N/A |
|---------------------------------------------------------------------------------------------------|-----|----|-----|
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | | | Yes |
| Laboratory Control Sample criteria met? | | | Yes |
| Laboratory Control Sample Duplicate? | | | N/A |
| Laboratory Blanks criteria met (within control limits)? | | | Yes |
| Trip Blanks/Rinsate Blanks | | | N/A |
| ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? | | | Yes |
| CCV % Recoveries within 30% and RRF greater than or equal to 0.05? | | | Yes |
| Tuning (abundance criteria and 12 hour time frame)? | | | N/A |
| Surrogate % Recoveries? | | | No |
| Internal Standards | | | N/A |

Comments (note deviations): MS/MSD - Matrix spike performed on a sample from a different SDG 229401-2.

| Precision | %RPD |
|------------------|------------------------------------|
| Field Duplicates | RISB-51-913/RISB-951 acceptable |

| Laboratory Duplicate | %RPD |
|----------------------|------|
| | N/A |

| Accuracy | MS/MSD | MS/MSD | RPD |
|----------|--------|--------------------|------------|
| | 129667 | Diff. SDG 229401-2 | acceptable |

| LCS/LCSD | %R |
|----------|------------|
| 129667 | acceptable |

| Blanks | Analyte | Qualifier | Associated Sample/ Qualification |
|--------|---------|------------|----------------------------------|
| 129667 | | non-detect | |

| Rinsate | N/A | <u>Qualifier</u> | | <u>Associated sample</u> |
|--------------------------|---------------------------------------------------|------------------|----------------------------------------------------|--------------------------|
| Blank | | | | |
| <hr/> | | | | |
| ICV | | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> |
| | 6/5/06 8270/Benzaldehyde/ TCL ICV's | | acceptable | |
| | 6/13/06 8270/TCL | | acceptable | |
| | 6/14/06 8270C | | acceptable | |
| <hr/> | | | | |
| CCV | | <u>RRF</u> | <u>%D</u> | <u>Qualifier</u> |
| | 6/12/06 8270/Benzaldehyde/ TCL CCV's | | acceptable | |
| | 6/13/06 8270/Benzaldehyde/ TCL CCV's | | acceptable | |
| | 6/14/06 8270/Benzaldehyde/ TCL CCV's | | acceptable | |
| <hr/> | | | | |
| Surr. | | <u>%R</u> | <u>Qualifier</u> | <u>Associated sample</u> |
| | RISB-4-01 | | | |
| 129667 | 2-Fluorobiphenyl (36-101) | 32% | No action, one surrogate per fraction allowed out. | |
| | RISB-4-01 RR1 re-extraction 2-Fluorobiphenyl | 33% | | |
| <hr/> | | | | |
| Internal Standard | not included | | | |

Representativeness:

| | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|----------------------------------------------------------------------|-----------------------------|-----------|------------|
| Were sampling procedures and design criteria met? | Yes | | |
| Were holding times met? | Yes | | |
| Were preservation criteria met? ($4^{\circ}C \pm 2^{\circ}C$) | Yes | | |
| Were Chain-of-Custody records complete and provided in data package? | Yes | | |
| Were contaminants present in blanks? | No | | |
| Comments (note deviations): | Cooler temperatures 4.0° C. | | |

Comparability:

| | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|--------------------------------------------------------|------------|-----------|------------|
| Does data compare with similar analysis and data sets? | Yes | | |
| Comments (note deviations): | | | |

Completeness (90%):

| | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|-----------------------------------|------------|-----------|------------|
| Are all data in this SDG useable? | Yes | | |
| Comments (note deviations): | | | |

| | <u>Yes</u> |
|-----------------------------------------------------------|------------|
| Do all data in this SDG meet the Data Quality Objectives? | Yes |
| Comments: | |

Validator: Carrie Madrid
 Reviewer: Cherie Zakowski

Date: 4/20/07
 Date: 10/20/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229403
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8260B

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|---------------|----------|------------|----------|
| | RISB-4-01 | 229403-1 | RISB-4-59 | 229403-4 |
| | RISB-44-5-8.5 | 229403-2 | RISB-951 | 229403-5 |
| | RISB-51-913 | 229403-3 | RISB-52-01 | 229403-6 |
| | | | Trip Blank | 229403-7 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils.

Precision: **Yes No N/A**
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) Yes
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) N/A

Comments (note deviations): Field Duplicates - Samples RISB-51-913/RISB-951 are field duplicates.

Accuracy: **Yes No N/A**
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) No
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? Yes
 Trip Blanks/Rinsate Blanks Yes
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? No
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05? No
 Tuning (abundance criteria and 12 hour time frame)? N/A
 Surrogate % Recoveries? Yes
 Internal Standards N/A

Comments (note deviations): Matrix Spike - See below.
 Trip Blank - Non-detect

| <u>Precision</u> | <u>%RPD</u> |
|------------------------------------------|--------------------------------------------------------|
| Field Duplicates RISB-51-913/RISB-951 | acceptable No action taken on field duplicate data. |
| Laboratory Duplicate | N/A |

| <u>Accuracy</u> | <u>MS/MSD</u> | <u>RPD</u> |
|------------------------------|-----------------|------------|
| | <u>(70-130)</u> | |
| MS/MSD | | |
| 129583 RISB-51-913 | acceptable | |
| trans-1,3-Dichloro propene | 66/70% | 6% |
| cis-1,3-Dichloro propene | 66/70% | 6% |
| 129627Aq Diff. SDG 229404-13 | | |
| Bromoform | 52/49% | 6% |
| Dibromochloromethane | 56/53% | 6% |
| 1,1,2-Trichloroethane | 60/55 | 9% |
| trans-1,3-Dichloropropene | 53/50% | 6% |
| cis-1,3-Dichloropropene | 62/60% | 3% |
| Trichlorofluoromethane | 142/136% | 4% |
| Chloroethane | 139/134% | 4% |

No action taken based solely on MS/MSD data.

| <u>LCS/ LCSD</u> | <u>%R</u> |
|----------------------|-----------------|
| | <u>(70-130)</u> |
| 129583 | acceptable |
| 129627Aq | acceptable |

| <u>Blanks</u> | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|---------------|------------------------|------------------|---------------------------|
| 129583 | non-detect | | |
| 129627Aq | non-detect | | |

| <u>Trip Blank</u> | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|-------------------|------------------------|------------------|---------------------------|
| Trip Blank | non-detect | | |

Holding Blank N/A

Rinsate Blank N/A

| | | <u>Qualifier</u> | <u>Associated sample</u> |
|--|--|------------------|--------------------------|
|--|--|------------------|--------------------------|

| ICV | | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|---------|-------------------|------------|-------------|------------------|--------------------------|
| PT1/PT2 | 4/26/2006 A Files | | acceptable | | |

| | | | | | |
|-----|--------------------------------------------|-------------|--|---|-------------------------|
| PT1 | 4/26/2006 A Files Extra 1/2 Methyl Acetate | 0.019/0.017 | | R | All samples in this SDG |
|-----|--------------------------------------------|-------------|--|---|-------------------------|

| CCV | | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|-----|---------------------------------------------|------------|-------------|------------------|--------------------------|
| PT1 | 6/8/2006 0958 A16911 Extra 1 Methyl Acetate | | 53.50% | UJ | Already qual. due to ICV |

| | | | | | |
|-----|---------------------------|--|------------|--|--|
| PT1 | 6/8/2006 1041 A16913 8260 | | acceptable | | |
|-----|---------------------------|--|------------|--|--|

| | | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|-----|---------------------------------------------|------------|-------------|------------------|--------------------------|
| PT1 | 6/8/2006 2157 A16945 Extra 1 Methyl Acetate | | 46.60% | UJ | Already qual. due to ICV |

| | | | | | |
|-----|---------------------------|--|------------|--|--|
| PT2 | 6/8/2006 2239 A16947 8260 | | acceptable | | |
|-----|---------------------------|--|------------|--|--|

| | | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|-----|---------------------------------------------|------------|-------------|------------------|--------------------------|
| PT2 | 6/9/2006 1015 A16978 Extra 2 Methyl Acetate | | 35.62% | J | Already qual. due to ICV |

| | | | | | |
|-----|---------------------------|--|------------|--|--|
| PT2 | 6/9/2006 1057 A16980 8260 | | acceptable | | |
|-----|---------------------------|--|------------|--|--|

| Surr. | | <u>%R</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|----------|--|---------------------|------------------|--------------------------|
| 129583 | | (70-130) acceptable | | |
| 129627Aq | | acceptable | | |

Internal Standard not included

Representativeness:

| | |
|-------------------------------------------------------------------------------|------------------------------------|
| Were sampling procedures and design criteria met? | <u>Yes</u> |
| Were holding times met? | <u>Yes</u> |
| Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) | <u>Yes</u> |
| Were Chain-of-Custody records complete and provided in data package? | <u>Yes</u> |
| Were contaminants present in blanks? | <u>No</u> |
| Comments (note deviations): | <u>Cooler temperatures 4.0° C.</u> |

Comparability:

| | |
|--------------------------------------------------------|------------|
| Does data compare with similar analysis and data sets? | <u>Yes</u> |
| Comments (note deviations): | |

Completeness (90%):

| | |
|-----------------------------------|------------|
| Are all data in this SDG useable? | <u>Yes</u> |
| Comments (note deviations): | |

Do all data in this SDG meet the Data Quality Objectives? Yes

Comments: _____

Validator: Carrie Madrid
Reviewer: Cherie Zakowski

Date: 4/20/07
Date: 10/20/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229404
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 6010B/7471A/%Moist.

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|-----------|-----------|------------|-----------|
| | RISS-1 | 229404-1 | RISD-1 | 229404-15 |
| | RISS-2 | 229404-2 | RISD-2 | 229404-16 |
| | RISS-3 | 229404-3 | RISD-3 | 229404-17 |
| | RISS-4 | 229404-4 | RISD-4 | 229404-18 |
| | RISS-5 | 229404-5 | RISD-5 | 229404-19 |
| | RISS-6 | 229404-6 | RISD-WCBK6 | 229404-20 |
| | RISS-7 | 229404-7 | RISD-FCBK6 | 229404-21 |
| | RISS-8 | 229404-8 | RISD-54 | 229404-22 |
| | RISS-9 | 229404-9 | RIBCK1-01 | 229404-23 |
| | RISS-10 | 229404-10 | RIBCK1-34 | 229404-24 |
| | RISS-510 | 229404-11 | RIBCK2-01 | 229404-25 |
| | RICB-3 | 229404-12 | RIBCK2-34 | 229404-26 |
| | | | IDW(TCLP) | 229404-27 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils.

Precision:

| | |
|-------------------------------------------------------------------------------------------------|-------------------|
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20%, 35% for soils) | Yes No N/A |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%, 35% for soils) | <u>No</u> |
| Comments (note deviations): | <u>Yes</u> |

Field Duplicate - Samples RISS-10/RISS-510 AND RISD-4/RISD-54 are identified as field duplicates.

Laboratory Duplicate - Dup. analysis performed on sample RIBCK2-34 for 6010B all %RPD within limits with the exception of Ba, Co, Cu, Mn, and Pb. Another dup. analyzed for 6010B on a sample from another SDG.

Dup. analysis performed for Hg(7471) on samples RISS-1 and RIBCK2-01 all RPD all RPD within criteria.

Hg (7470) also performed on a sample from another SDG.

%Moisture performed on samples RISD-54 and RICB-3 as well as samples from another SDG.

Accuracy:

| | |
|---------------------------------------------------------------------------------------------------|-------------------|
| Serial Dilutions ± 10% | Yes No N/A |
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | <u>N/A</u> |
| Post Digestion Spike criteria met (if applicable)? | <u>No</u> |
| Laboratory Control Sample criteria met? | <u>No</u> |
| Laboratory Control Sample Duplicate? (± 25%) | <u>Yes</u> |
| Laboratory Blanks criteria met (within control limits)? | <u>N/A</u> |
| ICV/CCV % Recoveries within 90-110%? | <u>No</u> |
| ICSA/ICSAB % Recoveries acceptable? | <u>N/A</u> |
| CRI % | <u>N/A</u> |

Comments (note deviations): **Matrix Spike** - See below.

Blanks - Aluminum and zinc were detected in the blank for batch 129357.

Representativeness:

| | |
|----------------------------------------------------------------------|-------------------|
| Were sampling procedures and design criteria met? | Yes No N/A |
| Were holding times met? | <u>Yes</u> |
| Were preservation criteria met? (4° C ± 2° C) | <u>Yes</u> |
| Were Chain-of-Custody records complete and provided in data package? | <u>Yes</u> |
| Were contaminants present in blanks? | <u>No</u> |

Comments (note deviations): Sample cooler was received at 4.0 ° C.

Comparability:

Does data compare with similar analysis and data sets?

Yes No N/A

Yes

Comments (note deviations):

Completeness (90%):

Are all data in this SDG useable?

Yes No N/A

Yes

Comments (note deviations):

Precision

Field Duplicate

| | Analyte | %RPD |
|------------------|----------|--------|
| RISS-10/RISS-510 | Chromium | 50% |
| RISD-4/RISD-54 | Calcium | 87.27% |

No action taken on field duplicates

Laboratory Duplicate

| | %RPD | Qualifier |
|---------------------------|------|------------|
| 6010B RIBCK2-34 | | |
| 129358 Barium | 58% | J/UJ |
| Cobalt | 51% | J/UJ |
| Copper | 36% | J/UJ |
| Manganese | 92% | J/UJ |
| Lead | 41% | J/UJ |
| 129357 Diff. SDG 229403-5 | | acceptable |

Associated SamplesRISD-WCBK6, RISD-FCBK6, RISD-54,
RIBCK1-01, RIBCK1-34, RIBCK2-01,

"

"

"

"

"

TCLP

129368 Diff. SDG 229424-1 acceptable

Hg (7471)

RISS-1
128638 acceptable
129707 RIBCK2-01
acceptable

Hg (7470)128639 Diff. SDG 229269-1
acceptable**%Mois.**

129587 RISD-54 acceptable
129664 RICB-3 acceptable

Accuracy

Serial Dilution

%RPD

not included

| MS/MSD | Analyte | MS/MSD %R RPD | Post %R | Qualifier | Associated Samples |
|------------|--------------------|---------------|---------|-----------|--------------------|
| Hg(7471) | | | | | |
| 128638 | RISS-1 | Accep. | N/A | | |
| 129707 | RIBCK2-01 | Accep. | N/A | | |
| Hg(7470) | | | | | |
| 128639 | Diff. SDG 229269-1 | Accep. | N/A | | |
| 6010B TCLP | | | | | |
| 129368 | Diff. SDG 229424-1 | Accep. | N/A | | |
| 6010B | (76-124) | | | | |

Associated Samples

| | | | | | |
|--------|--------------------|----------|-----|------|----------------------------------------------------------------------|
| 129358 | RIBCK2-34 | | | | RISD-WCBK6, RISD-FCBK6, RISD-54, RIBCK1-01, RIBCK1-34, RIBCK2-01, |
| | Aluminum | 999/999% | 6% | 0% | Sample concentration >4x spike - no qualification required |
| | Barium | 433/75% | 54% | 0% | Sample concentration >4x spike - no qualification required |
| | Calcium | 156/143% | 1% | 67% | Sample concentration >4x spike - no qualification required |
| | Iron | 999/999% | 4% | 0% | Sample concentration >4x spike - no qualification required |
| | Potassium | 363/144% | 5% | 0% | Sample concentration >4x spike - no qualification required |
| | Magnesium | 667/413% | 4% | 0% | Sample concentration >4x spike - no qualification required |
| | Mangenes | 999/0% | 77% | 0% | Sample concentration >4x spike - no qualification required |
| | Antimony | 43/41% | 5% | 73% | UJ Samples listed above |
| 129357 | Diff. SDG 229403-5 | | | | RISS-1-RISS-10, RISD-1, RISS-510, RIB-3, RISD-2-RISD-5 |
| | Aluminum | 999/999% | 4% | 470% | Sample concentration >4x spike - no qualification required |
| | Barium | 117/125% | 3% | 360% | Sample concentration >4x spike - no qualification required |
| | Calcium | 999/999% | 9% | 0% | Sample concentration >4x spike - no qualification required |
| | Iron | 999/999% | 2% | | Sample concentration >4x spike - no qualification required |
| | Potassium | 153/148% | 2% | 0% | Sample concentration >4x spike - no qualification required |
| | Magnesium | 999/873% | 2% | 0% | Sample concentration >4x spike - no qualification required |
| | Manganese | 0/88% | 24% | 212% | Sample concentration >4x spike - no qualification required |
| | Sodium | 670/633% | 2% | | Sample concentration >4x spike - no qualification required |
| | Antimony | 47/47% | 1% | | UJ |

LCS/LCSD - 6010B(90-110);Hg (62-136)

| | <u>%R</u> |
|-----------|------------|
| 6010B | |
| 129357 | acceptable |
| Hg (7471) | |
| 128638 | acceptable |
| Hg (7470) | |
| 128639 | acceptable |

Blanks

| | <u>Analyte</u> | <u>Results</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|-------------------|----------------|----------------|------------------|---------------------------|
| 6010B | | | | |
| 129357 | Aluminum | 2.40 mg/Kg | 20U | no action all > R.L. |
| | Zinc | 0.300mg/Kg | 6U | no action all > R.L. |
| 129358 | non-detect | | | |
| Hg (7471) | | | | |
| 128638 | non-detect | | | |
| 129707 | non-detect | | | |
| Hg (74710) | | | | |
| 128639 | non-detect | | | |
| %Moist | | | | |
| 129587 | | | | |
| 129664 | non-detect | | | |
| TCLP | non-detect | | | |

ICV/CCV

not included

ICSA/CSAB

not included

CRI

not included

Do all data in this SDG meet the Data Quality Objectives?

Yes

Comments:

Validator:

Carrie Madrid

Date:

4/15/07

Reviewer:

Cherie Zakowski

Date:

10/7/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229404
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8270C

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|-----------|-----------|------------|-----------|
| | RISS-1 | 229404-1 | RISD-1 | 229404-15 |
| | RISS-2 | 229404-2 | RISD-2 | 229404-16 |
| | RISS-3 | 229404-3 | RISD-3 | 229404-17 |
| | RISS-4 | 229404-4 | RISD-4 | 229404-18 |
| | RISS-5 | 229404-5 | RISD-5 | 229404-19 |
| | RISS-6 | 229404-6 | RISD-WCBK6 | 229404-20 |
| | RISS-7 | 229404-7 | RISD-FCBK6 | 229404-21 |
| | RISS-8 | 229404-8 | RISD-54 | 229404-22 |
| | RISS-9 | 229404-9 | RIBCK1-01 | 229404-23 |
| | RISS-10 | 229404-10 | RIBCK1-34 | 229404-24 |
| | RISS-510 | 229404-11 | RIBCK2-01 | 229404-25 |
| | RICB-3 | 229404-12 | RIBCK2-34 | 229404-26 |
| | | | IDW(TCLP) | 229404-27 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils.

| Precision: | Yes | No | N/A |
|--------------------------------------------------------------------------------------------------|-----|----|-----|
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) | Yes | | |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) | N/A | | |

Comments (note deviations): Field Duplicate - Samples RISS-10/RISS-510 and RISD-4/RISD-54 are identified as field duplicates.

| Accuracy: | Yes | No | N/A |
|---------------------------------------------------------------------------------------------------|-----|----|-----|
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | Yes | | |
| Laboratory Control Sample criteria met? | Yes | | |
| Laboratory Control Sample Duplicate? | N/A | | |
| Laboratory Blanks criteria met (within control limits)? | Yes | | |
| Trip Blanks/Rinsate Blanks | N/A | | |
| ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? | No | | |
| CCV % Recoveries within 30% and RRF greater than or equal to 0.05? | No | | |
| Tuning (abundance criteria and 12 hour time frame)? | N/A | | |
| Surrogate % Recoveries? | Yes | | |
| Internal Standards | N/A | | |

Comments (note deviations): MS/MSD - Batch 129693 sample RISS-6, batch 129786 sample RIBCK2-01, and spiked. and batch 129817 (TCLP) sample IDW were spiked.

| Precision | %RPD |
|----------------------|------------|
| Field Duplicates | |
| RISS-10/RISS-510 | acceptable |
| RISD-4/RISD-54 | acceptable |
| Laboratory Duplicate | |
| N/A | |

| Accuracy | MS/MSD | RPD |
|----------|------------------|------------|
| | 129693 RISS-6 | acceptable |
| | 129786 RIBCK2-01 | acceptable |
| | 129817(TCLP) IDW | acceptable |

| LCS/LCSD | %R |
|-------------|------------|
| 129693 | acceptable |
| 129786 | acceptable |
| 129817 TCLP | acceptable |

| Blanks | Analyte | Qualifier | Associated Sample/ Qualification |
|--------|---------|------------|----------------------------------|
| 129693 | | non-detect | |
| 129786 | | non-detect | |
| 129817 | | non-detect | |

| | | <u>Qualifier</u> | <u>Associated sample</u> |
|---------------|--------------------------------|--------------------------------------------------|---------------------------------------------------|
| Rinsate Blank | N/A | | |
| ICV | 6/14/2006 8270 Benzoic Acid | <u>RRF</u> 32.31% <u>Qualifier</u> none | <u>Associated sample</u> not a target compound |

| | | | |
|------------|----------------------------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| CCV | 6/14/2006 8270 1354 Benzidine | <u>RRF</u> 0.038 <u>%RPD</u> 78.3% <u>Qualifier</u> analyte not a target compound | <u>Associated sample</u> IDW(TCLP) IDW MS/MSD |
|------------|----------------------------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------|

| Surr. | <u>%R</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|--------------|------------|------------------|--------------------------|
| 129693 | acceptable | | |
| 129786 | acceptable | | |
| 129817 TCLP | acceptable | | |

Internal Standard not included

Representativeness:

| | |
|----------------------------------------------------------------------|-----------------------------------|
| Were sampling procedures and design criteria met? | <u>Yes</u> |
| Were holding times met? | <u>Yes</u> |
| Were preservation criteria met? (4° C ± 2° C) | <u>Yes</u> |
| Were Chain-of-Custody records complete and provided in data package? | <u>Yes</u> |
| Were contaminants present in blanks? | <u>No</u> |
| Comments (note deviations): | <u>Cooler temperatures 4.0° C</u> |

Comparability:

| | |
|--------------------------------------------------------|------------|
| Does data compare with similar analysis and data sets? | <u>Yes</u> |
| Comments (note deviations): | |

Completeness (90%):

| | |
|-----------------------------------|------------|
| Are all data in this SDG useable? | <u>Yes</u> |
| Comments (note deviations): | |

| | |
|-----------------------------------------------------------|------------|
| Do all data in this SDG meet the Data Quality Objectives? | <u>Yes</u> |
| Comments: | |
| | |
| | |

Validator: Carrie Madrid Date: 4/15/07
 Reviewer: Cherie Zakowski Date: 10/7/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 229404
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8260B

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|------------|-----------|------------|-----------|
| | RICB-3 | 229404-12 | RISD-FCBK6 | 229404-21 |
| | RITW-12 | 229404-13 | RISD-54 | 229404-22 |
| | RITW-34 | 229404-14 | RIBCK1-01 | 229404-23 |
| | RISD-1 | 229404-15 | RIBCK1-34 | 229404-24 |
| | RISD-2 | 229404-16 | RIBCK2-01 | 229404-25 |
| | RISD-3 | 229404-17 | RIBCK2-34 | 229404-26 |
| | RISD-4 | 229404-18 | IDW(TCLP) | 229404-27 |
| | RISD-5 | 229404-19 | Trip Blank | 229404-28 |
| | RISD-WCBK6 | 229404-20 | | |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils.

Precision: Yes No N/A
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) Yes
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) N/A

Comments (note deviations): Field Duplicate - Samples RISD-4/RISD-54 are identified as field dups.

Accuracy: Yes No N/A

Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) No
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? Yes
 Trip Blanks/Rinsate Blanks Yes
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? No
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05? No
 Tuning (abundance criteria and 12 hour time frame)? N/A
 Surrogate % Recoveries? No
 Internal Standards N/A

Comments (note deviations): MS/MSD - Batch 129582 and 129583 spiked a sample from another SDG.
 TCLP 129798 sample IDW was spiked.
 Aqueous 129627 sample RITW-12 was spiked.

Surrogate - 4-Bromofluorobenzene out in sample RICB-3

Precision

Field Duplicates %RPD
 RISD-4/RISD-54 acceptable

Laboratory Duplicate
 N/A

Accuracy

| MS/MSD | MS/MSD | RPD |
|----------------------------------|------------|-----|
| | (70-130) | |
| 129582/129583 soil | acceptable | |
| diff. SDG | | |
| 129583 trans-1,3-Dichloropropene | 66/70% | 6% |
| cis-1, 3-Dichloropropene | 66/70% | 6% |
| 129627 aqueous | | |
| Bromoform | 52/49% | 6% |
| Dibromochloromethane | 56/53% | 6% |
| 1,1,2-Trichloroethane | 60/55% | 9% |
| trans-1,3-Dichloropropene | 53/50% | 6% |
| cis-1,3-Dichloropropene | 62/60% | 3% |
| Trichlorofluoromethane | 142/136% | 4% |
| Chloroethane | 139/134% | 4% |

no action taken on MS/MSD data

129798 TCLP IDW acceptable

| LCS/LCSD | <u>%R</u> (70-130) |
|--------------------|-----------------------|
| 129582/129583 soil | acceptable |
| 129627 Aq. | acceptable |
| 129798 TCLP | acceptable |

| | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Sample/ Qualification</u> |
|--------------------|------------------------|------------------|-----------------------------------------|
| Blanks | | | |
| 129582/129583 soil | non-detect | | |
| 129627 Aq. | non-detect | | |
| 129798 TCLP | non-detect | | |
| Trip Blank | 229404-28 Trip Blank | | |
| | non-detect | | |

| | |
|----------------------|-----|
| Holding Blank | N/A |
|----------------------|-----|

| | <u>Qualifier</u> | <u>Associated sample</u> |
|----------------------|------------------|--------------------------|
| Rinsate Blank | N/A | |

| ICV | | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|----------------|---------------------------------------------|------------|-------------|------------------|--------------------------------------------------------------------------------------------------|
| PT1/PT2 | 4/26/2006 A Files | | acceptable | | |
| PT1 | 4/26/2006 A Files Extra 1 Methyl Acetate | | 0.019 | R | RIBCK1-34, RIBCK2-01, RIBCK2-34 |
| PT2 | 4/26/2006 A Files Extra 2 Methyl Acetate | | 0.017 | J R | RICB-3, RISD-4, RISD-54, RISD-1, RISD-2, RISD-3, RISD-5, RISD-WCBK6, RISD-FCBK6, RIBCK1-01 |
| PT1 | 6/2/2006 B Files Bromomethane | | 0.035 | R | RITW-12, RITW-34, Trip Blank |
| PT2 | 6/2/2006 B Files Bromomethane | | 0.037 | R | none |
| PT1 | 5/26/2006 B Files Extra 1 Methyl Acetate | | 0.034 | R | RITW-12, RITW-34, Trip Blank |
| PT2 | 5/26/2006 B Files Extra 2 Methyl Acetate | | 0.026 | R | |

| CCV | | <u>RRF</u> | <u>%D</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|------------|------------------------------------------------|------------|------------|------------------|---------------------------|
| PT1 | 6/8/2006 0958 A16911 Extra 1 Methyl Acetate | | 53.50% | UJ | Qual. due to ICV |
| PT2 | 6/8/2006 1020 A16912 Extra 2 Methyl Acetate | | 32.00% | UJ | Qual. due to ICV |
| PT1 | 6/8/2006 1041 A16913 8260 | | acceptable | | |
| PT2 | 6/8/2006 1102 A16914 8260 Carbon Disulfide | | 22.60% | UJ | RISD-1, RISD-2, RIBCK1-01 |

| | | <u>RRF</u> | <u>%D</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|------------|------------------------------------------------|------------|------------|------------------|--------------------------------|
| PT1 | 6/8/2006 2157 A16945 Extra 1 Methyl Acetate | | 46.60% | | none |
| PT2 | 6/8/2006 2218 A16946 Extra 2 Methyl Acetate | | 29.02% | UJ | Qual. due to ICV |
| PT1 | 6/8/2006 2239 A16947 | | acceptable | | |
| PT2 | 6/8/2006 2301 A16948 Chloroethane | | 52.9%(L) | UJ | RISD-5, RISD-WCBK6, RISD-FCBK6 |

| | | <u>RRF</u> | <u>%D</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|------------|------------------------------------------------|------------|-----------|------------------|--------------------------|
| PT2 | 6/9/2006 1015 A16978 Extra 2 Methyl Acetate | | 35.62% | UJ | Qual. due to ICV |

PT2 6/9/2006 1057 A16980 8260
acceptable

| | RRF | %D | Qualifier | Associated sample |
|-----|------------------------------------------------------------|--------|------------|-------------------|
| PT1 | 6/12/2006 1046 A17037 Extra 1 Methyl Acetate | 49.28% | | none |
| PT2 | 6/12/2006 1108 A17038 Extra 2 | | acceptable | |
| PT1 | 6/12/2006 1129 A17039 8260 | | acceptable | |
| PT2 | 6/12/2006 1150 A17040 8260 trans-1,2-dichloro ethene | 26.60% | | none |

| | RRF | %D | Qualifier | Associated sample |
|-----|-----------------------------------------------------|----------------------|-----------|---------------------------------------------------------|
| PT2 | 6/14/2006 1116 A17126 Extra 2 Methyl Acetate | 90.80% | | none |
| PT2 | 6/14/2006 1159 A17128 8260 Acetone 2-Butanone | 74.6%(L) 39.6%(L) | UJ | none IDW - not analyte of concern - no qualification |

(L) Linear

| | RRF | %D | Qualifier | Associated sample |
|-----|----------------------------------------------------------------------------------|----------------------------------------|----------------------|------------------------------------------------------------------------------------------------|
| PT1 | 6/9/2006 0835 B24661 Extra 1 | | acceptable | |
| PT1 | 6/9/2006 1039 B24665 8260 Bromomethane Acetone 2-Butanone 2-Hexanone | 48.60% 95.1%(L) 45.10% 44.40% | UJ UJ UJ UJ | Qual. due to ICV RITW-34, Trip Blank RITW-34, Trip Blank RITW-34, RITW-12, Trip Blank |

(L) Linear

| Surr. | %R (70-130) | Qualifier | Associated sample |
|---------------------------------------|----------------|-----------|-----------------------------------|
| 129583 RICB-3 4-Bromofluorobenzene | 132% | J | RICB-3 Toluene and Methyl Acetate |
| 129582 | acceptable | | |
| 129627 Aq. | acceptable | | |
| 129798 TCLP | acceptable | | |

Internal Standard not included

Representativeness: Yes No N/A
 Were sampling procedures and design criteria met? Yes
 Were holding times met? Yes
 Were preservation criteria met? ($f^{\circ}C \pm 2^{\circ}C$) Yes
 Were Chain-of-Custody records complete and provided in data package? Yes
 Were contaminants present in blanks? No
 Comments (note deviations): Cooler temperatures 4.0° C

Comparability: Yes No N/A
 Does data compare with similar analysis and data sets? Yes
 Comments (note deviations): _____

Completeness (90%): Yes No N/A
 Are all data in this SDG useable? Yes
 Comments (note deviations): _____

Do all data in this SDG meet the Data Quality Objectives? Yes
 Comments: _____

Validator: Carrie Madrid Date: 4/15/07
 Reviewer: Cherie Zakowski Date: 10/7/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 237552
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8260B/ %Moisture

| Samples in SDG: | Client ID | Lab ID |
|-----------------|---------------|----------|
| | RISB-57:0-1 | 237552-1 |
| | RISB-57:3-5 | 237552-2 |
| | RISB-57:10-14 | 237552-3 |
| | RISB-57:14-18 | 237552-4 |
| | RISB-57:18-22 | 237552-5 |

Full Validation Sample: Level III evaluation performed on all samples. No raw data was present. Samples are soils.

| Precision: | Yes | No | N/A |
|------------------------------------------------------------------------------------------------------------|-----|----|-----|
| Field Duplicates RPD criteria met? (frequency 10% and control limits $\pm 20\%$ water and $\pm 50\%$ soil) | | | N/A |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits $\pm 20\%$) | | | Yes |

Comments (note deviations): Laboratory Duplicate - A laboratory duplicate was performed for % moisture on samples from a different SDG (237535-1 and 237372-3).

| Accuracy: | Yes | No | N/A |
|---------------------------------------------------------------------------------------------------|-----|----|-----|
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | | | No |
| Laboratory Control Sample criteria met? | | | Yes |
| Laboratory Control Sample Duplicate? | | | N/A |
| Laboratory Blanks criteria met (within control limits)? | | | Yes |
| Trip Blanks/Rinsate Blanks | | | N/A |
| ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? | | | No |
| CCV % Recoveries within 30% and RRF greater than or equal to 0.05? | | | No |
| Tuning (abundance criteria and 12 hour time frame)? | | | N/A |
| Surrogate % Recoveries? | | | Yes |
| Internal Standards | | | N/A |

Comments (note deviations): MS/MSD - Sample RISB-57:0-1(136228) was spiked.

| Precision | %RPD |
|----------------------------------------|--------------------------|
| Field Duplicates | N/A |
| Laboratory Duplicate 136214 %moist. | N/A (8260) acceptable |

| Accuracy | MS/MSD | RPD |
|----------------------|----------|-----|
| | (70-130) | |
| MS/MSD | | |
| 136228 RISB-57:0-1 | | |
| Carbon Tetrachloride | 55/55% | 0% |
| Chloroethane | 63/69% | 9% |

No action taken based solely on MS/MSD data.

| LCS/ LCSD | %R |
|--------------|------------|
| | (70-130) |
| 136228 | acceptable |

| | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|-----------------|------------------------|------------------|---------------------------|
| Blanks | | | |
| 136228 | non-detect | | |
| 136214 % Moist. | non-detect | | |

| Trip | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|------------------|------------------------|------------------|---------------------------|
| Blank N/A | | | |

Holding Blank N/A

| Rinsate Blank | <u>Qualifier</u> | <u>Associated sample</u> |
|----------------------|------------------|--------------------------|
| N/A | | |

| ICV | <u>12/4/06</u> | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|---------------|---------------------------------|------------|-------------|------------------|--------------------------|
| Batch | Bromomethane | 0.048 | | R | All samples |
| 136228 | Chloroethane | 0.048 | | R | All samples |
| | 11/29/2006 Extra A files | | | | |
| | Methyl Acetate | 0.035 | | R | All Samples |

| CCV | <u>12/11/2006 1224 A21877</u> | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|------------|-------------------------------------|------------|-------------|------------------|--------------------------|
| | Bromomethane | 0.04 | | | Qual. due to ICV |
| | Chloroethane | 0.04 | | | Qual. due to ICV |
| | 12/11/2006 1142 A21875 Extra | | | | |
| | acceptable | | | | |

| Surr. | <u>%R</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|--------------|------------------------|------------------|--------------------------|
| 136228 | (70-130) acceptable | | |

Internal Standard not included

Representativeness:

| | |
|----------------------------------------------------------------------|----------------------------|
| Were sampling procedures and design criteria met? | <u>Yes</u> |
| Were holding times met? | <u>Yes</u> |
| Were preservation criteria met? ($4^{\circ}C \pm 2^{\circ}C$) | <u>Yes</u> |
| Were Chain-of-Custody records complete and provided in data package? | <u>Yes</u> |
| Were contaminants present in blanks? | <u>No</u> |
| Comments (note deviations): | Cooler temperature 2.0° C. |

Comparability:

| | |
|--------------------------------------------------------|------------|
| Does data compare with similar analysis and data sets? | <u>Yes</u> |
| Comments (note deviations): | |

Completeness (90%):

| | |
|-----------------------------------|------------|
| Are all data in this SDG useable? | <u>Yes</u> |
| Comments (note deviations): | |

Do all data in this SDG meet the Data Quality Objectives? Yes

Comments: Continuing Calibration reports were not included with the extra standards, therefore only %D was evaluated.
Extra analytes are cyclohexane, methylcyclohexane, and methyl acetate.

Validator: Carrie Madrid
 Reviewer: Cherie Zakowski

Date: 4/19/07
 Date: 5/24/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 237752
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8260B / % Moist/ 9060 TOC

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|---------------|----------|--------------|-----------|
| | RIMW-17:10-12 | 237752-1 | RIMW-6:0-1 | 237752-7 |
| | RIMW-17:18-20 | 237752-2 | RIMW-6:4-6 | 237752-8 |
| | RIMW-13:14-16 | 237752-3 | RIMW-6:8-10 | 237752-9 |
| | RIMW-19:8-10 | 237752-4 | RIMW-6:10-12 | 237752-10 |
| | RIMW-19:12-14 | 237752-5 | RIMW-6:18-19 | 237752-11 |
| | RIMW-19:16-18 | 237752-6 | Trip Blank | 237752-12 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils and a water.

Precision: **Yes No N/A**
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) N/A
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) Yes

Comments (note deviations): _____

Accuracy: **Yes No N/A**
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) No
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? Yes
 Trip Blanks/Rinsate Blanks No
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? No
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05? No
 Tuning (abundance criteria and 12 hour time frame)? N/A
 Surrogate % Recoveries? Yes
 Internal Standards N/A

Comments (note deviations): **Matrix Spike** - See below.
Trip Blank - Toluene was detected in the trip blank.

Precision **%RPD**

Field Duplicates N/A

| Laboratory Duplicate | %Moist | %RPD |
|----------------------|----------------------------------------|------------|
| 136388 | Diff. SDG's 237753-1 and RIMW-17:10-12 | acceptable |
| 136400 | RIMW-19:18-10 | acceptable |
| 136672 | RIMW-17:18-20 | acceptable |

Accuracy **MS/MSD RPD**
(70-130)

| MS/MSD | MS/MSD | RPD |
|----------|----------------------------------------------------------------------------|-------------|
| 136378 | Diff. SDG 237914-6 | |
| | Tetrachloroethene | 0/0% NC |
| | Trichloroethene | 0/0% NC |
| | 1,1-Dichloroethane | 0/0% NC |
| | Chloroethane | 58/66% 12% |
| | Vinyl Chloride | 59/53% 6% |
| 136441Aq | Spike not listed on batch information sheet. 0% R listed for all analytes. | |
| TOC | RIMW-6:10-12 | |
| | TOC | 155/149% 4% |

No action taken based solely on MS/MSD data. Also spiked sample is from another SDG.

| LCS/ LCSD | <u>%R</u> (70-130) |
|--------------|-----------------------|
| 136378 | acceptable |
| 136441Aq | acceptable |
| TOC | |
| 136672 | acceptable |

| | | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|---------------|------------|------------------------|------------------|---------------------------|
| Blanks | | | | |
| 136378 | non-detect | | | |
| 136441Aq | non-detect | | | |
| %Moist | | | | |
| 136388 | non-detect | | | |
| 136400 | non-detect | | | |
| TOC | | | | |
| 136672 | non-detect | | | |

| | | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|-------------------|------------|------------------------|--------------------------------------------------|---------------------------|
| Trip Blank | Trip Blank | Toluene 0.30 ug/L | Result raised to detection limit and qualified U | RIMW-6:0-1 RIMW-6:8-10 |

Holding Blank N/A

| | | <u>Qualifier</u> | <u>Associated sample</u> |
|----------------------|-----|------------------|--------------------------|
| Rinsate Blank | N/A | | |

| ICV | <u>12/4/07</u> | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|-----|----------------|------------|-------------|------------------|----------------------------------------------------------------------------------|
| | 136228/136378 | | | | |
| | Bromomethane | 0.048 | | R | RIMW-19:8-10, RIMW-19:12-14, RIMW-19:16-18, RIMW-6:0-1, RIMW-6:4-6, RIMW--6:8-10 |
| | Chloroethane | 0.048 | | R | RIMW-19:8-10, RIMW-19:12-14, RIMW-19:16-18, RIMW-6:0-1, RIMW-6:4-6, RIMW-6:8-10 |
| | <u>12/8/07</u> | | | | |
| | 136441 | acceptable | | | |

| CCV | <u>12/11/2006 1224</u> | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|-----|------------------------|------------|-------------|------------------|--------------------------|
| | Bromomethane | 0.04 | | R | |
| | Chloroethane | 0.04 | | R | |
| | <u>1/14/2007 1255</u> | | | | |
| | Bromomethane | 0.04 | | R | |
| | Chloroethane | 0.042 | | R | |
| | <u>1/15/2007 1333</u> | | | | |
| | Bromomethane | 0.039 | | R | |
| | Chloroethane | 0.036 | | R | |
| | <u>12/15/2007 1354</u> | | | | |
| | Bromomethane | 0.045 | | R | |
| | Chloroethane | 0.034 | | R | |

No action taken for CCV standards, bromomethane and chloroethane already qualified due to ICV.

| Surr. | <u>%R</u> (70-130) | <u>Qualifier</u> | <u>Associated sample</u> |
|----------|-----------------------|------------------|--------------------------|
| 136378 | acceptable | | |
| 136441Aq | acceptable | | |

Internal Standard not included

Representativeness:

Were sampling procedures and design criteria met?

Yes No N/A

Yes

Were holding times met?

Yes

Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$)

Yes

Were Chain-of-Custody records complete and provided in data package?

Yes

Were contaminants present in blanks?

Yes

Comments (note deviations): Cooler temperatures 2.0° C. Toluene was found in the Trip Blank.

Comparability:

Does data compare with similar analysis and data sets?

Yes No N/A

Yes

Comments (note deviations): _____

Completeness (90%):

Are all data in this SDG useable?

Yes No N/A

No

Comments (note deviations): Sample results for bromomethane and chloroethane were rejected and are not usable.

Do all data in this SDG meet the Data Quality Objectives?

No

Comments: See previous comment.

Validator: Carrie Madrid
Reviewer: Cherie Zakowski

Date: 4/23/07
Date: 10/13/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 237914
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8260B/ %Moist.

| | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|--------------|----------|---------------|----------|
| Samples in SDG: | RIMW-5:0-1 | 237914-1 | RISB-56:4-6 | 237914-6 |
| | RIMW-5:4-6 | 237914-2 | RISB-56:8-10 | 237914-7 |
| | RIMW-5:12-14 | 237914-3 | RISB-56:12-14 | 237914-8 |
| | RIMW-5:18-20 | 237914-4 | Trip Blank | 237914-9 |
| | RISB-56:0-1 | 237914-5 | | |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils.

Precision: **Yes No N/A**
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) NA
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) Yes

Comments (note deviations): _____

Accuracy: **Yes No N/A**
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) No
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? Yes
 Trip Blanks/Rinsate Blanks Yes
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? No
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05? No
 Tuning (abundance criteria and 12 hour time frame)? N/A
 Surrogate % Recoveries? Yes
 Internal Standards N/A

Comments (note deviations): **Matrix Spike** - See below.
Trip Blank - Non-detect

Precision **%RPD**

Field Duplicates N/A

Laboratory Duplicate N/A
 %Moist
 136582 RIMW-5:0-1 acceptable
 Diff. SDG 237819-7 acceptable

Accuracy **MS/MSD RPD**
(70-130)

MS/MSD
 136518 RISB-56:4-6 acceptable

136617Aq Diff. SDG 238041-20 1,2-Dichloroethane 47/15 103
 Chloroethane 50/54 8
 No qualifications are made based on MS/MSD alone.

LCS/ **%R**
(70-130)
LCSD
 136518 acceptable
 136617Aq acceptable

| | | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|---------------|------------|------------------------|------------------|---------------------------|
| Blanks | | | | |
| 136518 | non-detect | | | |
| 136617Aq | non-detect | | | |
| %Moist | | | | |
| 136582 | non-detect | | | |

| Trip Blank | | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|-------------------|--|------------------------|------------------|---------------------------|
| Trip Blank | | non-detect | | |

| | | | | |
|----------------------|-----|--|--|--|
| Holding Blank | N/A | | | |
|----------------------|-----|--|--|--|

| Rinsate Blank | N/A | | <u>Qualifier</u> | <u>Associated sample</u> |
|----------------------|-----|--|------------------|--------------------------|
| | | | | |

| ICV | 12/4/07 | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|------------|---------------------------------|------------|-------------|------------------|--------------------------------------------------------------------------------------------------------------|
| | 136228/136378 Bromomethane | 0.048 | | R | RIMW-5:0-1, RIMW-5:4-6, RIMW-5:12-14, RIMW-5:18-20, RISB-56:0-1, RISB-56:4-6, RISB-56:8-10, Trip Blank |
| | | | | J | RISB-56:12-14 |
| | Chloroethane | 0.048 | | R | RIMW-5:0-1, RIMW-5:4-6, RIMW-5:12-14, RIMW-5:18-20, RISB-56:0-1, RISB-56:4-6, Trip Blank |
| | | | | J | RISB-56:8-10, RISB-56:12-14 |
| | 11/29/2006 Extra A files | | | | |
| | Methyl Acetate | 0.035 | | R | All samples |

| CCV | 12/19/2006 1113 | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|------------|-------------------------------------|------------|-------------|------------------|-------------------------------------------|
| | Bromomethane | 0.046 | | R | Qual. due to ICV |
| | Chloroethane | 0.04 | | R | Qual. due to ICV |
| | 12/19/2006 1134 | | | | |
| | Chloroethane | 0.037 | | R | Qual. due to ICV |
| | 12/19/2006 2312 | | | | |
| | Bromomethane | 0.047 | | R | Qual. due to ICV |
| | Chloroethane | 0.033 | | R | Qual. due to ICV |
| | 12/20/2006 1110 | | | | |
| | Bromomethane | 0.049 | | R | Qual. due to ICV |
| | Chloroethane | 0.041 | | R | Qual. due to ICV |
| | 12/20/2006 1132 | | | | |
| | Chloroethane | 0.04 | | R | Qual. due to ICV |
| | 12/21/2006 1245 | | | | |
| | Chloroethane | 0.033 | | R | Qual. due to ICV |
| | 12/19/2007 1030 Extra A22127 | | | | |
| | Methyl Acetate | | 30.64% | | Qual. due to ICV |
| | 12/19/2007 1052 Extra A22128 | | | | |
| | Methyl Acetate | | 37.42% | | Qual. due to ICV |
| | 12/19/2007 2230 Extra A22161 | | | | |
| | Cyclohexane | | 33.42% | | No samples were associated with this std. |
| | Methyl Acetate | | 38.70% | | |
| | 12/19/2007 1028 Extra A22179 | | | | |
| | acceptable | | | | |

12/20/2007 1049 Extra A22180

Methyl Acetate 28.32%

Qual. due to ICV

12/21/2007 1202 Extra A22218

Methyl Acetate 28.30%

Qual. due to ICV

| Surr. | %R (70-130) | Qualifier | Associated sample |
|----------|----------------|-----------|-------------------|
| 136518 | acceptable | | |
| 136518Aq | acceptable | | |

Internal Standard not included

Representativeness:

Were sampling procedures and design criteria met?
 Were holding times met?
 Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$)
 Were Chain-of-Custody records complete and provided in data package?
 Were contaminants present in blanks?
 Comments (note deviations): Cooler temperatures 4.0° C.

Yes No N/AYesYesYesYesNo**Comparability:**

Does data compare with similar analysis and data sets?
 Comments (note deviations): _____

Yes No N/AYes**Completeness (90%):**

Are all data in this SDG useable?
 Comments (note deviations): _____

Yes No N/ANo

Do all data in this SDG meet the Data Quality Objectives?

No

Comments: Extra analytes are cyclohexane, methylcyclohexane, and methyl acetate.
Continuing Calibration reports were not included with the extra standards, therefore only %D was evaluated.
Some results for bromomethane, chloroethane, and methyl acetate were rejected due to initial and continuing calibration results.

Validator: Carrie Madrid

Date: 4/29/07

Reviewer: Cherie Zakowski

Date: 10/13/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 237943
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8260B / % Moisture

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|---------------|----------|---------------|-----------|
| | RISB-63:0-1 | 237943-1 | Trip Blank | 237943-9 |
| | RISB-63:4-6 | 237943-2 | RISB-58:0-1 | 237943-10 |
| | RISB-63:8-10 | 237943-3 | RISB-58:4-6 | 237943-11 |
| | RISB-63:14-16 | 237943-4 | RISB-58:10-12 | 237943-12 |
| | RISB-63:16-18 | 237943-5 | RISB-58:14-16 | 237943-13 |
| | RISB-61:10-12 | 237943-6 | RISB-58:18-20 | 237943-14 |
| | RISB-61:16-18 | 237943-7 | RISB-59 0-1 | 237943-15 |
| | RISB-61:20-22 | 237943-8 | RISB-59 4-6 | 237943-16 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils and a water.

Precision: Yes No N/A
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) N/A
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) Yes

Comments (note deviations): _____

Accuracy: Yes No N/A

Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) No
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? Yes
 Trip Blanks/Rinsate Blanks Yes
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? No
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05? No
 Tuning (abundance criteria and 12 hour time frame)? N/A
 Surrogate % Recoveries? Yes
 Internal Standards N/A

Comments (note deviations): **Matrix Spike - See below.**

Precision %RPD

Field Duplicates N/A

| Laboratory Duplicate | %Moist | %RPD |
|----------------------|-----------------------------------|--------------------------|
| 136582 | Diff. SDG's 237914-1 and 237819-7 | acceptable |
| 136583 | RISB-58:18-20 RISB-59 4-6 | acceptable acceptable |

Accuracy MS/MSD RPD
(70-130)

| MS/MSD | MS/MSD | RPD |
|----------|---------------------|-------------|
| 136518 | Diff. SDG 237914-6 | acceptable |
| 136590 | RISB-59 4-6 | acceptable |
| 136617Aq | Diff. SDG 238041-20 | |
| | 1,2-Dichloroethane | 47/15% 103% |
| | 1,1-Dichloroethene | 70/59% 17% |
| | Chloroethane | 50/54% 8% |

No action taken based solely on MS/MSD data. Also spiked sample is from another SDG.

| LCS/ LCSD | %R |
|--------------|------------|
| | (70-130) |
| 136518 | acceptable |
| 136590 | acceptable |
| 136617Aq | acceptable |

| | | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|---------------|------------|------------------------|------------------|---------------------------|
| Blanks | | | | |
| 136518 | non-detect | | | |
| 136590 | non-detect | | | |
| 136617Aq | non-detect | | | |
| %Moist | | | | |
| 136582 | non-detect | | | |
| 136583 | non-detect | | | |

| <u>Trip Blank</u> | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|-------------------|------------------------|------------------|---------------------------|
| Trip Blank | non-detect | | |

| | | | |
|----------------------|-----|--|--|
| Holding Blank | N/A | | |
|----------------------|-----|--|--|

| <u>Rinsate Blank</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|----------------------|------------------|--------------------------|
| N/A | | |

| <u>ICV</u> | <u>12/4/07</u> | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|------------|--------------------------------------------------------------------|------------|-------------|------------------|-------------------------------------------------------------------------------------------------------|
| | 136518/136617 Bromomethane | 0.048 | | R | RISB-63:0-1, RISB-63:4-6, RISB-63:8-10, RISB-63:14-16, RISB-63:16-18, RISB-61:10-12, Trip Blank |
| | Chloroethane | 0.048 | | R | RISB-63:0-1, RISB-63:4-6, RISB-63:8-10, RISB-63:14-16, RISB-63:16-18, RISB-61:10-12, Trip Blank |
| | 12/8/07 136590 | acceptable | | | |
| | 11/29/2006 Extra A files 136518/136617 Methyl Acetate | 0.035R | | R | RISB-63:0-1, RISB-63:4-6, RISB-63:8-10, RISB-63:14-16, RISB-63:16-18, RISB-61:10-12 |
| | 11/28/2006 Extra D files 136590 | acceptable | | | |

| <u>CCV</u> | <u>12/19/2007 1113</u> | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>RRF</u> | <u>%RSD</u> |
|------------|----------------------------------------|------------|-------------|------------------|--------------------------------------|-------------|
| | Bromomethane | 0.046 | | R | | |
| | Chloroethane | 0.04 | | R | 12/19/2007 1401 (ICV 12/8/07) | acceptable |
| | 12/19/2007 1134 Chloroethane | 0.037 | | R | 12/20/2007 1224 (ICV 12/8/07) | acceptable |
| | 12/19/2007 2312 Bromomethane | 0.047 | | R | | |
| | Chloroethane | 0.033 | | R | | |
| | 12/20/2007 1110 Bromomethane | 0.049 | | R | | |
| | Chloroethane | 0.041 | | R | | |

No action taken for CCV standards, bromomethane and chloroethane already qualified due to ICV.

| | | | | |
|-------------------------------------------------------|--------|--|----|--------------------------------------------------------------|
| 12/19/2006 Extra 1030 A22127 Methyl Acetate | 30.64% | | | Qual due to ICV |
| 12/19/2006 Extra 1052 A22128 Methyl Acetate | 37.42% | | | Qual due to ICV |
| 12/19/2006 Extra 2230 A22161 Cyclohexane | 33.42% | | UJ | RISB-63-8-10, RISB-63:14-16, RISB-63:16-18, RISB-61:10-12 |
| Methyl Cyclohexane | 38.70% | | UJ | RISB-63-8-10, RISB-63:14-16, RISB-63:16-18, RISB-61:10-12 |
| 12/20/2006 Extra 1028 A22179 acceptable | | | | |

12/21/2006 Extra 1202 A22218

Methyl Acetate 28.30%

Qual due to ICV

12/19/2006 Extra 1322 D8059

Methyl Acetate 38.96% UJ

RISB-61:16-18, RISB-61:20-22, Trip Blank,
RISB-58:0-1, RISB-58:4-6, RISB-58:10-12,
RISB-58:14-16, RISB-58:18-20, RISB-59:0-1,
RISB-59:4-6**12/20/2006 Extra 1144 D8116**

Methyl Acetate 49.84%

Qual due to ICV

| <u>Surr.</u> | <u>%R</u> <u>(70-130)</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|--------------|------------------------------|------------------|--------------------------|
| 136518 | acceptable | | |
| 136590 | acceptable | | |
| 136617Aq | acceptable | | |

Internal Standard not included**Representativeness:**

Were sampling procedures and design criteria met?

Yes No N/AYes

Were holding times met?

YesWere preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$)Yes

Were Chain-of-Custody records complete and provided in data package?

Yes

Were contaminants present in blanks?

NoComments (note deviations): Cooler temperature 1.0° C.**Comparability:**

Does data compare with similar analysis and data sets?

Yes No N/AYes

Comments (note deviations): _____

Completeness (90%):

Are all data in this SDG useable?

Yes No N/ANo

Comments (note deviations): _____

Do all data in this SDG meet the Data Quality Objectives?

No

Comments: Samples RIMW-18-44-56 and RIMW-18-56-68 are listed on the chain of custody, however the samples were not in the cooler.
Continuing Calibration reports were not included with the extra standards, therefore only %D was evaluated.
Extra analytes are cyclohexane, methylcyclohexane, and methyl acetate.
Some results for bromomethane, chloroethane, and methyl acetate were rejected due to initial and continuing calibration results.

Validator: Carrie Madrid
Reviewer: Cherie ZakowskiDate: 4/23/07
Date: 10/14/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 238041
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8260B/ % Moist/ TOC

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|----------------|-----------|----------------|-----------|
| | RISB-59:10-12 | 238041-1 | RIMW-58:10-12 | 238041-13 |
| | RISB-59:12-14 | 238041-2 | RISB-62:0-1 | 238041-14 |
| | RISB-559:12-14 | 238041-3 | RISB-62:4-6 | 238041-15 |
| | RIMW-8:0-1 | 238041-4 | RISB-62:8-10 | 238041-16 |
| | RIMW-8:2-4 | 238041-5 | RISB-562:12-14 | 238041-17 |
| | RIMW-8:4-6 | 238041-6 | RISB-62:12-14 | 238041-18 |
| | RIMW-8:6-8 | 238041-7 | RIMW-19:63-75 | 238041-19 |
| | RIMW-8:10-12 | 238041-8 | RIMW-19:76-88 | 238041-20 |
| | RIMW-8:12-14 | 238041-9 | RIMW-18 | 238041-21 |
| | RIMW-8:8-10 | 238041-12 | RIMW-8:14-16 | 238041-10 |
| | | | RIMW-8:25-27 | 238041-11 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils and waters.

Precision: **Yes No N/A**
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) No
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) N/A

Comments (note deviations): **Field Duplicates** - Samples RISB-59:12-14/RISB-559:12-14, RIMW-8:10-12/RIMW-58:10-12, RISB-62:12-14/RISB-562:12-14 are field duplicates.

Accuracy: **Yes No N/A**
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) No
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? Yes
 Trip Blanks/Rinsate Blanks Yes
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? No
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05? No
 Tuning (abundance criteria and 12 hour time frame)? N/A
 Surrogate % Recoveries? Yes
 Internal Standards N/A

Comments (note deviations): **Matrix Spike** - See below.
Trip Blank - Non-detect

| <u>Precision</u> | <u>%RPD</u> |
|------------------------------|-------------|
| Field Duplicates | |
| RISB-59:12-14/RISB-559:12-14 | |
| 1,2-Dichloroethane | 162.62% |
| 1,1,1-Trichloroethane | 103.49% |
| RIMW-8:10-12/RIMW-58:10-12 | |
| Toluene | 53.97% |
| 1,1-Dichloroethane | 50.50% |
| SB-62:12-14/RISB-562:12-14 | |
| Chlorobenzene | 98.31% |
| Chloroform | 96.44% |
| 1,3-Dichlorobenzene | 109.84% |
| 1,4-Dichlorobenzene | 98.04% |
| 1,2-Dichloropropane | 85.70% |
| Tetrachloroethene | 161.60% |
| Toluene | 62.77% |
| 1,2,4-Trichlorobenzene | 66.99% |
| 1,1,2-Trichloroethane | 54.55% |
| Trichloroethene | 142.73% |

No action taken on field duplicate data.

| Laboratory Duplicate | <u>%RPD</u> |
|---------------------------|-------------|
| TOC | |
| 136672 Diff. SDG 237752-2 | acceptable |
| %Moist | |
| 136722 RISB-62:0-1 | acceptable |
| 136723 RIMW-8:4-6 | acceptable |

| Accuracy | | MS/MSD | RPD |
|---------------|-------------------------|----------|------|
| | | (70-130) | |
| MS/MSD | | | |
| 136617 | RIMW-19:76-88 | | |
| | 1,2-Dichloroethane | 47/15% | 103% |
| | 1,1-Dichloroethene | 70/59% | 17% |
| | Chloroethane | 50/54% | 8% |
| 136620 | RISB-62:12-14 | | |
| | 1,2-Dichlorobenzene | 0/0% | NC |
| | 1,3-Dichlorobenzene | 38/34% | 11% |
| | Chlorobenzene | 13/9% | 36% |
| | 1,1,2-Trichloroethane | 0/0% | NC |
| | Trichloroethene | 60/56% | 7% |
| | 1,2-Dichloroethane | 0/0% | NC |
| | Chloroform | 61/59% | 3% |
| | Chloroethane | 71/60% | 17% |
| 136623 | RISB-59:10-12 | | |
| | Tetrachloroethene | 69/68% | 1% |
| | 1,1,2-Trichloroethane | 55/57% | 4% |
| | 1,1,1-Trichloroethane | 36/42% | 15% |
| | 1,1-Dichloroethene | 6/14% | 80% |
| | Trichlorofluoro methane | 62/66% | 6% |
| TOC | | | |
| 136672 | Diff. SDG 237752-10 | 155/149% | 4% |

No action taken based solely on MS/MSD data.

| | | %R |
|-------------|--|------------|
| | | (70-130) |
| LCS/ | | |
| LCSD | | |
| 136623 | | acceptable |
| 136620 | | acceptable |
| 136617Aq | | acceptable |
| 136672 TOC | | acceptable |

| | | Results in ug/L | Qualifier | Associated Samples |
|---------------|------------|-----------------|-----------|--------------------|
| Blanks | | | | |
| 136620 | non-detect | | | |
| 136623 | non-detect | | | |
| 136617Aq | non-detect | | | |
| TOC | | | | |
| 136672 | non-detect | | | |
| %Moist | | | | |
| 136722 | non-detect | | | |
| 136723 | non-detect | | | |

| | | Results in ug/L | Qualifier | Associated Samples |
|-------------------|-----|-----------------|-----------|--------------------|
| Trip Blank | N/A | | | |

| | | | | |
|----------------------|-----|--|--|--|
| Holding Blank | N/A | | | |
|----------------------|-----|--|--|--|

| | | Qualifier | Associated sample |
|----------------------|-----|-----------|-------------------|
| Rinsate Blank | N/A | | |

| ICV | 12/4/07 | RRF | %RSD | Qualifier | Associated sample |
|---------------------------------|----------------|-------|------|-----------|-------------------|
| | 136228/136378 | | | | |
| | Bromomethane | 0.048 | | J/R | All samples |
| | Chloroethane | 0.048 | | J/R | |
| 11/29/2006 Extra A files | | | | | |
| | Methyl Acetate | 0.035 | | R | All samples |

| CCV | 12/20/2006 1110 | RRF | %RSD | Qualifier | Associated sample |
|------------------------|-----------------|-------|------|-----------|-------------------|
| | Bromomethane | 0.049 | | R | Qual. due to ICV |
| | Chloroethane | 0.041 | | R | Qual. due to ICV |
| 12/20/2006 1132 | | | | | |
| | Chloroethane | 0.04 | | R | Qual. due to ICV |

| Surr. | %R (70-130) | Qualifier | Associated sample |
|----------|----------------|------------|-------------------|
| 136620 | | acceptable | |
| 136623 | | acceptable | |
| 136617Aq | | acceptable | |

Internal Standard not included

Representativeness: **Yes No N/A**

Were sampling procedures and design criteria met? Yes

Were holding times met? Yes

Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) Yes

Were Chain-of-Custody records complete and provided in data package? Yes

Were contaminants present in blanks? No

Comments (note deviations): Cooler temperatures 4.0° C.

Comparability: **Yes No N/A**

Does data compare with similar analysis and data sets? Yes

Comments (note deviations): _____

Completeness (90%): **Yes No N/A**

Are all data in this SDG useable? Yes

Comments (note deviations): _____

Do all data in this SDG meet the Data Quality Objectives? Yes

Comments: A trip blank was listed on the Chain of Custody, however a trip blank was not present in the cooler.

Validator: Carrie Madrid Date: 4/21/07

Reviewer: Cherie Zakowski Date: 10/20/07

PSC
Data Evaluation Worksheet

Sample Delivery Group (SDG) Number: 238119
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8260B/ %Moisture

| Samples in SDG: | Client ID | Lab ID |
|-----------------|---------------|----------|
| | RIMW-1:10-12 | 238119-1 |
| | RIMW-1:12-14 | 238119-2 |
| | RIMW-51:12-14 | 238119-3 |
| | RIMW-7:0-1 | 238119-4 |
| | RIMW-7:4-6 | 238119-5 |
| | RIMW-7:8-10 | 238119-6 |
| | RIMW-18:44-56 | 238119-7 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils.

| Precision: | Yes | No | N/A |
|--------------------------------------------------------------------------------------------------|-----|-----|-----|
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) | | No | |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) | | Yes | |

Comments (note deviations): **Field Duplicate** - Samples RIMW-1:12-14/RIMW-51:12-14 are field duplicates.

Laboratory Duplicate - A laboratory duplicate was performed for % moisture on samples from a different SDG (238041-14 and 238066-1).

| Accuracy: | Yes | No | N/A |
|---------------------------------------------------------------------------------------------------|-----|----|-----|
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | Yes | | |
| Laboratory Control Sample criteria met? | Yes | | |
| Laboratory Control Sample Duplicate? | N/A | | |
| Laboratory Blanks criteria met (within control limits)? | Yes | | |
| Trip Blanks/Rinsate Blanks | N/A | | |
| ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? | No | | |
| CCV % Recoveries within 30% and RRF greater than or equal to 0.05? | No | | |
| Tuning (abundance criteria and 12 hour time frame)? | N/A | | |
| Surrogate % Recoveries? | Yes | | |
| Internal Standards | N/A | | |

Comments (note deviations): **MS/MSD** - Sample RIMW-7:8-10(136688) was spiked.

| Precision | %RPD |
|----------------------------|---------|
| Field Duplicates | |
| RIMW-1:12-14/RIMW-51:12-14 | |
| Benzene | 110.25% |
| 1,2-Dichloroethane | 82.79% |
| cis-1,2-Dichloroethene | 140.11% |
| Tetrachloroethene | 77.64% |
| Trichloroethene | 150.67% |

No action taken on field duplicate data.

Laboratory Duplicate - %moisture Acceptable

| Accuracy | MS/MSD | RPD |
|----------------------|------------|-----|
| | (70-130) | |
| MS/MSD | | |
| 136688 RIMW-7:8-10 | acceptable | |
| 136732 RIMW-18:44-56 | | |
| Tetrachloroethene | 35/33% | 6% |
| Toluene | 16/22% | 32% |

No action taken based solely on MS/MSD data.

| LCS/LCSD | %R |
|----------|------------|
| | (70-130) |
| 136688 | acceptable |
| 136732 | acceptable |

| | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|-----------------|------------------------|------------------|---------------------------|
| Blanks | | | |
| 136688 | non-detect | | |
| 136732 | non-detect | | |
| 136722 % Moist. | non-detect | | |

| Trip Blank | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|-------------------|------------------------|------------------|---------------------------|
| N/A | | | |

| Holding Blank | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|----------------------|------------------------|------------------|---------------------------|
| N/A | | | |

| Rinsate Blank | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|----------------------|------------------------|------------------|--------------------------|
| N/A | | | |

| ICV | <u>Date</u> | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|------------|---------------------------------|------------|-------------|------------------|--------------------------|
| | 12/7/06 | | | | |
| | 136688 | | | | |
| | Chloroethane | 0.04 | | R | All samples |
| | 11/29/2006 Extra A files | | | | |
| | Methyl Acetate | 0.035 | | R | All Samples |

| CCV | <u>Date</u> | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|------------|-------------------------------------|------------|-------------|------------------|--------------------------|
| | 12/21/2006 1223 | | | | |
| | 136688 | | | | |
| | Chloroethane | 0.041 | | R | Qual. Due to ICV |
| | 12/22/2006 1156 | | | | |
| | 136732 | | | | |
| | Bromomethane | 0.049 | | R | RIMW-18:44-56 |
| | Chloroethane | 0.042 | | R | Qual. Due to ICV |
| | 12/21/2006 Extra 1141 A22217 | | | | |
| | acceptable | | | | |
| | 12/22/2006 Extra 1114 A22253 | | | | |
| | acceptable | | | | |

| Surr. | <u>%R</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|--------------|------------|------------------|--------------------------|
| | (70-130) | | |
| 136228 | acceptable | | |

| Internal Standard | <u>Results</u> |
|--------------------------|----------------|
| not included | |

| Representativeness: | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|----------------------------------------------------------------------|----------------------------|-----------|------------|
| Were sampling procedures and design criteria met? | Yes | | |
| Were holding times met? | Yes | | |
| Were preservation criteria met? (4° C ± 2° C) | Yes | | |
| Were Chain-of-Custody records complete and provided in data package? | Yes | | |
| Were contaminants present in blanks? | No | | |
| Comments (note deviations): | Cooler temperature 2.0° C. | | |

| Comparability: | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|--------------------------------------------------------|------------|-----------|------------|
| Does data compare with similar analysis and data sets? | Yes | | |
| Comments (note deviations): | | | |

| Completeness (90%): | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|-----------------------------------|------------|-----------|------------|
| Are all data in this SDG useable? | No | | |
| Comments (note deviations): | | | |

Do all data in this SDG meet the Data Quality Objectives? No

Comments: RIMW-18:44-56 was not listed on the Chain of Custody as a sample. The laboratory noted it as a previously missing sample.
The trip blank was not present in the cooler.
ICV and CCV results required the rejection of some results for chloroethane, methyl acetate, and bromomethane.
Extra analytes are cyclohexane, methylcyclohexane, and methyl acetate.

Validator: Carrie Madrid Date: 4/19/07
Reviewer: Cherie Zakowski Date: 10/14/07

PSC
Data Evaluation Worksheet

Sample Delivery Group (SDG) Number: 238907
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: TCLP 6010B

| | | |
|-----------------|-----------|----------|
| Samples in SDG: | Client ID | Lab ID |
| | R-84607 | 238907-1 |
| | R-84610 | 238907-2 |

Full Validation Sample: Level III data evaluation performed on all samples. No raw data was present. Samples are soils.

| | |
|-------------------------------------------------------------------------------------------------------|-------------------|
| Precision: | Yes No N/A |
| Field Duplicates RPD criteria met? (frequency 10% and control limits $\pm 20\%$, 35% for soils) | N/A |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits $\pm 20\%$, 35% for soils) | Yes |

Comments (note deviations): Sample Duplicates - See below.

| | |
|---------------------------------------------------------------------------------------------------|-------------------|
| Accuracy: | Yes No N/A |
| Serial Dilutions $\pm 10\%$ | N/A |
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | Yes |
| Post Digestion Spike criteria met (if applicable)? | Yes |
| Laboratory Control Sample criteria met? | Yes |
| Laboratory Control Sample Duplicate? ($\pm 25\%$) | N/A |
| Laboratory Blanks criteria met (within control limits)? | Yes |
| ICV/CCV % Recoveries within 90-110%? | N/A |
| ICSA/ICSAB % Recoveries acceptable? | N/A |
| CRI % | N/A |

Comments (note deviations): Matrix Spike - See below.
Hg - RPD 23 (limit 0-14) no action required

| | |
|----------------------------------------------------------------------|-------------------|
| Representativeness: | Yes No N/A |
| Were sampling procedures and design criteria met? | Yes |
| Were holding times met? | Yes |
| Were preservation criteria met? ($4^{\circ}C \pm 2^{\circ}C$) | Yes |
| Were Chain-of-Custody records complete and provided in data package? | Yes |
| Were contaminants present in blanks? | No |

Comments (note deviations): Sample cooler was received at 4.0 ° C.

| | |
|--------------------------------------------------------|-------------------|
| Comparability: | Yes No N/A |
| Does data compare with similar analysis and data sets? | Yes |
| Comments (note deviations): | |

| | |
|-----------------------------------|-------------------|
| Completeness (90%): | Yes No N/A |
| Are all data in this SDG useable? | Yes |
| Comments (note deviations): | |

| | | |
|------------------|--|-------------|
| Precision | | %RPD |
| Field Duplicate | | N/A |

| Laboratory Duplicate | | <u>%RPD</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|----------------------|---------|-------------|------------------|---------------------------|
| 6010B | | | | |
| 137157 | R-84607 | acceptable | | |
| Hg | | | | |
| 137277 | R-84610 | acceptable | | |

Accuracy

| <u>Serial Dilution</u> | <u>%RPD</u> |
|------------------------|-------------|
| | N/A |

| <u>MS/MSD</u> | <u>Analyte</u> | <u>MS/MSD %R</u> | <u>RPD</u> | <u>Post %R</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|---------------|----------------|------------------|------------|----------------|------------------|---------------------------|
| 6010B | (76-124) | | | | | |
| 137157 | R-84607 | acceptable | | | | |
| Hg | | | | | | |
| 137277 | R-84610 | acceptable | | | | |

LCS/ LSD(90-110)

| | | <u>%R</u> |
|-------|--------|------------|
| 6010B | 137157 | acceptable |

Blanks

| | <u>Analyte</u> | <u>Results</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|--------|----------------|----------------|------------------|---------------------------|
| 6010B | | | | |
| 137157 | non-detect | | | |
| TC1951 | non-detect | | | |
| ZH1952 | non-detect | | | |

ICV/CCV

| |
|-------------|
| not present |
|-------------|

ICSA/ICSAB

| |
|-------------|
| not present |
|-------------|

CRI

| |
|-------------|
| not present |
|-------------|

Do all data in this SDG meet the Data Quality Objectives?

Yes

Comments:

Validator:

Carrie Madrid

Date: 4/20/07

Reviewer:

Cherie Zakowski

Date: 4/29/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 238907
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: TCLP 8270C

| | <u>Client ID</u> | <u>Lab ID</u> |
|-----------------|------------------|---------------|
| Samples in SDG: | R-84607 | 238907-1 |
| | R-84610 | 238907-2 |

Full Validation Sample: Level III data evaluation performed on all samples. No raw data was present. Samples are soils.

Precision:

| | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|--------------------------------------------------------------------------------------------------|------------|-----------|------------|
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) | | | N/A |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) | | | N/A |

Comments (note deviations): _____

Accuracy:

| | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|---------------------------------------------------------------------------------------------------|------------|-----------|------------|
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | | | Yes |
| Laboratory Control Sample criteria met? | | | Yes |
| Laboratory Control Sample Duplicate? | | | N/A |
| Laboratory Blanks criteria met (within control limits)? | | | Yes |
| Trip Blanks/Rinsate Blanks | | | N/A |
| ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? | | | Yes |
| CCV % Recoveries within 30% and RRF greater than or equal to 0.05? | | | Yes |
| Tuning (abundance criteria and 12 hour time frame)? | | | N/A |
| Surrogate % Recoveries? | | | Yes |
| Internal Standards | | | N/A |

Comments (note deviations): **MS/MSD - Matrix spike performed on sample R-84607.**

| <u>Precision</u> | | <u>%RPD</u> |
|------------------|-----|-------------|
| Field Duplicates | N/A | |

| Laboratory Duplicate | | <u>%RPD</u> |
|----------------------|-----|-------------|
| | N/A | |

Accuracy

| <u>MS/MSD</u> | | <u>MS/MSD</u> | <u>RPD</u> |
|---------------|---------|---------------|------------|
| 137313 | R-84607 | | acceptable |

| <u>LCS/LCSD</u> | | <u>%R</u> |
|-----------------|--|------------|
| 137313 | | acceptable |

| <u>Blanks</u> | <u>Analyte</u> | <u>Qualifier</u> | <u>Associated Sample/ Qualification</u> |
|---------------|----------------|------------------|-----------------------------------------|
| 137313 | | non-detect | |

| Rinsate | N/A | <u>Qualifier</u> | | <u>Associated sample</u> |
|--------------------------|-----------------------|------------------|------------------|--------------------------|
| Blank | | | | |
| ICV | 12/26/06 8270 TCLP | <u>RRF</u> | <u>%RSI</u> | <u>Qualifier</u> |
| | | | acceptable | |
| CCV | 1/17/07 8270 TCLP | <u>RRF</u> | <u>%C</u> | <u>Qualifier</u> |
| | | | acceptable | |
| Surr. | | <u>%R</u> | <u>Qualifier</u> | <u>Associated sample</u> |
| 137313 | | | accpetable | |
| Internal Standard | not included | | | |

Representativeness:

| | Yes | No | N/A |
|----------------------------------------------------------------------|------------------------------------|-----------|-----|
| Were sampling procedures and design criteria met? | <u>Yes</u> | | |
| Were holding times met? | <u>Yes</u> | | |
| Were preservation criteria met? (4° C ± 2° C) | <u>Yes</u> | | |
| Were Chain-of-Custody records complete and provided in data package? | <u>Yes</u> | | |
| Were contaminants present in blanks? | | <u>No</u> | |
| Comments (note deviations): | <u>Cooler temperatures 4.0° C.</u> | | |

Comparability:

| | Yes | No | N/A |
|--------------------------------------------------------|------------|----|-----|
| Does data compare with similar analysis and data sets? | <u>Yes</u> | | |
| Comments (note deviations): | _____ | | |

Completeness (90%):

| | Yes | No | N/A |
|-----------------------------------|------------|----|-----|
| Are all data in this SDG useable? | <u>Yes</u> | | |
| Comments (note deviations): | _____ | | |

| | |
|-----------------------------------------------------------|------------|
| Do all data in this SDG meet the Data Quality Objectives? | <u>Yes</u> |
| Comments: | _____ |
| | _____ |
| | _____ |

Validator: Carrie Madrid Date: 4/21/07
 Reviewer: Cherie Zakowski Date: 4/29/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 238907
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: TCLP 8260B

| | | |
|-----------------|------------------|---------------|
| | <u>Client ID</u> | <u>Lab ID</u> |
| Samples in SDG: | R-84607 | 238907-1 |
| | R-84610 | 238907-2 |

Full Validation Sample: Level III data evaluation performed on all samples. No raw data was present. Samples are soils.

| | |
|--------------------------------------------------------------------------------------------------|-------------------|
| Precision: | Yes No N/A |
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) | <u>N/A</u> |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) | <u>N/A</u> |

Comments (note deviations): _____

| | |
|---------------------------------------------------------------------------------------------------|-------------------|
| Accuracy: | Yes No N/A |
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | <u>Yes</u> |
| Laboratory Control Sample criteria met? | <u>Yes</u> |
| Laboratory Control Sample Duplicate? | <u>N/A</u> |
| Laboratory Blanks criteria met (within control limits)? | <u>Yes</u> |
| Trip Blanks/Rinsate Blanks | <u>N/A</u> |
| ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? | <u>Yes</u> |
| CCV % Recoveries within 30% and RRF greater than or equal to 0.05? | <u>Yes</u> |
| Tuning (abundance criteria and 12 hour time frame)? | <u>N/A</u> |
| Surrogate % Recoveries? | <u>Yes</u> |
| Internal Standards | <u>N/A</u> |

Comments (note deviations): **Matrix Spike - See below.**

| | |
|-------------------------|--------------------|
| <u>Precision</u> | <u>%RPD</u> |
| Field Duplicates | N/A |
| Laboratory Duplicate | N/A |

| | |
|------------------------|--------------------------|
| <u>Accuracy</u> | <u>MS/MSD RPD</u> |
| | <u>(70-130)</u> |
| MS/MSD | |
| 137344 R-84607 | acceptable |
| LCS/ LCSD | |
| 137344 | acceptable |

| | | | |
|-------------------|-------------------------------|-------------------------|----------------------------------|
| Blanks | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
| 137313 non-detect | | | |

| | | | |
|-------------------|-------------------------------|-------------------------|----------------------------------|
| Trip Blank | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
| N/A | | | |

| | | | |
|----------------------|-----|--|--|
| Holding Blank | N/A | | |
|----------------------|-----|--|--|

| | | | |
|----------------------|-----|-------------------------|---------------------------------|
| Rinsate Blank | N/A | <u>Qualifier</u> | <u>Associated sample</u> |
|----------------------|-----|-------------------------|---------------------------------|

| ICV | RRF | %RSD | Qualifier |
|---------|-----|------|------------|
| 1/12/07 | | | acceptable |

| CCV | RRF | %RSD | Qualifier |
|----------------|-----|------|------------|
| 1/18/2007 1059 | | | acceptable |

| Surr. | %R | Qualifier | Associated sample |
|--------|----------|------------|-------------------|
| 137313 | (70-130) | acceptable | |

Internal Standard not included

Representativeness:

| | Yes | No | N/A |
|-------------------------------------------------------------------------------|------------------------------------|-----------|-----|
| Were sampling procedures and design criteria met? | <u>Yes</u> | | |
| Were holding times met? | <u>Yes</u> | | |
| Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) | <u>Yes</u> | | |
| Were Chain-of-Custody records complete and provided in data package? | <u>Yes</u> | | |
| Were contaminants present in blanks? | | <u>No</u> | |
| Comments (note deviations): | <u>Cooler temperatures 4.0° C.</u> | | |

Comparability:

| | Yes | No | N/A |
|--------------------------------------------------------|------------|----|-----|
| Does data compare with similar analysis and data sets? | <u>Yes</u> | | |
| Comments (note deviations): | _____ | | |

Completeness (90%):

| | Yes | No | N/A |
|-----------------------------------|------------|----|-----|
| Are all data in this SDG useable? | <u>Yes</u> | | |
| Comments (note deviations): | _____ | | |

Do all data in this SDG meet the Data Quality Objectives? Yes

Comments: _____

Validator: Carrie Madrid
 Reviewer: Cherie Zakowski

Date: 4/21/07
 Date: 4/29/07

PSC
Data Evaluation Worksheet

Sample Delivery Group (SDG) Number: 239274
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 6010B/7471A/%Moist

| | <u>Client ID</u> | <u>Lab ID</u> |
|-----------------|------------------|---------------|
| Samples in SDG: | RIMW-11 | 239274-1 |
| | RIMW-18 | 239274-3 |
| | RIMW-12 | 239274-4 |
| | RIMW-10 | 239274-8 |
| | RIMW-9 | 239274-10 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are waters.

Precision:

| | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|----------------------------------------------------------------------------------|------------|-----------|------------|
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20%) | | | N/A |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) | | | Yes |

Comments (note deviations): Sample Duplicates - RIMW-11(6010B), RIMW-18 (thallium), and RIMW-9 (Hg) were analyzed as sample duplicates.

Accuracy:

| | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|---------------------------------------------------------------------------------------------------|------------|-----------|------------|
| Serial Dilutions ± 10% | | | N/A |
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | | | No |
| Post Digestion Spike criteria met (if applicable)? | | | No |
| Laboratory Control Sample criteria met? | | | Yes |
| Laboratory Control Sample Duplicate? (± 25%) | | | N/A |
| Laboratory Blanks criteria met (within control limits)? | | | No |
| ICV/CCV % Recoveries within 90-110%? | | | N/A |
| ICSA/ICSAB % Recoveries acceptable? | | | N/A |
| CRI % | | | N/A |

Comments (note deviations): Serial Dilution - 6010B on sample RIMW-11, on sample RIMW-9 for thallium, and thallium and Hg. However no data was present for validation.
Matrix Spike - 6010B spike performed on sample RIMW-11, thallium on sample RIMW-18, and sample RIMW-10 for Hg.

Representativeness:

| | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|----------------------------------------------------------------------|------------|-----------|------------|
| Were sampling procedures and design criteria met? | | | Yes |
| Were holding times met? | | | Yes |
| Were preservation criteria met? ($4^{\circ}C \pm 2^{\circ}C$) | | | No |
| Were Chain-of-Custody records complete and provided in data package? | | | Yes |
| Were contaminants present in blanks? | | | Yes |

Comments (note deviations): Sample cooler was received at 1.0 ° C, however no action taken based on temperature.

Comparability:

| | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|--------------------------------------------------------|------------|-----------|------------|
| Does data compare with similar analysis and data sets? | | | Yes |

Comments (note deviations): _____

Completeness (90%):

| | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|-----------------------------------|------------|-----------|------------|
| Are all data in this SDG useable? | | | Yes |

Comments (note deviations): _____

| Precision | <u>%RPD</u> |
|-----------------|-------------|
| Field Duplicate | N/A |

| Laboratory Duplicate | <u>%RPD</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|----------------------------|-------------|------------------|---------------------------|
| 6010B RIMW-11 137461 | acceptable | | |
| Thallium RIMW-18 137456 | acceptable | | |
| Hg RIMW-9 137458 | acceptable | | |

| Accuracy | <u>%RPD</u> |
|-----------------|-------------|
| Serial Dilution | N/A |

| <u>MS/MSD</u> | <u>Analyte</u> | <u>MS/MSD %R</u> | <u>RPD</u> | <u>Post %R</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|-------------------|------------------|------------------|------------|----------------|-------------------------------------------------------------------|---------------------------|
| 6010B | (76-124) | | | | | |
| RIMW-11 | Calcium | 79/33% | 1 | 16% | No action - sample result greater than 4x the spike concentration | |
| 137461 | Magnesium | 90/66% | 1 | 58% | No action - sample result greater than 4x the spike concentration | |
| | Sodium | 93/64% | 1 | 46% | No action - sample result greater than 4x the spike concentration | |
| RIMW-18 137456 | Thallium(54-136) | Accep. | | Accep. | | |
| RIMW-10 137458 | Hg(85-115) | Accep. | | Accep. | | |

| <u>LCS/ LSD(90-110)</u> | | |
|-------------------------|----------|------------|
| | | <u>%R</u> |
| 137461 | 6010B | acceptable |
| 137456 | Thallium | acceptable |
| 137458 | Hg | acceptable |

| <u>Blanks</u> | | | <u>Qualifier</u> | <u>Associated Samples</u> |
|---------------|----------------|----------------|------------------|-----------------------------------|
| | <u>Analyte</u> | <u>Results</u> | | |
| 6010B | Nickel | 0.0040mg/L | 0.04U | RIMW-11, RIMW-18, RIMW-10 |
| 137461 | Zinc | 0.0037 | 0.06U | RIMW-11, RIMW-18, RIMW-12, RIMW-9 |
| 137456 | Thallium | non-detect | | |
| 137458 | Hg | non-detect | | |

| <u>ICV/CCV</u> |
|----------------|
| not present |

| <u>ICSA/ICSAB</u> |
|-------------------|
| not present |

| <u>CRI</u> |
|-------------|
| not present |

Do all data in this SDG meet the Data Quality Objectives? Yes
 Comments: _____

Validator: Carrie Madrid Date: 4/17/07
 Reviewer: Cherie Zakowski Date: 10/20/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 239274
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8270C

| | <u>Client ID</u> | <u>Lab ID</u> |
|-----------------|------------------|---------------|
| Samples in SDG: | RIMW-11 | 239274-1 |
| | RIMW-18 | 239274-3 |
| | RIMW-12 | 239274-4 |
| | RIMW-10 | 239274-8 |
| | RIMW-9 | 239274-10 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are waters.

Precision: **Yes No N/A**
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) N/A
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) N/A

Comments (note deviations): _____

Accuracy: **Yes No N/A**
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) Yes
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? Yes
 Trip Blanks/Rinsate Blanks N/A
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? No
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05? No
 Tuning (abundance criteria and 12 hour time frame)? N/A
 Surrogate % Recoveries? Yes
 Internal Standards N/A

Comments (note deviations): MS/MSD - performed on a sample from another SDG 235847-6..
CCV - 8270 CCV standard analyzed at 1356 Di-n-octylphthalate out.

Precision %RPD
 Field Duplicates N/A

Laboratory Duplicate %RPD
N/A

Accuracy
MS/MSD MS/MSD RPD
 137514 MS/MSD from another SDG 235847-6.
 acceptable

LCS/LCSD %R
 137514 acceptable

| | <u>Analyte</u> | <u>Qualifier</u> | <u>Associated Sample/ Qualification</u> |
|---------------|----------------|------------------|-----------------------------------------|
| Blanks | | | |
| 137514 | non-detect | | |

| Rinsate | N/A | Qualifier | | Associated sample |
|-------------------|-------------------|------------|-----------|-------------------|
| Blank | | | | |
| ICV | 12/14/06 | RRF | %RSI | Qualifier |
| | TCL compounds | acceptable | | |
| | 12/15/06 | | | |
| | Benzaldehyde | acceptable | | |
| | 1/22/06 | | | |
| | 8270C | | | |
| | Pentachlorophenol | 35.61% | UJ | All samples |
| CCV | 1/26/07 | RRF | %D | Associated sample |
| | 8270C 1302 | | | |
| | 2,4-Dinitrophenol | 32.80% | UJ | All samples |
| | Pentachlorophenol | 40.80% | UJ | All samples |
| | Benzaldehyde 1343 | acceptable | | |
| | TCL cpds. 1405 | acceptable | | |
| Surr. | | %R | Qualifier | Associated sample |
| | 137514 | acceptable | | |
| Internal Standard | not included | | | |

Representativeness:

| | Yes | No | N/A |
|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------|-----|
| Were sampling procedures and design criteria met? | <u>Yes</u> | | |
| Were holding times met? | <u>Yes</u> | | |
| Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) | <u>Yes</u> | | |
| Were Chain-of-Custody records complete and provided in data package? | <u>Yes</u> | | |
| Were contaminants present in blanks? | | <u>No</u> | |
| Comments (note deviations): | <u>Cooler temperatures 1.0° C, however no action taken based on temperature.</u> | | |

Comparability:

| | Yes | No | N/A |
|--------------------------------------------------------|------------|----|-----|
| Does data compare with similar analysis and data sets? | <u>Yes</u> | | |
| Comments (note deviations): | _____ | | |

Completeness (90%):

| | Yes | No | N/A |
|-----------------------------------|------------|----|-----|
| Are all data in this SDG useable? | <u>Yes</u> | | |
| Comments (note deviations): | _____ | | |

| | |
|-----------------------------------------------------------|------------|
| Do all data in this SDG meet the Data Quality Objectives? | <u>Yes</u> |
| Comments: | _____ |
| | _____ |
| | _____ |

Validator: Carrie Madrid
 Reviewer: Cherie Zakowski

Date: 4/17/07
 Date: 10/20/07

| Blanks | | Results in ug/L | Qualifier | Associated Samples |
|------------|---------------------|-----------------|-------------------------------|-------------------------------------------------------------|
| 137517 | none | non-detect | | |
| 137531 | Chlorobenzene | 0.59ug/L | 10U | MW-106, RIMW-9, MW-101, RIMW-59, MW-100, MW-105, TRIP BLANK |
| | 1,2-Dichlorobenzene | 0.29 | 10U | RIMW-9 |
| | Toluene | 0.21 | 10U | MW-106, RIMW-9, MW-101, RIMW-59, MW-100, MW-105, TRIP BLANK |
| Trip Blank | Trip Blank | | | |
| | Acetone | 1.95ug/L | 10U | MW-106, MW-101, RIMW-59, MW-100, MW-105, |
| | Methylene Chloride | 1.05 ug/L | 10U | RIMW-11, RIMW-18, RIMW-10 |
| | Chlorobenzene | 0.53 | None qual. ND by method blank | |
| | Toluene | 0.19 | None qual. ND by method blank | |

Holding Blank N/A

Rinsate Blank N/A

| ICV | 12/7/06 | RRF | %RSD | Qualifier | Associated sample |
|-----|-------------------------|------------|------|-----------|----------------------------------------------------------------------|
| | 137517 | | | | |
| | Chloroethane | 0.04 | | J R | RIMW-11, RIMW-10 MW-102, RIMW-18, RIMW-12, MW-108, W-2, MW-107 |
| | 1/12/07 | | | | |
| | 137531 | acceptable | | | |
| | 11/29/2006 Extra inst A | | | | |
| | Methyl Acetate | 0.035 | | R | RIMW-11, MW-102, RIMW-18, RIMW-12, MW-108, W-2, MW-107, RIMW-10 |
| | 1/11/2007 Extra inst C | | | | |
| | | acceptable | | | |

| CCV | 1/25/2007 1241 | RRF | %RSD | Qualifier | Associated sample |
|-----|-----------------------------|------------|--------|-----------|--------------------------------------------------------------------|
| | Chloroethane | 0.035 | | R | Qual. due to ICV, no further action |
| | 1/26/2007 1444 | | | | |
| | Chloroethane | 0.039 | | R | Qual. due to ICV, no further action |
| | 1/25/2007 1245 | | | | |
| | Bromomethane | | 37.80% | UJ | MW-106, RIMW-9, MW-101, RIMW-59, MW-100, MW-105, Trip Blank |
| | 1/29/2007 Extra 1159 A23051 | | | | |
| | Cyclohexane | | 28.58% | UJ | RIMW-11, MW-102, RIMW-18, RIMW-12, MW-108, W-2, MW-107, RIMW-10 |
| | Methyl Cyclohexane | | 35.94% | UJ | RIMW-11, MW-102, RIMW-18, RIMW-12, MW-108, W-2, MW-107, RIMW-10 |
| | 1/25/2007 Extra 1206 C32966 | | | | |
| | | acceptable | | | |

| Surr. | %R (70-130) acceptable | Qualifier | Associated sample |
|--------------------------|------------------------------|-----------|-------------------|
| Internal Standard | not included | | |

Representativeness:

| | |
|----------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Were sampling procedures and design criteria met? | <u>Yes</u> No N/A |
| Were holding times met? | <u>Yes</u> |
| Were preservation criteria met? (4° C ± 2° C) | <u>Yes</u> |
| Were Chain-of-Custody records complete and provided in data package? | <u>Yes</u> |
| Were contaminants present in blanks? | <u>Yes</u> |
| Comments (note deviations): | <u>Cooler temperatures 1.0° C, however no action taken based on temperature.</u> |

Comparability:

| | |
|--------------------------------------------------------|---------------------------------|
| Does data compare with similar analysis and data sets? | <u>Yes</u> No N/A |
| Comments (note deviations): | |

Completeness (90%):

| | |
|-----------------------------------|---------------------------------|
| Are all data in this SDG useable? | <u>Yes</u> No N/A |
| Comments (note deviations): | |

Do all data in this SDG meet the Data Quality Objectives? Yes

Comments: Continuing Calibration reports were not included with the extra standards, therefore only %D was evaluated.
Extra analytes are cyclohexane, methylcyclohexane, and methyl acetate.

| | | | |
|------------|------------------------|-------|-----------------|
| Validator: | <u>Carrie Madrid</u> | Date: | <u>4/17/07</u> |
| Reviewer: | <u>Cherie Zakowski</u> | Date: | <u>10/20/07</u> |

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 239341
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 6010B/ 415.1/ %Moist.

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|--------------|-----------|--------------|-----------|
| | RIP2-3 | 239341-12 | RISB-65-510 | 239341-32 |
| | RISB-64-05 | 239341-26 | RISB-65-1015 | 239341-33 |
| | RISB-64-510 | 239341-27 | RISB-65-1520 | 239341-34 |
| | RISB-64-1015 | 239341-28 | RISB-66-05 | 239341-35 |
| | RITW-64 | 239341-29 | RISB-66-59 | 239341-36 |
| | RITW-65 | 239341-30 | RISB-67-05 | 239341-37 |
| | RISB-65-05 | 239341-31 | RISB-67-510 | 239341-38 |
| | MW-115A | 239341-1 | | |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils and a water.

Precision:

| | Yes | No | N/A |
|-------------------------------------------------------------------------------------------------|-----|----|-----|
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20%, 35% for soils) | | | N/A |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%, 35% for soils) | Yes | | |

Comments (note deviations): Sample Duplicates - See below.

Accuracy:

| | Yes | No | N/A |
|---------------------------------------------------------------------------------------------------|-----|-----|-----|
| Serial Dilutions ± 10% | | | N/A |
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | | No | |
| Post Digestion Spike criteria met (if applicable)? | | No | |
| Laboratory Control Sample criteria met? | Yes | | |
| Laboratory Control Sample Duplicate? (± 25%) | | N/A | |
| Laboratory Blanks criteria met (within control limits)? | | No | |
| ICV/CCV % Recoveries within 90-110%? | | N/A | |
| ICSA/ICSAB % Recoveries acceptable? | | N/A | |
| CRI % | | N/A | |

Comments (note deviations): Matrix Spike - See below.

Representativeness:

| | Yes | No | N/A |
|----------------------------------------------------------------------|-----|----|-----|
| Were sampling procedures and design criteria met? | Yes | | |
| Were holding times met? | Yes | | |
| Were preservation criteria met? (4° C ± 2° C) | Yes | | |
| Were Chain-of-Custody records complete and provided in data package? | Yes | | |
| Were contaminants present in blanks? | Yes | | |

Comments (note deviations): Sample cooler was received at 2.0 ° C.

Comparability:

| | Yes | No | N/A |
|--------------------------------------------------------|-----|----|-----|
| Does data compare with similar analysis and data sets? | Yes | | |

Comments (note deviations): _____

Completeness (90%):

| | Yes | No | N/A |
|-----------------------------------|-----|----|-----|
| Are all data in this SDG useable? | Yes | | |

Comments (note deviations): _____

Precision
 Field Duplicate
 N/A

Laboratory Duplicate
6010B/137466 acceptable
TI /137468 acceptable
Hg/137469 acceptable
415.1/137602 acceptable

Accuracy
 Serial Dilution
 N/A

| MS/MSD | Analyte | MS/MSD %R | RPD | Post %R | Qualifier | Associated Samples |
|---------------|-----------------------|----------------------|------------|----------------|-------------------------------------------------------------------|---------------------------|
| 6010B | (76-124) | | | | | |
| 137466 | Diff. SDG 239396-14 | | | | | |
| | Calcium | 29/189% | 4% | 14% | No action - sample result greater than 4x the spike concentration | |
| | Magnesium | 54/141% | 4% | 44% | No action - sample result greater than 4x the spike concentration | |
| | Sodium | 47/128% | 4% | 50% | No action - sample result greater than 4x the spike concentration | |
| 137468 | TI RIP2-3 | acceptable | | | | |
| 137469 | Hg Diff. SDG 239391-1 | acceptable | | | | |
| 415.1 | | | | | | |
| 137602 | Diff. SDG 239396-1 | acceptable | | | | |

LCS/ LSD(90-110)

6010B/137466 acceptable
TI /137468 acceptable
Hg/137469 acceptable
415.1/137602 acceptable

Blanks

| Analyte | Results | Qualifier | Associated Samples |
|----------------|----------------|------------------|-----------------------------------------------------------|
| 6010B | | | |
| 137466 | Aluminum | 0.012 mg/L | No action - sample result greater than blank action level |
| | Nickel | 0.0040mg/L | .02U RIP2-3 |
| 7841 TI | | | |
| 137468 | Thallium | 0.0007mg/L | .025U RIP2-3 |
| %Moist. | | | |
| 137586 | non-detect | | |
| 415.1 | | | |
| 137602 | non-detect | | |

ICV/CCV
 not present

ICSA/ICSAB
 not present

CRI
 not present

Do all data in this SDG meet the Data Quality Objectives? Yes
 Comments: Method 415.1 is listed as Dissolved Organic Carbon. This should be Total Organic Carbon

Validator: Carrie Madrid Date: 4/22/07
 Reviewer: Cherie Zakowski Date: 10/20/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 239341
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8270C

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|--------------|-----------|--------------|-----------|
| | RIP2-3 | 239341-12 | RISB-65-05 | 239341-31 |
| | RISB-64-05 | 239341-26 | RISB-65-510 | 239341-32 |
| | RISB-64-510 | 239341-27 | RISB-65-1015 | 239341-33 |
| | RISB-64-1015 | 239341-28 | | |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils and a water.

Precision: **Yes No N/A**
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) N/A
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) N/A

Comments (note deviations): _____

Accuracy: **Yes No N/A**
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) No
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? Yes
 Trip Blanks/Rinsate Blanks N/A
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? Yes
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05? Yes
 Tuning (abundance criteria and 12 hour time frame)? N/A
 Surrogate % Recoveries? Yes
 Internal Standards N/A

Comments (note deviations): **MS/MSD - Matrix spike analyzed on a sample from another SDG.**
Calibrations - See Below.

Precision **%RPD**
 Field Duplicates N/A

Laboratory Duplicate N/A

Accuracy

| MS/MSD | MS/MSD | RPD |
|------------------------------------------------------------|----------|------|
| 137579Aq Diff. SDG 239334-16 Pentachlorophenol | 147/154% | 4% |
| 137592 Diff. SDG 239340-1 2,4-Dinitrotoluene (28-95) | 265/275% | 4% |
| 4-Chloro-3-methyl- phenol (15-123) | 125/125% | 0% |
| N-Nitrosodipropyl- amine (14-104)(53) | 19/115% | 143% |

No action taken based solely on MS/MSD data.

| LCS/LCSD | %R |
|----------|------------|
| 137579Aq | acceptable |
| 137592 | acceptable |

| | Analyte | Qualifier | Associated Sample/ Qualification |
|--------------------------------------|--------------|------------------|----------------------------------|
| Blanks | | | |
| 137579Aq | non-detect | | |
| 137592 | non-detect | | |
| <hr/> | | | |
| Rinsate Blank | N/A | <u>Qualifier</u> | <u>Associated sample</u> |
| <hr/> | | | |
| ICV | <u>RRF</u> | <u>%RSI</u> | <u>Qualifier</u> |
| 1/30/07 | | | |
| 8270C | acceptable | | |
| 1/31/07 | | | |
| TCL/Benzaldehyde | acceptable | | |
| <hr/> | | | |
| CCV | <u>RRF</u> | <u>%C</u> | <u>Qualifier</u> |
| 1/30/07 | | | |
| 8270C/Benzaldehyde/ TCL compounds | acceptable | | |
| <hr/> | | | |
| Surr. | <u>%R</u> | <u>Qualifier</u> | <u>Associated sample</u> |
| 137579Aq | accpetable | | |
| 137592 | accpetable | | |
| <hr/> | | | |
| Internal Standard | not included | | |

Representativeness:

| | Yes | No | N/A |
|----------------------------------------------------------------------|------------------------------------|-----------|-----|
| Were sampling procedures and design criteria met? | <u>Yes</u> | | |
| Were holding times met? | <u>Yes</u> | | |
| Were preservation criteria met? ($4^{\circ}C \pm 2^{\circ}C$) | <u>Yes</u> | | |
| Were Chain-of-Custody records complete and provided in data package? | <u>Yes</u> | | |
| Were contaminants present in blanks? | | <u>No</u> | |
| Comments (note deviations): | <u>Cooler temperatures 2.0° C.</u> | | |

Comparability:

| | Yes | No | N/A |
|--------------------------------------------------------|------------|----|-----|
| Does data compare with similar analysis and data sets? | <u>Yes</u> | | |
| Comments (note deviations): | <hr/> | | |

Completeness (90%):

| | Yes | No | N/A |
|-----------------------------------|------------|----|-----|
| Are all data in this SDG useable? | <u>Yes</u> | | |
| Comments (note deviations): | <hr/> | | |

| | |
|-----------------------------------------------------------|-------------------|
| Do all data in this SDG meet the Data Quality Objectives? | <u>Yes</u> |
| Comments: | <hr/> <hr/> <hr/> |

Validator: Carrie Madrid Date: 4/22/02
 Reviewer: Cherie Zakowski Date: 10/20/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 239341
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8260B

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|-----------|-----------|---------------|-----------|
| | MW-115A | 239341-1 | P-2 | 239341-21 |
| | MW-115B | 239341-2 | RIP2-53 | 239341-22 |
| | OB-900 | 239341-3 | MW-118 | 239341-23 |
| | OB-23 | 239341-4 | MW-111 | 239341-24 |
| | OB-901 | 239341-5 | Trip Blank #1 | 239341-25 |
| | OB-902 | 239341-6 | RISB-64-05 | 239341-26 |
| | MW-104 | 239341-7 | RISB-64-510 | 239341-27 |
| | MW-116 | 239341-8 | RISB-64-1015 | 239341-28 |
| | MW-119 | 239341-9 | RITW-64 | 239341-29 |
| | MW-113A | 239341-10 | RITW-65 | 239341-30 |
| | MW-113B | 239341-11 | RISB-65-05 | 239341-31 |
| | RIP2-3 | 239341-12 | RISB-65-510 | 239341-32 |
| | MW-114 | 239341-13 | RISB-65-1015 | 239341-33 |
| | MW-112 | 239341-14 | RISB-65-1520 | 239341-34 |
| | OB-22 | 239341-15 | RISB-66-05 | 239341-35 |
| | OB-21 | 239341-16 | RISB-66-59 | 239341-36 |
| | PW-2A | 239341-17 | RISB-67-05 | 239341-37 |
| | OB-13 | 239341-18 | RISB-67-510 | 239341-38 |
| | OB-12 | 239341-19 | Trip Blank #2 | 239341-39 |
| | OB-11 | 239341-20 | | |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are soils and waters.

Precision: Yes No N/A
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) No
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) N/A

Comments (note deviations): Field Duplicates - RIP2-3/RIP2-53 are field duplicates.

Accuracy: Yes No N/A
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) No
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? No
 Trip Blanks/Rinsate Blanks Yes
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? No
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05? No
 Tuning (abundance criteria and 12 hour time frame)? N/A
 Surrogate % Recoveries? No
 Internal Standards N/A

Comments (note deviations): Matrix Spike - See below.

| <u>Precision</u> | <u>%RPD</u> |
|------------------------------------|-------------|
| Field Duplicates | |
| RIP2-3/RIP2-53 | |
| 1,2-Dichlorobenzene | 36.78% |
| trans-1,2-Dichloroethene | 20.34% |
| 1,1,2-Trichloroethane | 54.17% |
| No action on field duplicate data. | |

Laboratory Duplicate %RPD
 N/A

| <u>Accuracy</u> | <u>MS/MSD</u> | <u>RPD</u> |
|----------------------------------------------|------------------------|-------------|
| | | (70-130) |
| 137581 | Diff. Sample 239341-38 | acceptable |
| 137592 | Diff. SDG 239340-1 | acceptable |
| 137594Aq | MW-115A | acceptable |
| 137673Aq | MW-114 | |
| | Chloromethane | 60/59% 2% |
| | Chloroethane | 72/69% 4% |
| 137739 | OB-13 | |
| | Chloroethane | 440/435% 1% |
| No action taken based solely on MS/MSD data. | | |

| LCS/ LCSD | <u>%R</u> (70-130) |
|--------------|-----------------------|
| 137581 | acceptable |
| 137592 | acceptable |
| 137594Aq | acceptable |
| 137673Aq | acceptable |
| 137739 | acceptable |

| Blanks | | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|----------|------------|------------------------|------------------|-------------------------------------------------------------------------------------------|
| 137581 | non-detect | | | |
| 137592 | non-detect | | | |
| 137594Aq | Toluene | 0.11 ug/L J2 | 10U | MW-115A, MW-115B, OB-900, OB-23, OB-901, OB-902, MW-104, MW-116, MW-119, MW-113A, MW-113B |
| 137673Aq | non-detect | | | |
| 137739 | non-detect | | | |

| Trip Blank | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|------------|------------------------|------------------|---------------------------|
| Trip Blank | non-detect | | |

Holding Blank N/A

| Rinsate Blank | <u>Qualifier</u> | <u>Associated sample</u> |
|---------------|------------------|--------------------------|
| N/A | | |

| ICV batch | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|--------------------------|------------|-------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| 12/7/2006 A files | | | | |
| 137581 Chloroethane | 0.04 | | R | RISB-64-05, RISB-64-510, RISB-64-1015, RISB-65-05, RISB-65-510, RISB-65-1015, RISB-66-59, RISB-67-05, RISB-67-510 |
| | | | J | RISB-65-1520, RISB-66-05 |
| 1/12/2007 B files | | | | |
| 137594 | acceptable | | | |
| 1/12/2007 C files | | | | |
| 137594 | acceptable | | | |
| 11/29/2006 A files Extra | | | | |
| 137581 Methyl Acetate | 0.035 | | R | RISB-64-05, RISB-64-510, RISB-64-1015, RISB-65-05, RISB-65-510, RISB-65-1015, RISB-65-1520, RISB-66-05, RISB-66-59, RISB-67-05, RISB-67-510 |
| 137673/ 137739 | | | | RIP2-3, MW-114, MW-112, OB-22, OB-21, PW-2A, OB-12, OB-11, P-2, RIP2-53, MW-118, OB-13, MW-111, Trip Blank 1, RITW-64, RITW-65, Trip Blank 2 |
| 1/4/2007 B files Extra | | | | |
| 137594 | acceptable | | | |

| CCV | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|--------------------------------|------------|-------------|------------------|------------------------------------------------------------------------------|
| 1/26/2007 1423 A23089 | | | | |
| 137581 Chloroethane | 0.034 | | | Already qual. due to ICV |
| 1/26/2007 1444 A23090 | | | | |
| Chloroethane | 0.039 | | | Already qual. due to ICV |
| 1/29/2007 1016 A23149 | | | | |
| Dichlorodifluoromethane | | 35.20% | | No action these analytes not reported from this run. |
| Chloromethane | | 26.50% | | |
| Chloroethane | 0.031 | 35.4% | | |
| Bromomethane | 0.047 | | | |
| 1/29/2007 1037 A23150 | | | | |
| Dichlorodifluoromethane | | 36.50% | | Not used |
| Chloroethane | 0.033 | | | |
| 1/30/2007 0935 A23191 | | | | |
| 137673/ 137739 Bromomethane | 0.049 | | R | RIP2-3, MW-114, MW-112, RIP2-53, Trip Blank 1, RITW-64, RIT-65, Trip Blank 2 |
| Chloroethane | 0.033 | | J | RIP2-3, RIP2-53, RITW-65 |
| | | | R | MW-114, MW-112, Trip Blank 1, RITW-64, Trip Blank 2 |
| 1/30/2007 2217 A23227 | | | | |
| Bromomethane | 0.049 | | R | OB-22, OB-21, PW-2A, |
| Chloroethane | 0.033 | 25.8% | R | OB-22, OB-21, PW-2A, |

| | | | | | |
|----------------|------------------------------|-------|--------|---------|-------------------------------------------------------------------------------------------|
| | 1/31/2007 1401 A23248 | | | | |
| | Bromomethane | 0.049 | | R | P-2, OB-11, OB-12, RIP2-3, MW-118, MW-111 |
| | Chloroethane | 0.031 | 28.9% | J R | P-2, RIP2-3, OB-11, OB-12, MW-118, MW-111 |
| | 1/31/2007 1401 A23248 | | | | |
| | Chloroethane | 0.028 | | | |
| | 2/1/2007 1117 A23289 | | | | Not used |
| | Bromomethane | 0.045 | | | |
| | Chloroethane | 0.031 | 29.5% | | |
| | 2/1/2007 1138 A23290 | | | | Not used |
| | Bromomethane | 0.047 | | | |
| | Chloroethane | 0.028 | | | |
| | 2/2/2007 1111 A23320 | | | | Not used |
| | Bromomethane | 0.045 | | | |
| | Chloroethane | 0.030 | 32.7% | | |
| 137594 | 1/29/2007 1259 B31004 | | | | |
| | Acetone | | 68.50% | J UJ | OB-901, OB-900, MW-115A, MW-115B, OB-902, MW-104, MW-119, MW-113A, MW-113B, OB-23, MW-116 |
| | 2-Butanone | | 41.10% | J UJ | OB-901, MW-115A, MW-115B, OB-902, MW-104, MW-119, MW-113A, MW-113B, OB-900, OB-23, MW-116 |
| | 1/30/2007 1017 B31049 | | | | Not used |
| | Bromomethane | | 31.00% | | |
| | Acetone | | 88.50% | | |
| | 2-Butanone | | 60.70% | | |
| | 2-Hexanone | | 41.90% | | |
| | 1/30/2007 0958 C33093 | | | | Not used |
| | Bromomethane | | 33.30% | | |
| 137581 | 1/26/2007 1340 A23087 | | | | Not used |
| | Methyl Acetate | | 29.18% | | |
| | 1/26/2007 1401 A23088 | | | | Not used |
| | Methyl Acetate | | 28.02% | | |
| | 1/29/2007 0933 A23147 | | | | Not used |
| | Methyl Acetate | | 32.46% | | |
| | 1/29/2007 0955 A23148 | | | | Not used |
| | Methyl Acetate | | 32.00% | | |
| 137673/ | 1/30/2007 0853 A23189 | | | | Not used |
| 137739 | Methyl Acetate | | 37.04% | | |
| | 1/30/2007 2135 A23225 | | | | Not used |
| | Methyl Cyclohexane | | 27.16% | J | OB-22, OB-21, PW-2A |
| | 1/31/2007 1236 A23246 | | | | Not used |
| | Methyl Acetate | | 27.22% | | |
| | 2/1/2007 1034 A23287 | | | | Not used |
| | Methyl Acetate | | 26.08% | | |
| 137594 | 1/29/2007 1137 B31000 | | | | acceptable |

| <u>Surr.</u> | <u>%R</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|--------------|-----------------|------------------|----------------------------------------------------|
| | (70-130) | | |
| 137581 | acceptable | | |
| 137592 | acceptable | | |
| 137594Aq | 150% | J | Acetone only, all other analytes from another run. |
| 137673Aq | 165% | J | P-2 - positive results qualified J |
| | 239% | | |
| 137739 | acceptable | | |

Representativeness:

| | Yes | No | N/A |
|-------------------------------------------------------------------------------|------------------------------------|-----------|-----|
| Were sampling procedures and design criteria met? | <u>Yes</u> | | |
| Were holding times met? | <u>Yes</u> | | |
| Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) | <u>Yes</u> | | |
| Were Chain-of-Custody records complete and provided in data package? | <u>Yes</u> | | |
| Were contaminants present in blanks? | | <u>No</u> | |
| Comments (note deviations): | <u>Cooler temperatures 2.0° C.</u> | | |

Comparability:

| | Yes | No | N/A |
|--------------------------------------------------------|------------|----|-----|
| Does data compare with similar analysis and data sets? | <u>Yes</u> | | |
| Comments (note deviations): | <u></u> | | |

Completeness (90%):

| | Yes | No | N/A |
|-----------------------------------|------------|----|-----|
| Are all data in this SDG useable? | <u>Yes</u> | | |
| Comments (note deviations): | <u></u> | | |

Do all data in this SDG meet the Data Quality Objectives? Yes

Comments: Continuing Calibration reports were not included with the extra standards, therefore only %D was evaluated.
Extra analytes are cyclohexane, methylcyclohexane, and methyl acetate.

Validator: Carrie Madrid
Reviewer: Cherie Zakowski

Date: 4/21/07
Date: 10/20/07

PSC
Data Evaluation Worksheet

Sample Delivery Group (SDG) Number: 239396
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 6010B/7470/%Moist

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|-----------|-----------|-----------|-----------|
| | RIMW-6 | 239396-13 | RIMW-15 | 239396-16 |
| | RIMW-7 | 239396-14 | RIMW-515 | 239396-17 |
| | RIMW-13 | 239396-15 | RIMW-16 | 239396-18 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are waters.

Precision:

| | Yes | No | N/A |
|----------------------------------------------------------------------------------------|-----|----|-----|
| Field Duplicates RPD criteria met? (frequency 10% and control limits $\pm 20\%$) | | | N/A |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits $\pm 20\%$) | | | Yes |

Comments (note deviations): **Field Duplicates** - Samples RIMW-15/RIMW-515 are field duplicates.
Sample Duplicates - See below.

Accuracy:

| | Yes | No | N/A |
|---------------------------------------------------------------------------------------------------|-----|----|-----|
| Serial Dilutions $\pm 10\%$ | | | N/A |
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | | | No |
| Post Digestion Spike criteria met (if applicable)? | | | No |
| Laboratory Control Sample criteria met? | | | Yes |
| Laboratory Control Sample Duplicate? ($\pm 25\%$) | | | N/A |
| Laboratory Blanks criteria met (within control limits)? | | | No |
| ICV/CCV % Recoveries within 90-110%? | | | N/A |
| ICSA/ICSAB % Recoveries acceptable? | | | N/A |
| CRI % | | | N/A |

Comments (note deviations): **Matrix Spike** - See below.

Representativeness:

| | Yes | No | N/A |
|----------------------------------------------------------------------|-----|----|-----|
| Were sampling procedures and design criteria met? | | | Yes |
| Were holding times met? | | | Yes |
| Were preservation criteria met? ($4^{\circ}C \pm 2^{\circ}C$) | | | No |
| Were Chain-of-Custody records complete and provided in data package? | | | Yes |
| Were contaminants present in blanks? | | | Yes |

Comments (note deviations): Sample cooler was received at $1.0^{\circ}C$, however no action taken based on temperature.

Comparability:

| | Yes | No | N/A |
|--------------------------------------------------------|-----|----|-----|
| Does data compare with similar analysis and data sets? | | | Yes |

Comments (note deviations): _____

Completeness (90%):

| | Yes | No | N/A |
|-----------------------------------|-----|----|-----|
| Are all data in this SDG useable? | | | Yes |

Comments (note deviations): _____

| Precision | <u>%RPD</u> |
|------------------|------------------------------------------|
| Field Duplicate | |
| RIMW-15/RIMW-515 | |
| Beryllium | 28.57% |
| | No action taken on field duplicate data. |

| Laboratory Duplicate | | <u>%RPD</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|----------------------|--------------------|-------------|------------------|---------------------------|
| 6010B | | | | |
| 137466 | RIMW-13 | acceptable | | |
| Hg | | | | |
| 128636 | diff. SDG 239391-2 | acceptable | | |
| TI | | | | |
| 137468 | RIMW-6 | acceptable | | |

Accuracy

| <u>Serial Dilution</u> | <u>%RPD</u> |
|------------------------|-------------|
| | N/A |

| <u>MS/MSD</u> | <u>Analyte</u> | <u>MS/MSD %R</u> | <u>RPD</u> | <u>Post %R</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|---------------|---------------------|------------------|------------|----------------|-------------------------------------------------------------------|---------------------------|
| 6010B | (76-124) | | | | | |
| 137466 | RIMW-7 | | | | | |
| | Calcium | 29/189% | 4 | 14% | No Action - sample result greater than 4x the spike concentration | |
| | Magnesium | 54/141% | 4 | 44% | No Action - sample result greater than 4x the spike concentration | |
| | Sodium | 47/128% | 4 | 50% | No Action - sample result greater than 4x the spike concentration | |
| | Thallium | 77/71% | 8 | 81% | J | RIMW-6, RIMW-7, RIMW-515 |
| | | | | | UJ | RIMW-13, RIMW-15, RIMW-16 |
| Hg | | | | | | |
| 137469 | diff. SDG 239391-1 | acceptable | | | | |
| TI | | | | | | |
| 137468 | diff. SDG 239341-12 | acceptable | | | | |

LCS/ LSD(90-110)

| | | <u>%R</u> |
|--------|----------|------------|
| 137466 | 6010B | acceptable |
| 137468 | Thallium | acceptable |
| 137469 | Hg | acceptable |

Blanks

| | <u>Analyte</u> | <u>Results</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|--------|----------------|----------------|------------------|---------------------------|
| 6010B | | | | |
| 137466 | Aluminum | 0.0120mg/L | 0.2U | All samples |
| | Nickel | 0.004 | 0.2U | RIMW-6 |
| TI | Thallium | 0.007 | 0.2U | RIMW-6, RIMW-7, RIMW-515 |
| 137468 | | | | |
| Hg | | | | |
| 137469 | non-detect | | | |

ICV/CCV

not present

ICSA/ICSAB

not present

CRI

not present

Do all data in this SDG meet the Data Quality Objectives?

Yes

Comments:

Validator:

Carrie Madrid

Date:

4/20/07

Reviewer:

Cherie Zakowski

Date:

10/20/07

| Rinsate | N/A | <u>Qualifier</u> | | <u>Associated sample</u> |
|-------------------|------------------------------------------------------|------------------|------------------|--------------------------------------------------------------------------|
| Blank | | | | |
| | | <u>RRF</u> | <u>%RSI</u> | <u>Qualifier</u> |
| ICV | 1/30/07 8270/Benzaldehyde/ TCL ICV's | acceptable | | <u>Associated sample</u> |
| | | <u>RRF</u> | <u>%C</u> | <u>Qualifier</u> |
| CCV | 1/30/07 8270/Benzaldehyde/ TCL CCV's | acceptable | | <u>Associated sample</u> |
| | | <u>%R</u> | <u>Qualifier</u> | <u>Associated sample</u> |
| Surr. | RIMW-13 | | | |
| 129580 | Nitrobenzene(24-119) 2-Fluorobiphenyl (39-130) | 156% 178% | J J | RIMW-13 Bis(2-ethylhexyl)phthalate RIMW-13 Bis(2-ethylhexyl)phthalate |
| Internal Standard | not included | | | |

Representativeness:

| | Yes | No | N/A |
|----------------------------------------------------------------------|----------------------------------------------------------------------------|-----------|-----|
| Were sampling procedures and design criteria met? | <u>Yes</u> | | |
| Were holding times met? | <u>Yes</u> | | |
| Were preservation criteria met? ($4^{\circ}C \pm 2^{\circ}C$) | | <u>No</u> | |
| Were Chain-of-Custody records complete and provided in data package? | <u>Yes</u> | | |
| Were contaminants present in blanks? | | <u>No</u> | |
| Comments (note deviations): | <u>Cooler temperatures 1.0° C, however no action based on temperature.</u> | | |

Comparability:

| | Yes | No | N/A |
|--------------------------------------------------------|------------|----|-----|
| Does data compare with similar analysis and data sets? | <u>Yes</u> | | |
| Comments (note deviations): | _____ | | |

Completeness (90%):

| | Yes | No | N/A |
|-----------------------------------|------------|----|-----|
| Are all data in this SDG useable? | <u>Yes</u> | | |
| Comments (note deviations): | _____ | | |

| | Yes |
|-----------------------------------------------------------|------------|
| Do all data in this SDG meet the Data Quality Objectives? | <u>Yes</u> |
| Comments: | _____ |
| | _____ |
| | _____ |

Validator: Carrie Madrid Date: 4/20/07
 Reviewer: Cherie Zakowski Date: 10/20/07

PSC
Data Evaluation Worksheet

Sample Delivery Group (SDG) Number: 239396
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 415.1

| | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|-----------|-----------|-----------|-----------|
| Samples in SDG: | W-1 | 239396-7 | RIMW-15 | 239396-16 |
| | RIMW-6 | 239396-13 | RIPZ-1 | 239396-19 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are waters.

Precision:

| | Yes | No | N/A |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-----|-----|
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20%) | | No | |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) | | Yes | |
| Comments (note deviations): | Laboratory Duplicate - Dup. analysis performed on a sample from a different SDG 239401-3 all %RPD within limits. | | |

Accuracy:

| | Yes | No | N/A |
|---------------------------------------------------------------------------------------------------|----------------------------------------------------|-----|-----|
| Serial Dilutions ± 10% | | | N/A |
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | | Yes | |
| Post Digestion Spike criteria met (if applicable)? | | | N/A |
| Laboratory Control Sample criteria met? | | | N/A |
| Laboratory Control Sample Duplicate? (± 25%) | | | N/A |
| Laboratory Blanks criteria met (within control limits)? | | Yes | |
| ICV/CCV % Recoveries within 90-110%? | | | N/A |
| ICSA/ICSAB % Recoveries acceptable? | | | N/A |
| CRI % | | | N/A |
| Comments (note deviations): | Matrix Spike - performed on sample RIMW-15. | | |

Representativeness:

| | Yes | No | N/A |
|----------------------------------------------------------------------|-----|-----|-----|
| Were sampling procedures and design criteria met? | | Yes | |
| Were holding times met? | | Yes | |
| Were preservation criteria met? (4° C ± 2° C) | | No | |
| Were Chain-of-Custody records complete and provided in data package? | | Yes | |
| Were contaminants present in blanks? | | Yes | |

Comments (note deviations): Sample cooler was received at 1.0 ° C, however no action taken based on temperature.

Comparability:

Does data compare with similar analysis and data sets?

Yes No N/AYes

Comments (note deviations): _____

Completeness (90%):

Are all data in this SDG useable?

Yes No N/AYes

Comments (note deviations): _____

Precision

Field Duplicate

N/A

Laboratory Duplicate%RPDQualifier

415.1

137602

RIMW-15

acceptable

diff. SDG 239401-3

acceptable

AccuracySerial Dilution%RPD

N/A

MS/MSDAnalyteMS/MSD %F RPDPost %RQualifierAssociated Samples

415.1

RIMW-15

acceptable

LCS/ LSD(80-110)%R

N/A

BlanksAnalyteResultsQualifierAssociated Samples

415.1

non-detect

ICV/CCV

not present

ICSA/ICSAB

not present

CRI

not present

Do all data in this SDG meet the Data Quality Objectives?

Yes

Comments:

On the form 1's the analysis is listed as dissolved organic carbon. Should really be total organic carbon.

Validator:

Carrie Madrid

Date:

4/20/07

Reviewer:

Cherie Zakowski

Date:

10/20/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 239396
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8260B

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|-----------|----------|-----------|-----------|
| | BP-1A | 239396-1 | MW-121B | 239396-10 |
| | BP-1B | 239396-2 | MW-122B | 239396-11 |
| | MW-103 | 239396-3 | EW-1 | 239396-12 |
| | MW-117 | 239396-4 | RIMW-6 | 239396-13 |
| | MW-1175 | 239396-5 | RIMW-7 | 239396-14 |
| | MW-120A | 239396-6 | RIMW-13 | 239396-15 |
| | W-1 | 239396-7 | RIMW-15 | 239396-16 |
| | W-4 | 239396-8 | RIMW-515 | 239396-17 |
| | MW-120B | 239396-9 | RIMW-16 | 239396-18 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are waters.

Precision: **Yes No N/A**
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) No
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) N/A

Comments (note deviations): **Field Duplicate** - Samples RIMW-1:12-14/RIMW-51:12-14 are field duplicates.

Accuracy: **Yes No N/A**
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) No
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? No
 Trip Blanks/Rinsate Blanks N/A
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? Yes
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05? No
 Tuning (abundance criteria and 12 hr time frame)? N/A
 Surrogate % Recoveries? Yes
 Internal Standards N/A

Comments (note deviations): **MS/MSD** - Samples MW-122B(137667) and MW-103(137668) were spiked.
Trip Blank - A trip blank was listed on the chain of custody but was not present in the cooler.

| Precision | %RPD |
|------------------------------------------|-------------|
| Field Duplicates | |
| MW-117/MW1175 | |
| 1,2-Dichlorobenzene | 41.67% |
| Toluene | 27.03% |
| RIMW-15/RIMW-515 | |
| Tetrachloroethene | 21.38% |
| No action taken on field duplicate data. | |
| Laboratory Duplicate | N/A |

| Accuracy | MS/MSD | RPD |
|----------------------------------------------|-----------------------|------------|
| | (70-130) | |
| MS/MSD | | |
| 137667 | MW-122B | acceptable |
| | 1,1,2-Trichloroethane | 67/72% 7% |
| 137668 | MW-103 | |
| | Chloromethane | 68/71% 4% |
| No action taken based solely on MS/MSD data. | | |

| | %R |
|----------------------|------------|
| | (70-130) |
| LCS/ LCSD | |
| 137667 | acceptable |
| 137668 | acceptable |

| | | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|---------------|---------|------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Blanks | | | | |
| 137667 | Toluene | 0.13ug/L | 10U | All samples except for MW-120A, W-1, MW-120B, MW-121B, RIMW-6, All samples except for MW-120A, W-1, MW-120B, MW-121B, RIMW-6, |
| 137668 | Toluene | 0.13ug/L | 10U | |

| <u>Trip Blank</u> | <u>Results in ug/L</u> | <u>Qualifier</u> | <u>Associated Samples</u> |
|-------------------|------------------------|------------------|---------------------------|
| N/A | | | |

Holding Blank N/A

| <u>Rinsate Blank</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|----------------------|------------------|--------------------------|
| N/A | | |

| <u>ICV</u> | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> |
|------------|----------------------|-------------|------------------|
| PT1 | 1/4/07 Extra 1 | acceptable | |
| PT2 | 1/4/07 Extra 2 | acceptable | |
| PT1 | 1/12/07 8260 B files | acceptable | |
| PT2 | 1/12/07 8260 B files | acceptable | |

| <u>CCV</u> | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|------------|-----------------------------|-------------|------------------|---------------------------------------|
| PT1 | 1/30/07 Extra 1 0854 B31045 | acceptable | | |
| PT2 | 1/30/07 Extra 2 0915 B31046 | acceptable | | |
| PT1 | 1/30/07 0956 B31048 8260 | acceptable | | |
| | 1/30/07 1017 B31049 8260 | | | |
| | Acetone | 88.50% | UJ | All samples except RIMW-6 and RIMW-16 |
| | | | J | |
| | Bromomethane | 31.00% | UJ | All samples |
| | 2-Butanone | 48.40% | UJ | All samples |
| | 2-Hexanone | 41.90% | UJ | All samples |

| <u>Surr.</u> | <u>%R (70-130)</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|--------------|--------------------|------------------|--------------------------|
| 137667 | acceptable | | |
| 137668 | acceptable | | |

Internal Standard not included

Representativeness:

| | |
|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Were sampling procedures and design criteria met? | <u>Yes No N/A</u> |
| Were holding times met? | <u>Yes</u> |
| Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) | <u>No</u> |
| Were Chain-of-Custody records complete and provided in data package? | <u>Yes</u> |
| Were contaminants present in blanks? | <u>No</u> |
| Comments (note deviations): | <u>Cooler temperatures 1.0° C, however no action taken based on temperature.</u> |

Comparability:

| | |
|--------------------------------------------------------|-------------------|
| Does data compare with similar analysis and data sets? | <u>Yes No N/A</u> |
| Comments (note deviations): | <u>Yes</u> |

Completeness (90%):

| | |
|-----------------------------------|-------------------|
| Are all data in this SDG useable? | <u>Yes No N/A</u> |
| Comments (note deviations): | <u>Yes</u> |

Do all data in this SDG meet the Data Quality Objectives? Yes

Comments: _____

Validator: Carrie Madrid
 Reviewer: Cherie Zakowski

Date: 4/20/07
 Date: 10/20/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 239401
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8270C

| | Client ID | Lab ID |
|-----------------|-----------|-----------|
| Samples in SDG: | RIMW-8 | 239401-1 |
| | RIMW-58 | 239401-2 |
| | RIMW-4 | 239401-11 |
| | RIMW-1 | 239401-14 |
| | RIMW-5 | 239401-15 |
| | RIMW-14 | 239401-17 |
| | RIMW-19 | 239401-18 |
| | RIMW-3 | 239401-22 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present.

Precision:

| | Yes | No | N/A |
|--------------------------------------------------------------------------------------------------|-----|----|-----|
| Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) | | No | |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) | | | N/A |

Comments (note deviations): Field duplicates - Samples RIMW-8/RIMW-58 were identified as field duplicates. All %RPD's were within criteria with the exceptions listed below.

Accuracy:

| | Yes | No | N/A |
|---------------------------------------------------------------------------------------------------|-----|----|-----|
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | Yes | | |
| Laboratory Control Sample criteria met? | Yes | | |
| Laboratory Control Sample Duplicate? | | | N/A |
| Laboratory Blanks criteria met (within control limits)? | Yes | | |
| Trip Blanks/Rinsate Blanks | | | N/A |
| ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? | Yes | | |
| CCV % Recoveries within 30% and RRF greater than or equal to 0.05? | No | | |
| Tuning (abundance criteria and 12 hour time frame)? | | | N/A |
| Surrogate % Recoveries? | Yes | | |
| Internal Standards | | | N/A |

Comments (note deviations): MS/MSD - performed on a sample from another SDG 236472-1.
 CCV - 8270 CCV standard analyzed at 1356 Di-n-octylphthalate out.

Precision

| | %RPD |
|------------------------------------------|--------|
| Field Duplicates | |
| RIMW-8/RIMW-58 | |
| Butylbenzylphthalate | 77.78% |
| Bis(2-ethylhexyl)phthalate | 62.07% |
| 4-Chloroaniline | 28.57% |
| No action taken on field duplicate data. | |

Laboratory Duplicate

| | %RPD |
|-----|------|
| N/A | |

Accuracy

| MS/MSD | MS/MSD RPD |
|--------------|-------------------------------------------------|
| Batch 137624 | MS/MSD from another SDG 236472-1. acceptable |

| | %R |
|-----------------|------------|
| LCS/LCSD | |
| Batch 137624 | acceptable |

| Blanks | Analyte | Qualifier | Associated Sample/ Qualification |
|--------------|------------|-----------|----------------------------------|
| Batch 137624 | non-detect | | |

| Rinsate | N/A | <u>Qualifier</u> | | Associated sample | |
|-------------------|------------------------------------------------|-------------------|------------------|-------------------|------------------------------------------------------------|
| Blank | | | | | |
| ICV | 1/31/07 8270/Benzaldehyde/ TCL compounds | RRF acceptable | %RSI | <u>Qualifier</u> | Associated sample |
| CCV | 1/31/07 8270/Benzaldehyde/ TCL compounds | RRF acceptable | %D | | Associated sample |
| | 1/31/07 8270 1356 Di-n-octylphthalate | | 29.40% | none | No action, only 2-chlorophenol was reported from this run. |
| Surr. | | <u>%R</u> | <u>Qualifier</u> | Associated sample | |
| | Batch 137624 | acceptable | | | |
| Internal Standard | not included | | | | |

Representativeness:

| | Yes | No | N/A |
|----------------------------------------------------------------------|-----------------------------------|-----------|-----|
| Were sampling procedures and design criteria met? | <u>Yes</u> | | |
| Were holding times met? | <u>Yes</u> | | |
| Were preservation criteria met? ($4^{\circ}C \pm 2^{\circ}C$) | <u>Yes</u> | | |
| Were Chain-of-Custody records complete and provided in data package? | <u>Yes</u> | | |
| Were contaminants present in blanks? | | <u>No</u> | |
| Comments (note deviations): | <u>Cooler temperatures 2.0° C</u> | | |

Comparability:

| | Yes | No | N/A |
|--------------------------------------------------------|------------|----|-----|
| Does data compare with similar analysis and data sets? | <u>Yes</u> | | |
| Comments (note deviations): | _____ | | |

Completeness (90%):

| | Yes | No | N/A |
|-----------------------------------|------------|----|-----|
| Are all data in this SDG useable? | <u>Yes</u> | | |
| Comments (note deviations): | _____ | | |

| | |
|-----------------------------------------------------------|------------|
| Do all data in this SDG meet the Data Quality Objectives? | <u>Yes</u> |
| Comments: | _____ |
| | _____ |

Validator: Carrie Madrid Date: 4/17/07
 Reviewer: Cherie Zakowski Date: 10/20/07

PSC
Data Evaluation Worksheet

Sample Delivery Group (SDG) Number: 239401 groundwater
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 415.1

| | <u>Client ID</u> | <u>Lab ID</u> |
|-----------------|------------------|---------------|
| Samples in SDG: | OB-110A | 239401-3 |
| | OB-110B | 239401-7 |
| | MW-123A | 239401-10 |
| | RIMW-5 | 239401-15 |
| | RIMW-14 | 239401-17 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are waters.

Precision:

| | Yes | No | N/A |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----|-----|
| Field Duplicates RPD criteria met? (frequency 10% and control limits $\pm 20\%$) | N/A | | |
| Laboratory Duplicates RPD criteria met? (frequency 20% and control limits $\pm 20\%$) | Yes | | |
| Comments (note deviations): | Laboratory Duplicate - Dup. analysis performed on sample OB-110A all %RPD within limits. | | |

Accuracy:

| | Yes | No | N/A |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----|-----|
| Serial Dilutions $\pm 10\%$ | Yes | | |
| Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) | Yes | | |
| Post Digestion Spike criteria met (if applicable)? | N/A | | |
| Laboratory Control Sample criteria met? | Yes | | |
| Laboratory Control Sample Duplicate? ($\pm 25\%$) | N/A | | |
| Laboratory Blanks criteria met (within control limits)? | Yes | | |
| ICV/CCV % Recoveries within 90-110%? | N/A | | |
| ICSA/ICSAB % Recoveries acceptable? | N/A | | |
| CRI % | N/A | | |
| Comments (note deviations): | Serial Dilution - performed on sample MW-123A Matrix Spike - performed on a sample from another SDG. | | |

Representativeness:

| | Yes | No | N/A |
|-------------------------------------------------------------------------------|-------------------------------------------------------|----|-----|
| Were sampling procedures and design criteria met? | Yes | | |
| Were holding times met? | Yes | | |
| Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) | Yes | | |
| Were Chain-of-Custody records complete and provided in data package? | Yes | | |
| Were contaminants present in blanks? | Yes | | |
| Comments (note deviations): | Sample cooler was received at 2.0°C . | | |

Comparability:

Does data compare with similar analysis and data sets?

Yes No N/AYes

Comments (note deviations): _____

Completeness (90%):

Are all data in this SDG useable?

Yes No N/AYes

Comments (note deviations): _____

Precision

Field Duplicate

N/A

Laboratory Duplicate%RPDQualifier

415.1

OB-110A

acceptable

AccuracySerial Dilution%RPD

6010B

MW-123A

acceptable

MS/MSDAnalyteMS/MSD %F RPDPost %RQualifierAssociated Samples

N/A

performed on a sample from another SDG

LCS/ LSD(80-110)%R

415.1

acceptable

BlanksAnalyteResultsQualifierAssociated Samples

415.1

non-detect

ICV/CCV

not present

ICSA/ICSAB

not present

CRI

not present

Do all data in this SDG meet the Data Quality Objectives?

Yes

Comments:

On the form 1's the analysis is listed as dissolved organic carbon. Should really be total organic carbon.

Validator:

Carrie Madrid

Date:

4/18/07

Reviewer:

Cherie Zakowski

Date:

10/20/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 239401
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8260B

| Samples in SDG: | Client ID | Lab ID | Client ID | Lab ID |
|-----------------|-----------|-----------|------------|-----------|
| | RIMW-8 | 239401-1 | RIMW-54 | 239401-12 |
| | RIMW-58 | 239401-2 | PW-1 | 239401-13 |
| | OB-110A | 239401-3 | RIMW-1 | 239401-14 |
| | EW-4 | 239401-4 | RIMW-5 | 239401-15 |
| | P-3 | 239401-5 | RIMW-55 | 239401-16 |
| | P-1 | 239401-6 | RIMW-14 | 239401-17 |
| | OB-110B | 239401-7 | RIMW-19 | 239401-18 |
| | OB-8A | 239401-8 | TRIP BLANK | 239401-19 |
| | MW-123B | 239401-9 | OB-109 | 239401-20 |
| | MW-123A | 239401-10 | OB-109B | 239401-21 |
| | RIMW-4 | 239401-11 | RIMW-3 | 239401-22 |

Full Validation Sample: Cursory validation performed on all samples. No raw data was present. Samples are waters.

Precision: Yes No N/A
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) No
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) N/A

Comments (note deviations): **Field Duplicates** - Samples RIMW-4/RIMW54, RIMW-5/RIMW-55, and RIMW-8/RIMW-58 are field duplicates.
 All %RPD's were within criteria with the exceptions listed below.

Accuracy: Yes No N/A
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) Yes
 Laboratory Control Sample criteria met? Yes
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? No
 Trip Blanks/Rinsate Blanks No
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? No
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05? No
 Tuning (abundance criteria and 12 hour time frame)? N/A
 Surrogate % Recoveries? No
 Internal Standards N/A

Comments (note deviations): **MS/MSD** - Batch 137712 sample OB-110B; batch 137713 sample OB-109 spiked.
Surrogate - Several surrogates out. See below

Precision

| Field Duplicates | RIMW-4/RIMW-54 | %RPD | RIMW-5/RIMW-55 | %RPD |
|------------------|--------------------------|---------|--------------------------|--------|
| | 1,4-Dichlorobenzene | 88.89% | Chlorobenzene | 26.21% |
| | trans-1,2-Dichloroethene | 119.61% | 1,4-Dichlorobenzene | 31.98% |
| | Toluene | 48.78% | trans-1,2-Dichloroethene | 62.86% |
| | Xylenes | 160.04% | | |

| RIMW-8/RIMW-58 | %RPD |
|--------------------|--------|
| 1,1-Dichloroethene | 22.22% |
| 2-Hexanone | 48.95% |

No action taken on field duplicate data.

Laboratory Duplicate
N/A

Accuracy

| MS/MSD | MS/MSD RPD (70-130) |
|-------------------------|------------------------|
| Batch 137712 OB-110B | acceptable |
| Batch 137713 OB-109 | acceptable |

| LCS/ LCSD | %R (70-130) |
|--------------|----------------|
| Batch 137712 | acceptable |
| Batch 137713 | acceptable |

| | | Results in ug/L | Qualifier | Associated Samples |
|------------|--------------------|-----------------|-----------|-----------------------------------------------------------------------------------------------------|
| Blanks | Batch 137712 | | | |
| | Toluene | 0.91 | 10U | P-3, P-1, OB-110B, RIMW-4 |
| | Vinyl Chloride | 0.49 | 10U | All results > Reporting Limit |
| | Batch 137713 | | | |
| | Vinyl Chloride | 0.46 | 10U | RIMW-5, RIMW-55, Trip Blank, OB-109B |
| Trip Blank | Trip Blank | | | |
| | 1,2-Dichloroethane | 0.27 | 10U | OB-109, OB-109B |
| | Methylene Chloride | 0.74 | 10U | EW-4, P-3, P-1, RIMW-5, RIMW-55, |
| | Toluene | 0.29 | 10U | P-3, P-1, OB-110B, RIMW-4, RIMW-54, PW-1, RIMW-1, RIMW-5, RIMW-55, RIMW-18, OB-109, OB-109B, RIMW-3 |
| | Trichloroethene | 0.18 | 10U | OB-110A, EW-4, PW-1, RIMW-14 |
| | Vinyl chloride | 0.64 | 10U | P-3, RIMW-5, RIMW-55, OB-109 |

Holding Blank N/A

| Rinsate Blank | N/A | Qualifier | Associated sample |
|---------------|-----|-----------|-------------------|
|---------------|-----|-----------|-------------------|

| | | RRF | %RSD | Qualifier | Associated sample |
|-------------|------------------------------------|------------|------|-----------|-------------------------------|
| ICV | ICV 1/12/2007 8260 B files | | | | |
| | PT 1 and PT 2 | acceptable | | | |
| | Extra PT 1 and PT 2 | acceptable | | | |
| PT 1 PT2 | ICV 12/07/2006 8260 A files | | | | |
| | Chloroethane | 0.04 | | J | EW-4, RIMW-4, RIMW-54, RIMW-5 |
| | | acceptable | | | |
| | ICV 1/12/2007 8260 C files | | | | |
| | PT 1 and PT 2 | acceptable | | | |
| | ICV 1/12/2007 8260 D files | | | | |
| | PT 1 and PT 2 | acceptable | | | |
| | ICV 1/12/2007 Extra D files | | | | |
| | PT 1 and PT 2 | acceptable | | | |

| | | RRF | %RSD | Qualifier | Associated sample |
|-----|-------------------------------------|------------|------|-----------|-------------------|
| CCV | 1/31/2007 0850 B31089 Extra1 | | | | |
| | | acceptable | | | |
| PT1 | 1/31/2007 0932 B31091 82601 | | | | |
| | | acceptable | | | |
| | 1/31/2007 0952 B31089 Extra2 | | | | |
| | | acceptable | | | |
| | 1/31/2007 1033 B31094 82602 | | | | |
| | | acceptable | | | |

| | | | | | |
|-----|-------------------------------------|------------|--------|---|--------------|
| PT1 | 1/31/2007 2314 B31131 Extra1 | | | | |
| | | acceptable | | | |
| PT1 | 1/31/2007 2355 B31133 8260 | | | | |
| | Methylene Chloride | | 25.00% | J | MW-123B, P-1 |
| PT2 | 1/31/2007 2335 B31132 Extra2 | | | | |
| | | acceptable | | | |
| PT2 | 1/31/2007 0016 B31134 8260 | | | | |
| | | acceptable | | | |

| | | | | | |
|-----|------------------------------------|------------|--------|----|---------|
| PT1 | 2/2/2007 1128 B31200 Extra1 | | | | |
| | | acceptable | | | |
| PT1 | 2/2/2007 1209 B31202 8260 | | | | |
| | Methylene Chloride | | 25.00% | J | RIMW-58 |
| PT2 | 2/2/2007 1149 B31201 Extra2 | | | | |
| | Methyl Acetate | | 26.84% | UJ | RIMW-8 |

| | | | | |
|-----|---------------------------|------------------------------------------------------------------|---|-----------------------------------------------------------------------|
| PT2 | 2/2/2007 1230 B31203 8260 | acceptable | | |
| PT1 | 2/5/2007 1041 B31227 8260 | Bromomethane 35.00% | | Acetone and Chloroethane only analytes with this run |
| PT2 | 2/5/2007 1102 B31228 8260 | acceptable | | |
| PT1 | 2/1/2007 1117 A23289 8260 | Bromomethane 0.045 Chloroethane .031 29.5% | R | RIMW-54, RIMW-4, EW-4 Qual. Due to ICV |
| PT1 | 2/2/2007 1111 A23320 8260 | Bromomethane 0.045 Chloroethane .030 32.7% | | Reported from 1/31/07 run. Qual. Due to ICV |
| PT2 | 2/2/2007 1132 A23321 8260 | Bromomethane 0.04 Chloroethane 0.031 | | No action bromomethane and chloroethane reported from another run. |
| PT1 | 2/1/2007 1051 C33167 8260 | Bromochloromethane 26.10% Acetone 79.10% | | Toluene only reported from this run |
| PT2 | 2/1/2007 1111 C33168 8260 | Bromomethane 30.90% Nothing on quant sheet after bromobenzene | | not used |
| PT1 | 2/1/2007 1326 D8750 8260 | acceptable | | |
| PT2 | 2/1/2007 1406 D8752 8260 | CCV not processed for %D and RRF | | |

| Surr. | | %R | Qualifier | Associated sample |
|---------|-----------------------|----------|-----------|-------------------|
| | Dibromofluoromethane | (70-130) | | |
| RIMW-8 | | 44% | J/UJ | RIMW-8 |
| RIMW-58 | | 47% | J/UJ | RIMW-58 |
| | 1,2-Dichloroethane-d4 | | | |
| RIMW-5 | | 61% | J/UJ | RIMW-5 |
| RIMW-55 | | 63% | J/UJ | RIMW-55 |

Internal Standard not included

Representativeness: Yes No N/A
 Were sampling procedures and design criteria met? Yes
 Were holding times met? Yes
 Were preservation criteria met? ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$) Yes
 Were Chain-of-Custody records complete and provided in data package? Yes
 Were contaminants present in blanks? No
 Comments (note deviations): Cooler temperatures 2.0° C

Comparability: Yes No N/A
 Does data compare with similar analysis and data sets? Yes
 Comments (note deviations): _____

Completeness (90%): Yes No N/A
 Are all data in this SDG useable? Yes
 Comments (note deviations): _____

Do all data in this SDG meet the Data Quality Objectives? Yes
 Comments: _____

Validator: Carrie Madrid Date: 4/17/07
 Reviewer: Cherie Zakowski Date: 10/20/07

**PSC
Data Evaluation Worksheet**

Sample Delivery Group (SDG) Number: 249441
 Laboratory: Analytical Services, Inc.
 Analysis/Methods: 8260B

| Samples in SDG: | Lab ID | Lab ID | Lab ID |
|-----------------|----------|---------|-----------|
| RIMW-21 | 249441-1 | MW-122B | 249441-10 |
| RIMW-30 | 249441-2 | MW-121B | 249441-11 |
| RIMW-20 | 249441-3 | RIMW-24 | 249441-12 |
| RIMW-29 | 249441-4 | RIMW-23 | 249441-13 |
| RIMW-25 | 249441-5 | RIMW-22 | 249441-14 |
| DUP-01 | 249441-6 | DUP-02 | 249441-15 |
| RIMW-28 | 249441-7 | RIMW-27 | 249441-16 |
| TB-01 | 249441-8 | RIMW-15 | 249441-17 |
| RIMW-26 | 249441-9 | | |

Precision:
 Field Duplicates RPD criteria met? (frequency 10% and control limits ± 20% water and ± 50% soil) Yes
 Laboratory Duplicates RPD criteria met? (frequency 20% and control limits ± 20%) N/A

Comments (note deviations): Field Duplicates - Field duplicate sample pairs are as follows: DUP-01/RIMW-25; and DUP-02/RIMW-27. All RPD results were within criteria.

Accuracy:
 Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-lab defined) Yes
 Laboratory Control Sample criteria met? N/A
 Laboratory Control Sample Duplicate? N/A
 Laboratory Blanks criteria met (within control limits)? No
 Trip Blanks/Rinsate Blanks No
 ICV% Recoveries within 30%(Corr.Coeff. 0.99) and Ave. RRF greater than or equal to 0.05? No
 CCV % Recoveries within 30% and RRF greater than or equal to 0.05? No
 Tuning (abundance criteria and 12 hour time frame)? Yes
 Surrogate % Recoveries? Yes
 Internal Standards Yes

Comments (note deviations):

| Precision | Analyte | %RPD | Analyte | %RPD |
|-------------------------|--------------------------------|------|---------|------|
| Field Duplicates | DUP-01/RIMW-25, DUP-02/RIMW-27 | | | |
| Acceptable | | | | |

Laboratory Duplicate
 Not included

Accuracy

| MS/MSD | 145175 | MS/MSD | RPD |
|--------|--------------------|--------|-----|
| | Acceptable | | |
| | 145238 | | |
| | Tetrachloroethene | 0/0 | 0 |
| | Trichloroethene | 0/0 | 0 |
| | 1,2-Dichloroethane | 98/68 | 36 |
| | 1,1-Dichloroethene | 73/60 | 20 |

No action taken on MS/MSD Data

LCS/ LCSD Not included

| Blanks | Qualifier | Associated Sample/ Qualification |
|----------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| VBLK1-09-24-07 | All non-detect | None No reported samples associated with this blank |
| VBLK1-09-25-07 | Toluene - 0.66 ug/L 1,2 -Dichlorobenzene - 0.51 ug/L | None No reported samples associated with this blank |
| VBLK1-09-26-07 | Toluene - 0.24 ug/L | U RIMW-21 U RIMW-30 None RIMW-28 U TB-01 U RIMW-26 U MW-122B None MW-121B |
| VBLK3-09-26-07 | All non-detect | None RIMW-29 RIMW-24 RIMW-25 RIMW-22 DUP-01 DUP-02 |
| VBLK2-09-26-07 | 1,2,3-Trichlorobenzene - 1.95 ug/L 1,2,4-Trichlorobenzene - 0.56 ug/L | None RIMW-27 None RIMW-15 |
| VBLK1-09-27-07 | Toluene - 0.78 ug/L | None RIMW-25 DUP-01 |

Holding Blank Not included

Trip Blanks Trip Blank 9/22/07 1344 Toluene - 0.42 ug/L **Qualifier** None **Associated Sample/ Qualification** Toluene already qualified due to method blanks

Rinsate Blank NA Associated sample

ICV

| | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|--------------------------------------------------|------------|-------------|------------------|--------------------------|
| PT1 9/20/07 Trans-1, 3-Dichloropropene | | 30.70% | J/UJ | All samples in SDG |
| PT2 9/20/07 | | acceptable | | |

CCV

| | <u>RRF</u> | <u>%RSD</u> | <u>Qualifier</u> | <u>Associated sample</u> |
|----------------------------------------------|------------|-------------|------------------|----------------------------------------------------|
| 9/26/2007 - 12:30 | | acceptable | | |
| 9/26/07 - 13:08 Methyl Acetate | | 43.51% | J/UJ | RIMW-27, RIMW-15 |
| Methyl Cyclohexane | | 47.37% | J/UJ | RIMW-27, RIMW-15 |
| Cyclohexanone | | 48.52% | J/UJ | RIMW-27, RIMW-15 |
| 9/26/07 - 11:03 | | acceptable | | |
| 9/26/07 - 23:05 Cyclohexane | | 57.34% | J/UJ | RIMW-29, RIMW-25, DUP-01, RIMW-24, RIMW-22, DUP-02 |
| 9/26/07 - 23:45 | | acceptable | | |
| 9/27/07 - 11:00 Methyl Cyclohexane | | 68.12% | J/UJ | RIMW-23, RIMW-20, RIMW-15 |
| 9/27/07 11:39 | | acceptable | | |

Surr. Acceptable **%R** **Qualifier** **Associated sample**

Internal Standard Acceptable

Representativeness:

Were sampling procedures and design criteria met?
Were holding times met?
Were preservation criteria met? ($4^{\circ}C \pm 2^{\circ}C$)
Were Chain-of-Custody records complete and provided in data package?
Were contaminants present in blanks?
Comments (note deviations):

Yes No N/A

Yes
Yes
Yes
Yes
Yes

Comparability:

Does data compare with similar analysis and data sets?
Comments (note deviations):

Yes No N/A

Yes

Completeness (90%):

Are all data in this SDG useable?
Comments (note deviations):

Yes No N/A

Yes

Do all data in this SDG meet the Data Quality Objectives?

Yes

Comments:

Validator: Cherie Zakowski
Reviewer: Carrie Madrid

Date: 10/12/07
Date: 10/20/07

Appendix H

Risk Assessment Calculations

H-1 Contaminants of Potential Concern Screening

Table H-1.1
Occurrence, Distribution and Selection of Chemicals of Potential Concern
Site-wide Surface Soil

| Chemical | Units | Number of Samples | Number of Detects | Frequency of Detection | Minimum Reporting Limit | Maximum Reporting Limit | Minimum Detected Concentration | Maximum Detected Concentration | Twice the Arithmetic Average Background Concentration | Screening Criteria Residential PRGs | COPC (Yes/No) | Rationale for Selection or Deletion |
|-----------------------------|-------|-------------------|-------------------|------------------------|-------------------------|-------------------------|--------------------------------|--------------------------------|-------------------------------------------------------|-------------------------------------|---------------|-------------------------------------|
| Aluminum | mg/kg | 56 | 56 | 100% | 20 | 30 | 5000 | 58000 | 34,300 | 7.6E+04 | No | BSL |
| Antimony | mg/kg | 56 | 0 | 0% | 6 | 9.1 | ND | ND | ND | 3.1E+01 | No | IFD |
| Arsenic | mg/kg | 56 | 54 | 98% | 1 | 1.5 | ND | 8.9 | 2.5 | 3.9E-01 | Yes | ASL |
| Barium | mg/kg | 56 | 56 | 100% | 20 | 30 | 27 | 670 | 331 | 5.4E+03 | No | BSL |
| Beryllium | mg/kg | 56 | 56 | 100% | 0.51 | 0.76 | 0.08 | 1.9 | 2.1 | 1.5E+02 | No | BSL |
| Cadmium | mg/kg | 56 | 27 | 48% | 0.51 | 0.76 | ND | 2.6 | ND | 3.7E+01 | No | BSL |
| Calcium | mg/kg | 56 | 56 | 100% | 510 | 760 | 150 | 38000 | 1,505 | NA | No | NUT |
| Chromium | mg/kg | 56 | 56 | 100% | 1 | 1.5 | 4 | 100 | 24 | 2.1E+02 | No | BSL |
| Cobalt | mg/kg | 56 | 56 | 100% | 5.1 | 7.6 | 1.9 | 300 | 23 | 9.0E+02 | No | BSL |
| Copper | mg/kg | 56 | 56 | 100% | 2.5 | 3.8 | 3 | 130 | 20 | 3.1E+03 | No | BSL |
| Iron | mg/kg | 56 | 56 | 100% | 10 | 15 | 7400 | 99000 | 66,500 | 2.3E+04 | Yes | ASL |
| Lead | mg/kg | 56 | 56 | 100% | 1 | 1.5 | 2.3 | 170 | 20 | 4.0E+02 | No | BSL |
| Magnesium | mg/kg | 56 | 55 | 98% | 510 | 760 | ND | 28000 | 5,955 | NA | No | NUT |
| Manganese | mg/kg | 56 | 56 | 100% | 1.5 | 2.3 | 80 | 7300 | 1,125 | 1.8E+03 | Yes | ASL |
| Nickel | mg/kg | 56 | 56 | 100% | 4 | 6.1 | 1.8 | 180 | 10 | 1.6E+03 | No | BSL |
| Potassium | mg/kg | 56 | 56 | 100% | 510 | 760 | 67 | 5000 | 3,425 | NA | No | NUT |
| Selenium | mg/kg | 56 | 40 | 71% | 3.5 | 5.3 | ND | 4.9 | 1.0 | 3.9E+02 | No | BSL |
| Silver | mg/kg | 56 | 1 | 2% | 1 | 1.5 | ND | 0.42 | ND | 3.9E+02 | No | IFD |
| Sodium | mg/kg | 56 | 56 | 100% | 510 | 760 | 11 | 6800 | 62 | NA | No | NUT |
| Thallium | mg/kg | 56 | 56 | 100% | 2.5 | 3.8 | 7.75 | 99 | 70 | 5.2E+00 | Yes | ASL |
| Vanadium | mg/kg | 56 | 56 | 100% | 5.1 | 7.6 | 13 | 510 | 201 | 7.8E+01 | Yes | ASL |
| Zinc | mg/kg | 56 | 56 | 100% | 6.1 | 9.1 | 9 | 230 | 81 | 2.3E+04 | No | BSL |
| Mercury | mg/kg | 56 | 20 | 36% | 0.1 | 0.15 | ND | 0.41 | ND | 2.3E+01 | No | BSL |
| Aroclor 1016 | ug/kg | 2 | 0 | 0% | 40 | 47 | ND | ND | NA | 3.9E+03 | No | IFD |
| Aroclor 1221 | ug/kg | 2 | 0 | 0% | 40 | 47 | ND | ND | NA | 3.9E+03 | No | IFD |
| Aroclor 1232 | ug/kg | 2 | 0 | 0% | 40 | 47 | ND | ND | NA | 3.9E+03 | No | IFD |
| Aroclor 1242 | ug/kg | 2 | 0 | 0% | 40 | 47 | ND | ND | NA | 3.9E+03 | No | IFD |
| Aroclor 1248 | ug/kg | 2 | 0 | 0% | 40 | 47 | ND | ND | NA | 2.2E+02 | No | IFD |
| Aroclor 1254 | ug/kg | 2 | 0 | 0% | 40 | 47 | ND | ND | NA | 2.2E+02 | No | IFD |
| Aroclor 1260 | ug/kg | 2 | 0 | 0% | 40 | 47 | ND | ND | NA | 2.2E+02 | No | IFD |
| 1,2,4,5-Tetrachlorobenzene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 1.8E+04 | No | IFD |
| 2,4,5-Trichlorophenol | ug/kg | 56 | 0 | 0% | 840 | 4800 | ND | ND | NA | 6.1E+06 | No | IFD |
| 2,4,6-Trichlorophenol | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.1E+03 | No | IFD |
| 2,4-Dichlorophenol | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 1.8E+05 | No | IFD |
| 2,4-Dimethylphenol | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 1.2E+06 | No | IFD |
| 2,4-Dinitrophenol | ug/kg | 56 | 0 | 0% | 840 | 4800 | ND | ND | NA | 1.2E+05 | No | IFD |
| 2,4-Dinitrotoluene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 1.2E+05 | No | IFD |
| 2,6-Dinitrotoluene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.1E+04 | No | IFD |
| 2-Chloronaphthalene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | No | IFD |
| 2-Chlorophenol | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.3E+04 | No | IFD |
| 2-Methylnaphthalene | ug/kg | 56 | 1 | 2% | 330 | 1900 | ND | 255 | NA | NA | No | IFD |
| 2-Methylphenol | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 3.1E+06 | No | IFD |
| 2-Nitroaniline | ug/kg | 56 | 0 | 0% | 840 | 4800 | ND | ND | NA | 1.8E+05 | No | IFD |
| 2-Nitrophenol | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | No | IFD |
| 3,3'-Dichlorobenzidine | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 1.1E+03 | No | IFD |
| 3+4-Methylphenol | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | No | IFD |
| 3-Nitroaniline | ug/kg | 56 | 0 | 0% | 840 | 4800 | ND | ND | NA | 1.8E+04 | No | IFD |
| 4,6-Dinitro-o-cresol | ug/kg | 56 | 0 | 0% | 840 | 4800 | ND | ND | NA | 6.1E+03 | No | IFD |
| 4-Bromophenyl phenyl ether | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | No | IFD |
| 4-Chloroaniline | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.4E+05 | No | IFD |
| 4-Chlorophenyl phenyl ether | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | No | IFD |
| 4-Nitroaniline | ug/kg | 56 | 0 | 0% | 840 | 4800 | ND | ND | NA | 2.3E+04 | No | IFD |
| 4-Nitrophenol | ug/kg | 56 | 0 | 0% | 840 | 4800 | ND | ND | NA | NA | No | IFD |
| Acenaphthene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 3.7E+06 | No | IFD |
| Acenaphthylene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | No | IFD |
| Acetophenone | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | No | IFD |
| Anthracene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.2E+07 | No | IFD |
| Atrazine | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.2E+03 | No | IFD |
| Benzaldehyde | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.1E+06 | No | IFD |
| Benzo(a)anthracene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.2E+02 | No | IFD |
| Benzo(a)pyrene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.2E+01 | No | IFD |
| Benzo(b)fluoranthene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.2E+02 | No | IFD |
| Benzo(ghi)perylene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | No | IFD |
| Benzo(k)fluoranthene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.2E+03 | No | IFD |
| Biphenyl | ug/kg | 56 | 2 | 4% | 330 | 1900 | ND | 2700 | NA | 3.0E+06 | No | IFD |
| Bis(2-chloroethoxy)methane | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | No | IFD |
| Bis(2-chloroethyl)ether | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.2E+02 | No | IFD |
| Bis(2-chloroisopropyl)ether | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.9E+03 | No | IFD |
| Bis(2-ethylhexyl)phthalate | ug/kg | 56 | 28 | 50% | 330 | 3900 | ND | 29000 | NA | 3.5E+04 | No | BSL |
| Butyl benzyl phthalate | ug/kg | 56 | 6 | 11% | 330 | 1900 | ND | 720 | NA | 1.2E+07 | No | BSL |
| Caprolactam | ug/kg | 56 | 1 | 2% | 330 | 1900 | ND | 220 | NA | 3.1E+07 | No | IFD |
| Carbazole | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.4E+04 | No | IFD |
| Chrysene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.2E+04 | No | IFD |
| Dibenzo(a,h)anthracene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.2E+01 | No | IFD |
| Dibenzofuran | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 1.5E+05 | No | IFD |
| Diethyl phthalate | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 4.9E+07 | No | IFD |
| Dimethyl phthalate | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 1.0E+08 | No | IFD |
| Di-n-butylphthalate | ug/kg | 56 | 5 | 9% | 330 | 1900 | ND | 2400 | NA | NA | No | NTX |
| Di-n-octylphthalate | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.4E+06 | No | IFD |
| Fluoranthene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.3E+06 | No | IFD |
| Fluorene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.7E+06 | No | IFD |

Table H-1.1
Occurrence, Distribution and Selection of Chemicals of Potential Concern
Site-wide Surface Soil

| Chemical | Units | Number of Samples | Number of Detects | Frequency of Detection | Minimum Reporting Limit | Maximum Reporting Limit | Minimum Detected Concentration | Maximum Detected Concentration | Twice the Arithmetic Average Background Concentration | Screening Criteria Residential PRGs | COPC (Yes/No) | Rationale for Selection or Deletion |
|-----------------------------|-------|-------------------|-------------------|------------------------|-------------------------|-------------------------|--------------------------------|--------------------------------|-------------------------------------------------------|-------------------------------------|---------------|-------------------------------------|
| Hexachlorobenzene | ug/kg | 56 | 1 | 2% | 330 | 1900 | ND | 255 | NA | 3.0E+02 | No | IFD |
| Hexachlorobutadiene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.2E+03 | No | IFD |
| Hexachlorocyclopentadiene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 3.7E+05 | No | IFD |
| Hexachloroethane | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 3.5E+04 | No | IFD |
| Indeno(1,2,3-cd)pyrene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.2E+02 | No | IFD |
| Isophorone | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 5.1E+05 | No | IFD |
| Naphthalene | ug/kg | 56 | 1 | 2% | 330 | 1900 | ND | 175 | NA | 5.6E+04 | No | IFD |
| NDPA/DPA | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 9.9E+04 | No | IFD |
| Nitrobenzene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.0E+04 | No | IFD |
| n-Nitrosodi-n-propylamine | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.9E+01 | No | IFD |
| p-Chloro-m-cresol | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | No | IFD |
| Pentachlorophenol | ug/kg | 56 | 0 | 0% | 840 | 4800 | ND | ND | NA | 3.0E+03 | No | IFD |
| Phenanthrene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | No | IFD |
| Phenol | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 1.8E+07 | No | IFD |
| Pyrene | ug/kg | 56 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.3E+06 | No | IFD |
| 1,1,1-Trichloroethane | ug/kg | 58 | 3 | 5% | 7.7 | 970 | ND | 120 | NA | 1.2E+06 | No | IFD |
| 1,1,2,2-Tetrachloroethane | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | 4.1E+02 | No | IFD |
| 1,1,2-Trichloro-1,2,2- | ug/kg | 58 | 2 | 3% | 7.7 | 970 | ND | 2.3 | NA | NA | No | IFD |
| 1,1,2-Trichloroethane | ug/kg | 58 | 1 | 2% | 7.7 | 970 | ND | 7.42 | NA | 7.3E+02 | No | IFD |
| 1,1-Dichloroethane | ug/kg | 58 | 8 | 14% | 7.7 | 970 | ND | 37 | NA | 5.1E+05 | No | BSL |
| 1,1-Dichloroethene | ug/kg | 58 | 10 | 17% | 7.7 | 970 | ND | 340 | NA | 1.2E+05 | No | BSL |
| 1,2,3-Trichlorobenzene | ug/kg | 58 | 3 | 5% | 7.7 | 970 | ND | 270.3 | NA | NA | No | IFD |
| 1,2,4-Trichlorobenzene | ug/kg | 58 | 5 | 9% | 7.7 | 970 | ND | 10250 | NA | 6.2E+04 | No | BSL |
| 1,2-Dibromo-3-chloropropane | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | 4.6E+02 | No | IFD |
| 1,2-Dibromoethane | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | 3.2E+01 | No | IFD |
| 1,2-Dichlorobenzene | ug/kg | 58 | 9 | 16% | 7.7 | 970 | ND | 2215 | NA | 6.0E+05 | No | BSL |
| 1,2-Dichloroethane | ug/kg | 58 | 9 | 16% | 7.7 | 970 | ND | 1400 | NA | 2.8E+02 | Yes | ASL |
| 1,2-Dichloropropane | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | 3.4E+02 | No | IFD |
| 1,3-Dichlorobenzene | ug/kg | 58 | 2 | 3% | 7.7 | 970 | ND | 3135 | NA | 5.3E+05 | No | IFD |
| 1,4-Dichlorobenzene | ug/kg | 58 | 7 | 12% | 7.7 | 970 | ND | 2205 | NA | 3.4E+03 | No | BSL |
| 2-Butanone | ug/kg | 58 | 8 | 14% | 7.7 | 970 | ND | 120 | NA | 2.2E+07 | No | BSL |
| 2-Hexanone | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | NA | No | IFD |
| 4-Methyl-2-pentanone | ug/kg | 58 | 4 | 7% | 7.7 | 970 | ND | 1200 | NA | 5.3E+06 | No | BSL |
| Acetone | ug/kg | 58 | 11 | 19% | 7.7 | 970 | ND | 270 | NA | 1.4E+07 | No | BSL |
| Benzene | ug/kg | 58 | 8 | 14% | 7.7 | 970 | ND | 150 | NA | 6.4E+02 | No | BSL |
| Bromochloromethane | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | NA | No | IFD |
| Bromodichloromethane | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | 8.2E+02 | No | IFD |
| Bromoform | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | 6.2E+04 | No | IFD |
| Bromomethane | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | 3.9E+03 | No | IFD |
| Carbon disulfide | ug/kg | 58 | 5 | 9% | 7.7 | 970 | ND | 8 | NA | 3.6E+05 | No | BSL |
| Carbon tetrachloride | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | 2.5E+02 | No | IFD |
| Chlorobenzene | ug/kg | 58 | 6 | 10% | 7.7 | 970 | ND | 1280 | NA | 1.5E+05 | No | BSL |
| Chloroethane | ug/kg | 58 | 1 | 2% | 7.7 | 970 | ND | 23 | NA | 3.0E+03 | No | IFD |
| Chloroform | ug/kg | 58 | 6 | 10% | 7.7 | 970 | ND | 3.57 | NA | 2.2E+02 | No | BSL |
| Chloromethane | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | 4.7E+04 | No | IFD |
| cis-1,2-Dichloroethene | ug/kg | 58 | 15 | 26% | 7.9 | 970 | ND | 3400 | NA | 4.3E+04 | No | BSL |
| cis-1,3-Dichloropropene | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | NA | No | IFD |
| Cyclohexane | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | 1.4E+05 | No | IFD |
| Dibromochloromethane | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | 1.1E+03 | No | IFD |
| Dichlorodifluoromethane | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | 9.4E+04 | No | IFD |
| Ethylbenzene | ug/kg | 58 | 12 | 21% | 7.7 | 970 | ND | 1445 | NA | 4.0E+05 | No | BSL |
| Isopropylbenzene | ug/kg | 58 | 4 | 7% | 7.7 | 970 | ND | 8.5 | NA | 5.7E+05 | No | BSL |
| Methyl acetate | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | 2.2E+07 | No | IFD |
| Methyl tert butyl ether | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | 3.2E+04 | No | IFD |
| Methylcyclohexane | ug/kg | 58 | 6 | 10% | 7.7 | 970 | ND | 395 | NA | 2.6E+06 | No | BSL |
| Methylene chloride | ug/kg | 58 | 3 | 5% | 7.7 | 970 | ND | 54 | NA | 9.1E+03 | No | IFD |
| Styrene | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | 1.7E+06 | No | IFD |
| Tetrachloroethene | ug/kg | 58 | 18 | 31% | 7.9 | 970 | ND | 2800 | NA | 4.8E+02 | Yes | ASL |
| Toluene | ug/kg | 58 | 20 | 34% | 7.7 | 970 | ND | 14350 | NA | 5.2E+05 | No | BSL |
| trans-1,2-Dichloroethene | ug/kg | 58 | 3 | 5% | 7.7 | 970 | ND | 19 | NA | 7.0E+04 | No | IFD |
| trans-1,3-Dichloropropene | ug/kg | 58 | 0 | 0% | 7.7 | 970 | ND | ND | NA | NA | No | IFD |
| Trichloroethene | ug/kg | 58 | 15 | 26% | 7.7 | 970 | ND | 300 | NA | 4.8E+02 | No | BSL |
| Trichlorofluoromethane | ug/kg | 58 | 1 | 2% | 7.7 | 970 | ND | 1.5 | NA | 3.9E+05 | No | IFD |
| Vinyl chloride | ug/kg | 58 | 5 | 9% | 7.7 | 970 | ND | 29 | NA | 7.9E+01 | No | BSL |
| Xylenes (Total) | ug/kg | 58 | 13 | 22% | 7.7 | 970 | ND | 6150 | NA | 2.7E+05 | No | BSL |

Notes:

Rationale Codes:

- Selection Reason: ASL = Above Screening Level.
- NSL- Detected, No Screening Level Available.
- TOX = Group A Carcinogen.
- Deletion Reason: BSL = Below Screening Level.
- IFD = Infrequent detection (less than or equal to 5%)
- NUT = Essential Nutrient.
- NTX = No Toxicity Value Available.

Table H-1.2
Occurrence, Distribution and Selection of Chemicals of Potential Concern
Site-wide Subsurface Soil

| Chemical | Units | Number of Samples | Number of Detects | Frequency of Detection | Minimum Reporting Limit | Maximum Reporting Limit | Minimum Detected Concentration | Maximum Detected Concentration | Twice the Arithmetic Average Background Concentrations | Screening Criteria Residential PRGs | COPC (Yes/No) | Rationale for Selection or Deletion |
|-----------------------------|-------|-------------------|-------------------|------------------------|-------------------------|-------------------------|--------------------------------|--------------------------------|--------------------------------------------------------|-------------------------------------|---------------|-------------------------------------|
| Aluminum | mg/kg | 105 | 105 | 100% | 20 | 30 | 5000 | 58000 | 34,300 | 7.6E+04 | NO | BSL |
| Antimony | mg/kg | 105 | 0 | 0% | 6 | 9.1 | ND | ND | ND | 3.1E+01 | NO | IFD |
| Arsenic | mg/kg | 105 | 81 | 77% | 1 | 1.5 | ND | 8.9 | 2.5 | 3.9E-01 | YES | ASL |
| Barium | mg/kg | 105 | 105 | 100% | 20 | 30 | 22 | 670 | 331 | 5.4E+03 | NO | BSL |
| Beryllium | mg/kg | 105 | 105 | 100% | 0.51 | 0.76 | 0.08 | 1.6 | 2.1 | 1.5E+02 | NO | BSL |
| Cadmium | mg/kg | 105 | 44 | 42% | 0.51 | 0.76 | ND | 2.6 | ND | 3.7E+01 | NO | BSL |
| Calcium | mg/kg | 105 | 105 | 100% | 510 | 760 | 185 | 38000 | 1,505 | NA | NO | NUT |
| Chromium | mg/kg | 105 | 105 | 100% | 1 | 1.5 | 0.63 | 100 | 24 | 2.1E+02 | NO | BSL |
| Cobalt | mg/kg | 105 | 105 | 100% | 5.1 | 7.6 | 1.9 | 300 | 23 | 9.0E+02 | NO | BSL |
| Copper | mg/kg | 105 | 105 | 100% | 2.5 | 3.8 | 3 | 190 | 20 | 3.1E+03 | NO | BSL |
| Iron | mg/kg | 105 | 105 | 100% | 10 | 15 | 7400 | 99000 | 66,500 | 2.3E+04 | YES | ASL |
| Lead | mg/kg | 105 | 104 | 99% | 1 | 1.5 | ND | 170 | 20 | 4.0E+02 | NO | BSL |
| Magnesium | mg/kg | 105 | 104 | 99% | 510 | 760 | ND | 28000 | 5,955 | NA | NO | NUT |
| Manganese | mg/kg | 105 | 105 | 100% | 1.5 | 2.3 | 60 | 7300 | 1,125 | 1.8E+03 | YES | ASL |
| Nickel | mg/kg | 105 | 105 | 100% | 4 | 6.1 | 2.4 | 180 | 10 | 1.6E+03 | NO | BSL |
| Potassium | mg/kg | 105 | 105 | 100% | 510 | 760 | 32 | 5000 | 3,425 | NA | NO | NUT |
| Selenium | mg/kg | 105 | 78 | 74% | 3.5 | 5.3 | ND | 4.9 | 1.0 | 3.9E+02 | NO | BSL |
| Silver | mg/kg | 105 | 1 | 1% | 1 | 1.5 | ND | 0.42 | ND | 3.9E+02 | NO | IFD |
| Sodium | mg/kg | 105 | 105 | 100% | 510 | 760 | 11 | 6800 | 62 | NA | NO | NUT |
| Thallium | mg/kg | 105 | 105 | 100% | 2.5 | 3.8 | 7.75 | 99 | 70 | 5.2E+00 | YES | ASL |
| Vanadium | mg/kg | 105 | 105 | 100% | 5.1 | 7.6 | 1.2 | 510 | 201 | 7.8E+01 | YES | ASL |
| Zinc | mg/kg | 105 | 105 | 100% | 6.1 | 9.1 | 5.8 | 230 | 81 | 2.3E+04 | NO | BSL |
| Mercury | mg/kg | 105 | 22 | 21% | 0.1 | 0.15 | ND | 0.41 | ND | 2.3E+01 | NO | BSL |
| Aroclor 1016 | ug/kg | 6 | 0 | 0% | 38 | 47 | ND | ND | NA | 3.9E+03 | NO | IFD |
| Aroclor 1221 | ug/kg | 6 | 0 | 0% | 38 | 47 | ND | ND | NA | 3.9E+03 | NO | IFD |
| Aroclor 1232 | ug/kg | 6 | 0 | 0% | 38 | 47 | ND | ND | NA | 3.9E+03 | NO | IFD |
| Aroclor 1242 | ug/kg | 6 | 0 | 0% | 38 | 47 | ND | ND | NA | 3.9E+03 | NO | IFD |
| Aroclor 1248 | ug/kg | 6 | 0 | 0% | 38 | 47 | ND | ND | NA | 2.2E+02 | NO | IFD |
| Aroclor 1254 | ug/kg | 6 | 0 | 0% | 38 | 47 | ND | ND | NA | 2.2E+02 | NO | IFD |
| Aroclor 1260 | ug/kg | 6 | 0 | 0% | 38 | 47 | ND | ND | NA | 2.2E+02 | NO | IFD |
| 1,2,4,5-Tetrachlorobenzene | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 1.8E+04 | NO | IFD |
| 2,4,5-Trichlorophenol | ug/kg | 110 | 0 | 0% | 840 | 4800 | ND | ND | NA | 6.1E+06 | NO | IFD |
| 2,4,6-Trichlorophenol | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.1E+03 | NO | IFD |
| 2,4-Dichlorophenol | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 1.8E+05 | NO | IFD |
| 2,4-Dimethylphenol | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 1.2E+06 | NO | IFD |
| 2,4-Dinitrophenol | ug/kg | 110 | 0 | 0% | 840 | 4800 | ND | ND | NA | 1.2E+05 | NO | IFD |
| 2,4-Dinitrotoluene | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 1.2E+05 | NO | IFD |
| 2,6-Dinitrotoluene | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.1E+04 | NO | IFD |
| 2-Chloronaphthalene | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | NO | IFD |
| 2-Chlorophenol | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.3E+04 | NO | IFD |
| 2-Methylnaphthalene | ug/kg | 110 | 6 | 5% | 330 | 48000 | ND | 110000 | NA | NA | NO | IFD |
| 2-Methylphenol | ug/kg | 110 | 1 | 1% | 330 | 1900 | ND | 170 | NA | 3.1E+06 | NO | IFD |
| 2-Nitroaniline | ug/kg | 110 | 0 | 0% | 840 | 4800 | ND | ND | NA | 1.8E+05 | NO | IFD |
| 2-Nitrophenol | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | NO | IFD |
| 3,3'-Dichlorobenzidine | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 1.1E+03 | NO | IFD |
| 3+4-Methylphenol | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | NO | IFD |
| 3-Nitroaniline | ug/kg | 110 | 0 | 0% | 840 | 4800 | ND | ND | NA | 1.8E+04 | NO | IFD |
| 4,6-Dinitro-o-cresol | ug/kg | 110 | 0 | 0% | 430 | 4800 | ND | ND | NA | 6.1E+03 | NO | IFD |
| 4-Bromophenyl phenyl ether | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | NO | IFD |
| 4-Chloroaniline | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.4E+05 | NO | IFD |
| 4-Chlorophenyl phenyl ether | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | NO | IFD |
| 4-Nitroaniline | ug/kg | 110 | 0 | 0% | 840 | 4800 | ND | ND | NA | 2.3E+04 | NO | IFD |
| 4-Nitrophenol | ug/kg | 110 | 0 | 0% | 840 | 4800 | ND | ND | NA | NA | NO | IFD |
| Acenaphthene | ug/kg | 110 | 1 | 1% | 330 | 4800 | ND | 9200 | NA | 3.7E+06 | NO | IFD |
| Acenaphthylene | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | NO | IFD |
| Acetophenone | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | NO | IFD |
| Anthracene | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.2E+07 | NO | IFD |
| Atrazine | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.2E+03 | NO | IFD |
| Benzaldehyde | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.1E+06 | NO | IFD |
| Benzo(a)anthracene | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.2E+02 | NO | IFD |
| Benzo(a)pyrene | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.2E+01 | NO | IFD |
| Benzo(b)fluoranthene | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.2E+02 | NO | IFD |
| Benzo(ghi)perylene | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | NO | IFD |
| Benzo(k)fluoranthene | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.2E+03 | NO | IFD |
| Biphenyl | ug/kg | 110 | 5 | 5% | 330 | 4800 | ND | 15000 | NA | 3.0E+06 | NO | IFD |
| Bis(2-chloroethoxy)methane | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | NO | IFD |
| Bis(2-chloroethyl)ether | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.2E+02 | NO | IFD |
| Bis(2-chloroisopropyl)ether | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.9E+03 | NO | IFD |
| Bis(2-ethylhexyl)phthalate | ug/kg | 110 | 39 | 35% | 330 | 4400 | ND | 29000 | NA | 3.5E+04 | NO | BSL |
| Butyl benzyl phthalate | ug/kg | 110 | 8 | 7% | 330 | 1900 | ND | 1400 | NA | 1.2E+07 | NO | BSL |
| Caprolactam | ug/kg | 110 | 1 | 1% | 330 | 1900 | ND | 220 | NA | 3.1E+07 | NO | IFD |
| Carbazole | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.4E+04 | NO | IFD |
| Chrysene | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.2E+04 | NO | IFD |
| Dibenzo(a,h)anthracene | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.2E+01 | NO | IFD |
| Dibenzofuran | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 1.5E+05 | NO | IFD |
| Diethyl phthalate | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 4.9E+07 | NO | IFD |
| Dimethyl phthalate | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 1.0E+08 | NO | IFD |
| Di-n-butylphthalate | ug/kg | 110 | 10 | 9% | 330 | 1900 | ND | 2400 | NA | NA | NO | NTX |
| Di-n-octylphthalate | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.4E+06 | NO | IFD |

Table H-1.2
Occurrence, Distribution and Selection of Chemicals of Potential Concern
Site-wide Subsurface Soil

| Chemical | Units | Number of Samples | Number of Detects | Frequency of Detection | Minimum Reporting Limit | Maximum Reporting Limit | Minimum Detected Concentration | Maximum Detected Concentration | Twice the Arithmetic Average Background Concentrations | Screening Criteria PRGs | COPC (Yes/No) | Rationale for Selection or Deletion |
|---------------------------------------|-------|-------------------|-------------------|------------------------|-------------------------|-------------------------|--------------------------------|--------------------------------|--------------------------------------------------------|-------------------------|---------------|-------------------------------------|
| Fluoranthene | ug/kg | 110 | 1 | 1% | 330 | 1900 | ND | 1200 | NA | 2.3E+06 | NO | IFD |
| Fluorene | ug/kg | 110 | 1 | 1% | 330 | 4800 | ND | 15000 | NA | 2.7E+06 | NO | IFD |
| Hexachlorobenzene | ug/kg | 110 | 1 | 1% | 330 | 1900 | ND | 255 | NA | 3.0E+02 | NO | IFD |
| Hexachlorobutadiene | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.2E+03 | NO | IFD |
| Hexachlorocyclopentadiene | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 3.7E+05 | NO | IFD |
| Hexachloroethane | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 3.5E+04 | NO | IFD |
| Indeno(1,2,3-cd)pyrene | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.2E+02 | NO | IFD |
| Isophorone | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 5.1E+05 | NO | IFD |
| Naphthalene | ug/kg | 110 | 6 | 5% | 330 | 4800 | ND | 27000 | NA | 5.6E+04 | NO | IFD |
| NDPA/DPA | ug/kg | 110 | 2 | 2% | 330 | 4800 | ND | 13000 | NA | 9.9E+04 | NO | IFD |
| Nitrobenzene | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 2.0E+04 | NO | IFD |
| n-Nitrosodi-n-propylamine | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | 6.9E+01 | NO | IFD |
| p-Chloro-m-cresol | ug/kg | 110 | 0 | 0% | 330 | 1900 | ND | ND | NA | NA | NO | IFD |
| Pentachlorophenol | ug/kg | 110 | 0 | 0% | 840 | 4800 | ND | ND | NA | 3.0E+03 | NO | IFD |
| Phenanthrene | ug/kg | 110 | 1 | 1% | 330 | 4800 | ND | 31000 | NA | NA | NO | IFD |
| Phenol | ug/kg | 110 | 1 | 1% | 330 | 1900 | ND | 940 | NA | 1.8E+07 | NO | IFD |
| Pyrene | ug/kg | 110 | 1 | 1% | 330 | 1900 | ND | 4200 | NA | 2.3E+06 | NO | IFD |
| 1,1,1-Trichloroethane | ug/kg | 161 | 17 | 11% | 7.6 | 5400 | ND | 3600 | NA | 1.2E+06 | NO | BSL |
| 1,1,2,2-Tetrachloroethane | ug/kg | 161 | 0 | 0% | 7.6 | 1100 | ND | ND | NA | 4.1E+02 | NO | IFD |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | ug/kg | 161 | 9 | 6% | 7.6 | 1100 | ND | 33 | NA | NA | NO | NTX |
| 1,1,2-Trichloroethane | ug/kg | 161 | 17 | 11% | 7.6 | 1100 | ND | 280 | NA | 7.3E+02 | NO | BSL |
| 1,1-Dichloroethane | ug/kg | 161 | 46 | 29% | 7.6 | 5400 | ND | 1600 | NA | 5.1E+05 | NO | BSL |
| 1,1-Dichloroethene | ug/kg | 161 | 56 | 35% | 7.6 | 5400 | ND | 480 | NA | 1.2E+05 | NO | BSL |
| 1,2,3-Trichlorobenzene | ug/kg | 161 | 8 | 5% | 7.6 | 1100 | ND | 270.3 | NA | NA | NO | IFD |
| 1,2,4-Trichlorobenzene | ug/kg | 161 | 12 | 7% | 7.6 | 1100 | ND | 10250 | NA | 6.2E+04 | NO | BSL |
| 1,2-Dibromo-3-chloropropane | ug/kg | 161 | 0 | 0% | 7.6 | 1100 | ND | ND | NA | 4.6E+02 | NO | IFD |
| 1,2-Dibromoethane | ug/kg | 161 | 0 | 0% | 7.6 | 1100 | ND | ND | NA | 3.2E+01 | NO | IFD |
| 1,2-Dichlorobenzene | ug/kg | 161 | 29 | 18% | 7.6 | 4800 | ND | 22000 | NA | 6.0E+05 | NO | BSL |
| 1,2-Dichloroethane | ug/kg | 161 | 60 | 37% | 7.6 | 11000 | ND | 45000 | NA | 2.8E+02 | YES | ASL |
| 1,2-Dichloropropane | ug/kg | 161 | 3 | 2% | 7.6 | 1100 | ND | 3.12 | NA | 3.4E+02 | NO | IFD |
| 1,3-Dichlorobenzene | ug/kg | 161 | 12 | 7% | 7.6 | 1100 | ND | 3135 | NA | 5.3E+05 | NO | BSL |
| 1,4-Dichlorobenzene | ug/kg | 161 | 21 | 13% | 7.6 | 1100 | ND | 4000 | NA | 3.4E+03 | YES | ASL |
| 2-Butanone | ug/kg | 161 | 40 | 25% | 6.4 | 26000 | ND | 33000 | NA | 2.2E+07 | NO | BSL |
| 2-Hexanone | ug/kg | 161 | 7 | 4% | 7.6 | 1100 | ND | 56 | NA | NA | NO | IFD |
| 4-Methyl-2-pentanone | ug/kg | 161 | 30 | 19% | 7.6 | 26000 | ND | 48000 | NA | 5.3E+06 | NO | BSL |
| Acetone | ug/kg | 161 | 50 | 31% | 6.4 | 26000 | ND | 36000 | NA | 1.4E+07 | NO | BSL |
| Benzene | ug/kg | 161 | 45 | 28% | 7.6 | 1100 | ND | 5600 | NA | 6.4E+02 | YES | ASL |
| Bromochloromethane | ug/kg | 161 | 0 | 0% | 7.6 | 1100 | ND | ND | NA | NA | NO | IFD |
| Bromodichloromethane | ug/kg | 161 | 0 | 0% | 7.6 | 1100 | ND | ND | NA | 8.2E+02 | NO | IFD |
| Bromoform | ug/kg | 161 | 0 | 0% | 7.6 | 1100 | ND | ND | NA | 6.2E+04 | NO | IFD |
| Bromomethane | ug/kg | 161 | 3 | 2% | 7.6 | 1100 | ND | 60 | NA | 3.9E+03 | NO | IFD |
| Carbon disulfide | ug/kg | 161 | 11 | 7% | 7.6 | 1100 | ND | 8.4 | NA | 3.6E+05 | NO | BSL |
| Carbon tetrachloride | ug/kg | 161 | 0 | 0% | 7.6 | 1100 | ND | ND | NA | 2.5E+02 | NO | IFD |
| Chlorobenzene | ug/kg | 161 | 35 | 22% | 7.6 | 1100 | ND | 1280 | NA | 1.5E+05 | NO | BSL |
| Chloroethane | ug/kg | 161 | 10 | 6% | 7.6 | 1100 | ND | 72 | NA | 3.0E+03 | NO | BSL |
| Chloroform | ug/kg | 161 | 31 | 19% | 7.6 | 1100 | ND | 750 | NA | 2.2E+02 | YES | ASL |
| Chloromethane | ug/kg | 161 | 0 | 0% | 7.6 | 1100 | ND | ND | NA | 4.7E+04 | NO | IFD |
| cis-1,2-Dichloroethene | ug/kg | 161 | 81 | 50% | 7.6 | 11000 | ND | 58000 | NA | 4.3E+04 | YES | ASL |
| cis-1,3-Dichloropropene | ug/kg | 161 | 0 | 0% | 7.6 | 1100 | ND | ND | NA | NA | NO | IFD |
| Cyclohexane | ug/kg | 161 | 4 | 2% | 7.6 | 1100 | ND | 1.41 | NA | 1.4E+05 | NO | IFD |
| Dibromochloromethane | ug/kg | 161 | 0 | 0% | 7.6 | 1100 | ND | ND | NA | 1.1E+03 | NO | IFD |
| Dichlorodifluoromethane | ug/kg | 161 | 0 | 0% | 7.6 | 1100 | ND | ND | NA | 9.4E+04 | NO | IFD |
| Ethylbenzene | ug/kg | 161 | 50 | 31% | 7.6 | 26000 | ND | 150000 | NA | 4.0E+05 | NO | BSL |
| Isopropylbenzene | ug/kg | 161 | 32 | 20% | 7.6 | 5400 | ND | 4400 | NA | 5.7E+05 | NO | BSL |
| Methyl acetate | ug/kg | 161 | 0 | 0% | 7.6 | 1100 | ND | ND | NA | 2.2E+07 | NO | IFD |
| Methyl tert butyl ether | ug/kg | 161 | 1 | 1% | 7.6 | 1100 | ND | 0.86 | NA | 3.2E+04 | NO | IFD |
| Methylcyclohexane | ug/kg | 161 | 37 | 23% | 7.6 | 26000 | ND | 85000 | NA | 2.6E+06 | NO | BSL |
| Methylene chloride | ug/kg | 161 | 31 | 19% | 7.6 | 1100 | ND | 402 | NA | 9.1E+03 | NO | BSL |
| Styrene | ug/kg | 161 | 0 | 0% | 7.6 | 1100 | ND | ND | NA | 1.7E+06 | NO | IFD |
| Tetrachloroethene | ug/kg | 161 | 79 | 49% | 7.7 | 11000 | ND | 72000 | NA | 4.8E+02 | YES | ASL |
| Toluene | ug/kg | 161 | 75 | 47% | 7.6 | 260000 | ND | 1900000 | NA | 5.2E+05 | YES | ASL |
| trans-1,2-Dichloroethene | ug/kg | 161 | 14 | 9% | 7.6 | 1100 | ND | 70 | NA | 7.0E+04 | NO | BSL |
| trans-1,3-Dichloropropene | ug/kg | 161 | 0 | 0% | 7.6 | 1100 | ND | ND | NA | NA | NO | IFD |
| Trichloroethene | ug/kg | 161 | 80 | 50% | 7.6 | 11000 | ND | 150000 | NA | 4.8E+02 | YES | ASL |
| Trichlorofluoromethane | ug/kg | 161 | 10 | 6% | 7.6 | 1100 | ND | 130 | NA | 3.9E+05 | NO | BSL |
| Vinyl chloride | ug/kg | 161 | 32 | 20% | 7.6 | 1100 | ND | 370 | NA | 7.9E+01 | YES | ASL |
| Xylenes (Total) | ug/kg | 161 | 57 | 35% | 7.6 | 26000 | ND | 650000 | NA | 2.7E+05 | YES | ASL |

Notes:

Rationale Codes:

- Selection Reason: ASL = Above Screening Level.
- NSL - Detected, No Screening Level Available.
- TOX = Group A Carcinogen.
- Deletion Reason: BSL = Below Screening Level.
- IFD = Infrequent detection (less than or equal to 5%)
- NUT = Essential Nutrient.
- NTX = No Toxicity Value Available.

Table H-1.3
Occurrence, Distribution and Selection of Chemicals of Potential Concern
Site-wide Shallow Groundwater

| Chemical | Units | Number of Samples | Number of Detects | Frequency of Detection | Minimum Reporting Limit | Maximum Reporting Limit | Minimum Detected Concentration | Maximum Detected Concentration | Screening Criteria Tap Water PRGs | COPC (Yes/No) | Rationale for Selection or Deletion |
|-----------------------------|-------|-------------------|-------------------|------------------------|-------------------------|-------------------------|--------------------------------|--------------------------------|-----------------------------------|---------------|-------------------------------------|
| Aluminum | mg/L | 14 | 14 | 100% | 0.2 | 0.2 | 0.038 | 0.6 | 3.6E+01 | NO | BSL |
| Antimony | mg/L | 14 | 0 | 0% | 0.05 | 0.05 | ND | ND | 1.5E-02 | NO | IFD |
| Arsenic | mg/L | 14 | 0 | 0% | 0.01 | 0.01 | ND | ND | 4.5E-05 | NO | IFD |
| Barium | mg/L | 14 | 14 | 100% | 0.01 | 0.01 | 0.02 | 0.15 | 2.6E+00 | NO | BSL |
| Beryllium | mg/L | 14 | 10 | 71% | 0.005 | 0.005 | ND | 0.0007 | 7.3E-02 | NO | BSL |
| Cadmium | mg/L | 14 | 0 | 0% | 0.005 | 0.005 | ND | ND | 1.8E-02 | NO | IFD |
| Calcium | mg/L | 14 | 14 | 100% | 0.05 | 0.05 | 28 | 140 | NA | NO | NUT |
| Chromium | mg/L | 14 | 0 | 0% | 0.01 | 0.01 | ND | ND | NA | NO | IFD |
| Cobalt | mg/L | 14 | 8 | 57% | 0.05 | 0.05 | ND | 0.12 | 7.3E-01 | NO | BSL |
| Copper | mg/L | 14 | 2 | 14% | 0.02 | 0.02 | ND | 0.0105 | 1.5E+00 | NO | BSL |
| Iron | mg/L | 14 | 12 | 86% | 0.1 | 0.1 | ND | 12.5 | 1.1E+01 | YES | ASL |
| Lead | mg/L | 14 | 0 | 0% | 0.01 | 0.01 | ND | ND | NA | NO | IFD |
| Magnesium | mg/L | 14 | 14 | 100% | 0.05 | 0.05 | 14 | 75 | NA | NO | NUT |
| Manganese | mg/L | 14 | 14 | 100% | 0.015 | 0.015 | 0.032 | 12 | 8.8E-01 | YES | ASL |
| Nickel | mg/L | 14 | 11 | 79% | 0.02 | 0.02 | ND | 0.05 | 7.3E-01 | NO | BSL |
| Potassium | mg/L | 14 | 14 | 100% | 0.2 | 0.2 | 0.3 | 3.3 | NA | NO | NUT |
| Selenium | mg/L | 14 | 11 | 79% | 0.035 | 0.035 | ND | 0.033 | 1.8E-01 | NO | BSL |
| Silver | mg/L | 14 | 0 | 0% | 0.01 | 0.01 | ND | ND | 1.8E-01 | NO | IFD |
| Sodium | mg/L | 14 | 14 | 100% | 0.05 | 0.05 | 11 | 36 | NA | NO | NUT |
| Thallium | mg/L | 14 | 8 | 57% | 0.025 | 0.025 | ND | 0.0014 | 2.4E-03 | NO | BSL |
| Vanadium | mg/L | 14 | 9 | 64% | 0.05 | 0.05 | ND | 0.012 | 3.6E-02 | NO | BSL |
| Zinc | mg/L | 14 | 8 | 57% | 0.02 | 0.02 | ND | 0.03 | 1.1E+01 | NO | BSL |
| Mercury | mg/L | 14 | 2 | 14% | 0.0002 | 0.0002 | ND | 0.000057 | 1.1E-02 | NO | BSL |
| 1,2,4,5-Tetrachlorobenzene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 1.1E+01 | NO | IFD |
| 2,4,5-Trichlorophenol | ug/L | 14 | 0 | 0% | 25 | 25 | ND | ND | 3.6E+03 | NO | IFD |
| 2,4,6-Trichlorophenol | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 3.6E+00 | NO | IFD |
| 2,4-Dichlorophenol | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 1.1E+02 | NO | IFD |
| 2,4-Dimethylphenol | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 7.3E+02 | NO | IFD |
| 2,4-Dinitrophenol | ug/L | 14 | 0 | 0% | 25 | 25 | ND | ND | 7.3E+01 | NO | IFD |
| 2,4-Dinitrotoluene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 7.3E+01 | NO | IFD |
| 2,6-Dinitrotoluene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 3.6E+01 | NO | IFD |
| 2-Chloronaphthalene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| 2-Chlorophenol | ug/L | 14 | 1 | 7% | 10 | 50 | ND | 145 | 3.0E+01 | YES | ASL |
| 2-Methylnaphthalene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| 2-Methylphenol | ug/L | 14 | 1 | 7% | 10 | 10 | ND | 88.5 | 1.8E+03 | NO | BSL |
| 2-Nitroaniline | ug/L | 14 | 0 | 0% | 25 | 25 | ND | ND | 1.1E+02 | NO | IFD |
| 2-Nitrophenol | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| 3,3'-Dichlorobenzidine | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 1.5E-01 | NO | IFD |
| 3+4-Methylphenol | ug/L | 14 | 1 | 7% | 10 | 10 | ND | 52.5 | 1.80E+02 | NO | BSL |
| 3-Nitroaniline | ug/L | 14 | 0 | 0% | 25 | 25 | ND | ND | 3.2E+00 | NO | IFD |
| 4,6-Dinitro-o-cresol | ug/L | 14 | 0 | 0% | 25 | 25 | ND | ND | 3.6E+00 | NO | IFD |
| 4-Bromophenyl phenyl ether | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| 4-Chloroaniline | ug/L | 14 | 1 | 7% | 10 | 10 | ND | 35 | 1.5E+02 | NO | BSL |
| 4-Chlorophenyl phenyl ether | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| 4-Nitroaniline | ug/L | 14 | 0 | 0% | 25 | 25 | ND | ND | 3.2E+00 | NO | IFD |
| 4-Nitrophenol | ug/L | 14 | 0 | 0% | 25 | 25 | ND | ND | NA | NO | IFD |
| Acenaphthene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 3.7E+02 | NO | IFD |
| Acenaphthylene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| Acetophenone | ug/L | 14 | 1 | 7% | 10 | 10 | ND | 60 | NA | YES | NSL |
| Anthracene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 1.8E+03 | NO | IFD |
| Atrazine | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 3.0E-01 | NO | IFD |
| Benzaldehyde | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 3.6E+03 | NO | IFD |
| Benzo(a)anthracene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 9.2E-02 | NO | IFD |
| Benzo(a)pyrene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 9.2E-03 | NO | IFD |
| Benzo(b)fluoranthene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 9.2E-02 | NO | IFD |
| Benzo(ghi)perylene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| Benzo(k)fluoranthene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 9.2E-01 | NO | IFD |
| Biphenyl | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 3.04E+02 | NO | IFD |
| Bis(2-chloroethoxy)methane | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| Bis(2-chloroethyl)ether | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 1.0E-02 | NO | IFD |
| Bis(2-chloroisopropyl)ether | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 2.7E-01 | NO | IFD |
| Bis(2-ethylhexyl)phthalate | ug/L | 14 | 2 | 14% | 10 | 10 | ND | 14.5 | 4.8E+00 | YES | ASL |
| Butyl benzyl phthalate | ug/L | 14 | 1 | 7% | 10 | 10 | ND | 36 | 7.3E+03 | NO | BSL |
| Caprolactam | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 1.8E+04 | NO | IFD |
| Carbazole | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 3.4E+00 | NO | IFD |
| Chrysene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 9.2E+00 | NO | IFD |
| Dibenzo(a,h)anthracene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 9.2E-03 | NO | IFD |
| Dibenzofuran | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 1.2E+01 | NO | IFD |
| Diethyl phthalate | ug/L | 14 | 1 | 7% | 10 | 10 | ND | 6.85 | 2.9E+04 | NO | BSL |
| Dimethyl phthalate | ug/L | 14 | 1 | 7% | 10 | 10 | ND | 19 | 3.6E+05 | NO | BSL |
| Di-n-butylphthalate | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| Di-n-octylphthalate | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 1.46E+03 | NO | IFD |
| Fluoranthene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 1.5E+03 | NO | IFD |
| Fluorene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 2.4E+02 | NO | IFD |
| Hexachlorobenzene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 4.2E-02 | NO | IFD |

Table H-1.3
Occurrence, Distribution and Selection of Chemicals of Potential Concern
Site-wide Shallow Groundwater

| Chemical | Units | Number of Samples | Number of Detects | Frequency of Detection | Minimum Reporting Limit | Maximum Reporting Limit | Minimum Detected Concentration | Maximum Detected Concentration | Screening Criteria Tap Water PRGs | COPC (Yes/No) | Rationale for Selection or Deletion |
|-----------------------------|-------|-------------------|-------------------|------------------------|-------------------------|-------------------------|--------------------------------|--------------------------------|-----------------------------------|---------------|-------------------------------------|
| Hexachlorobutadiene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 8.6E-01 | NO | IFD |
| Hexachlorocyclopentadiene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 2.2E+02 | NO | IFD |
| Hexachloroethane | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 4.8E+00 | NO | IFD |
| Indeno(1,2,3-cd)pyrene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 9.2E-02 | NO | IFD |
| Isophorone | ug/L | 14 | 1 | 7% | 10 | 10 | ND | 16.5 | 7.1E+01 | NO | BSL |
| Naphthalene | ug/L | 14 | 3 | 21% | 10 | 10 | ND | 30.5 | 6.2E+00 | YES | ASL |
| NDPA/DPA | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 1.4E+01 | NO | IFD |
| Nitrobenzene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 3.4E+00 | NO | IFD |
| n-Nitrosodi-n-propylamine | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | 9.6E-03 | NO | IFD |
| p-Chloro-m-cresol | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| Pentachlorophenol | ug/L | 14 | 0 | 0% | 25 | 25 | ND | ND | 5.6E-01 | NO | IFD |
| Phenanthrene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| Phenol | ug/L | 14 | 1 | 7% | 10 | 10 | ND | 44 | 1.1E+04 | NO | BSL |
| Pyrene | ug/L | 14 | 0 | 0% | 10 | 10 | ND | 0 | 1.8E+02 | NO | IFD |
| 1,1,1-Trichloroethane | ug/L | 60 | 17 | 28% | 10 | 10000 | ND | 51000 | 3.2E+03 | YES | ASL |
| 1,1,2,2-Tetrachloroethane | ug/L | 60 | 0 | 0% | 10 | 10000 | ND | ND | 5.5E-02 | NO | IFD |
| trifluoroethane | ug/L | 60 | 10 | 17% | 10 | 10000 | ND | 333 | NA | NO | NTX |
| 1,1,2-Trichloroethane | ug/L | 60 | 19 | 32% | 10 | 10000 | ND | 154 | 2.0E-01 | YES | ASL |
| 1,1-Dichloroethane | ug/L | 60 | 34 | 57% | 10 | 10000 | ND | 7200 | 8.1E+02 | YES | ASL |
| 1,1-Dichloroethene | ug/L | 60 | 33 | 55% | 10 | 10000 | ND | 8100 | 3.5E+02 | YES | ASL |
| 1,2,3-Trichlorobenzene | ug/L | 60 | 1 | 2% | 10 | 10000 | ND | 374 | NA | NO | IFD |
| 1,2,4-Trichlorobenzene | ug/L | 60 | 3 | 5% | 10 | 10000 | ND | 126 | 7.2E+00 | NO | IFD |
| 1,2-Dibromo-3-chloropropane | ug/L | 60 | 0 | 0% | 10 | 10000 | ND | ND | 4.8E-02 | NO | IFD |
| 1,2-Dibromoethane | ug/L | 60 | 0 | 0% | 10 | 10000 | ND | ND | 5.6E-03 | NO | IFD |
| 1,2-Dichlorobenzene | ug/L | 60 | 20 | 33% | 10 | 10000 | ND | 2500 | 3.7E+02 | YES | ASL |
| 1,2-Dichloroethane | ug/L | 60 | 34 | 57% | 10 | 10000 | ND | 52500 | 1.2E-01 | YES | ASL |
| 1,2-Dichloropropane | ug/L | 60 | 3 | 5% | 10 | 10000 | ND | 1.245 | 1.6E-01 | NO | IFD |
| 1,3-Dichlorobenzene | ug/L | 60 | 9 | 15% | 10 | 10000 | ND | 101.5 | 1.8E+02 | NO | BSL |
| 1,4-Dichlorobenzene | ug/L | 60 | 11 | 18% | 10 | 10000 | ND | 1300 | 5.0E-01 | YES | ASL |
| 2-Butanone | ug/L | 60 | 9 | 15% | 10 | 10000 | ND | 3150 | 7.0E+03 | NO | BSL |
| 2-Hexanone | ug/L | 60 | 5 | 8% | 10 | 10000 | ND | 478 | NA | YES | NSL |
| 4-Methyl-2-pentanone | ug/L | 60 | 10 | 17% | 10 | 10000 | ND | 11000 | 6.3E+03 | YES | ASL |
| Acetone | ug/L | 60 | 16 | 27% | 10 | 10000 | ND | 4400 | 5.5E+03 | NO | BSL |
| Benzene | ug/L | 60 | 37 | 62% | 10 | 10000 | ND | 1050 | 3.5E-01 | YES | ASL |
| Bromochloromethane | ug/L | 60 | 0 | 0% | 10 | 10000 | ND | ND | NA | NO | IFD |
| Bromodichloromethane | ug/L | 60 | 3 | 5% | 10 | 10000 | ND | 6.27 | 1.8E-01 | NO | IFD |
| Bromoform | ug/L | 60 | 0 | 0% | 10 | 10000 | ND | ND | 8.5E+00 | NO | IFD |
| Bromomethane | ug/L | 60 | 0 | 0% | 10 | 10000 | ND | ND | 8.7E+00 | NO | IFD |
| Carbon disulfide | ug/L | 60 | 2 | 3% | 10 | 10000 | ND | 1.22 | 1.0E+03 | NO | IFD |
| Carbon tetrachloride | ug/L | 60 | 1 | 2% | 10 | 10000 | ND | 11000 | 1.7E-01 | NO | IFD |
| Chlorobenzene | ug/L | 60 | 28 | 47% | 10 | 10000 | ND | 3000 | 1.1E+02 | YES | ASL |
| Chloroethane | ug/L | 60 | 19 | 32% | 10 | 10000 | ND | 2850 | 4.6E+00 | YES | ASL |
| Chloroform | ug/L | 60 | 21 | 35% | 10 | 10000 | ND | 882 | 1.7E-01 | YES | ASL |
| Chloromethane | ug/L | 60 | 3 | 5% | 10 | 10000 | ND | 14 | 1.6E+02 | NO | IFD |
| cis-1,2-Dichloroethene | ug/L | 60 | 41 | 68% | 10 | 10000 | ND | 13000 | 6.10E+01 | YES | ASL |
| cis-1,3-Dichloropropene | ug/L | 60 | 0 | 0% | 10 | 10000 | ND | ND | NA | NO | IFD |
| Cyclohexane | ug/L | 60 | 10 | 17% | 10 | 10000 | ND | 770 | 1.0E+04 | NO | BSL |
| Dibromochloromethane | ug/L | 60 | 1 | 2% | 10 | 10000 | ND | 3.32 | 1.3E-01 | NO | IFD |
| Dichlorodifluoromethane | ug/L | 60 | 1 | 2% | 10 | 10000 | ND | 0.1375 | 3.9E+02 | NO | IFD |
| Ethylbenzene | ug/L | 60 | 26 | 43% | 10 | 10000 | ND | 46000 | 1.3E+03 | YES | ASL |
| Isopropylbenzene | ug/L | 60 | 30 | 50% | 10 | 10000 | ND | 36000 | 6.6E+02 | YES | ASL |
| Methyl acetate | ug/L | 60 | 0 | 0% | 10 | 10000 | ND | ND | 6.1E+03 | NO | IFD |
| Methyl tert butyl ether | ug/L | 60 | 15 | 25% | 10 | 10000 | ND | 444 | 1.1E+01 | YES | ASL |
| Methylcyclohexane | ug/L | 60 | 25 | 42% | 10 | 10000 | ND | 19000 | 5.2E+03 | YES | ASL |
| Methylene chloride | ug/L | 60 | 22 | 37% | 10 | 10000 | ND | 7900 | 4.3E+00 | YES | ASL |
| Styrene | ug/L | 60 | 0 | 0% | 10 | 10000 | ND | ND | 1.6E+03 | NO | IFD |
| Tetrachloroethene | ug/L | 60 | 34 | 57% | 10 | 10000 | ND | 13000 | 1.0E-01 | YES | ASL |
| Toluene | ug/L | 60 | 51 | 85% | 10 | 10000 | ND | 52000 | 7.2E+02 | YES | ASL |
| trans-1,2-Dichloroethene | ug/L | 60 | 21 | 35% | 10 | 10000 | ND | 49 | 1.22E+02 | NO | BSL |
| trans-1,3-Dichloropropene | ug/L | 60 | 0 | 0% | 10 | 10000 | ND | ND | NA | NO | IFD |
| Trichloroethene | ug/L | 60 | 40 | 67% | 10 | 10000 | ND | 14000 | 1.0E-01 | YES | ASL |
| Trichlorofluoromethane | ug/L | 60 | 8 | 13% | 10 | 10000 | ND | 987 | 1.3E+03 | NO | BSL |
| Vinyl chloride | ug/L | 60 | 29 | 48% | 10 | 10000 | ND | 1200 | 2.0E-02 | YES | ASL |
| Xylenes (Total) | ug/L | 60 | 31 | 52% | 10 | 10000 | ND | 150000 | 2.1E+02 | YES | ASL |

Notes:

Rationale Codes:

Selection Reason: ASL = Above Screening Level.

NSL = Detected, No Screening Level Available.

TOX = Group A Carcinogen.

Deletion Reason: BSL = Below Screening Level.

IFD = Infrequent detection (less than or equal to 5%).

NUT = Essential Nutrient.

NTX = No Toxicity Value Available.

Table H-1.4
Occurrence, Distribution and Selection of Chemicals of Potential Concern
Site-wide Shallow and Bedrock Groundwater

| Chemical | Units | Number of Samples | Number of Detects | Frequency of Detection | Minimum Reporting Limit | Maximum Reporting Limit | Minimum Detected Concentration | Maximum Detected Concentration | Criteria Tap Water PRGs | COPC (Yes/No) | Rationale for Selection or Deletion |
|-----------------------------|-------|-------------------|-------------------|------------------------|-------------------------|-------------------------|--------------------------------|--------------------------------|-------------------------|---------------|-------------------------------------|
| Aluminum | mg/L | 18 | 18 | 100% | 0.2 | 0.2 | 0.038 | 1.4 | 3.6E+01 | NO | BSL |
| Antimony | mg/L | 18 | 0 | 0% | 0.05 | 0.05 | ND | ND | 1.5E-02 | NO | IFD |
| Arsenic | mg/L | 18 | 0 | 0% | 0.01 | 0.01 | ND | ND | 4.5E-05 | NO | IFD |
| Barium | mg/L | 18 | 18 | 100% | 0.01 | 0.01 | 0.0052 | 0.15 | 2.6E+00 | NO | BSL |
| Beryllium | mg/L | 18 | 13 | 72% | 0.005 | 0.005 | ND | 0.0007 | 7.3E-02 | NO | BSL |
| Cadmium | mg/L | 18 | 0 | 0% | 0.005 | 0.005 | ND | ND | 1.8E-02 | NO | IFD |
| Calcium | mg/L | 18 | 18 | 100% | 0.05 | 0.05 | 28 | 140 | NA | NO | NUT |
| Chromium | mg/L | 18 | 1 | 6% | 0.01 | 0.01 | ND | 0.0058 | 1.1E-01 | NO | BSL |
| Cobalt | mg/L | 18 | 8 | 44% | 0.05 | 0.05 | ND | 0.12 | 7.3E-01 | NO | BSL |
| Copper | mg/L | 18 | 3 | 17% | 0.02 | 0.02 | ND | 0.0105 | 1.5E+00 | NO | BSL |
| Iron | mg/L | 18 | 15 | 83% | 0.1 | 0.1 | ND | 12.5 | 1.1E+01 | YES | ASL |
| Lead | mg/L | 18 | 0 | 0% | 0.01 | 0.01 | ND | ND | NA | NO | IFD |
| Magnesium | mg/L | 18 | 18 | 100% | 0.05 | 0.05 | 8.2 | 75 | NA | NO | NUT |
| Manganese | mg/L | 18 | 18 | 100% | 0.015 | 0.015 | 0.022 | 12 | 8.8E-01 | YES | ASL |
| Nickel | mg/L | 18 | 12 | 67% | 0.02 | 0.02 | ND | 0.05 | 7.3E-01 | NO | BSL |
| Potassium | mg/L | 18 | 18 | 100% | 0.2 | 0.2 | 0.3 | 3.3 | NA | NO | NUT |
| Selenium | mg/L | 18 | 15 | 83% | 0.035 | 0.035 | ND | 0.033 | 1.8E-01 | NO | BSL |
| Silver | mg/L | 18 | 0 | 0% | 0.01 | 0.01 | ND | ND | 1.8E-01 | NO | IFD |
| Sodium | mg/L | 18 | 18 | 100% | 0.05 | 0.05 | 11 | 36 | NA | NO | NUT |
| Thallium | mg/L | 18 | 8 | 44% | 0.025 | 0.025 | ND | 0.0014 | 2.4E-03 | NO | BSL |
| Vanadium | mg/L | 18 | 11 | 61% | 0.05 | 0.05 | ND | 0.013 | 3.6E-02 | NO | BSL |
| Zinc | mg/L | 18 | 12 | 67% | 0.02 | 0.02 | ND | 0.03 | 1.1E+01 | NO | BSL |
| Mercury | mg/L | 18 | 3 | 17% | 0.0002 | 0.0002 | ND | 0.000057 | 1.1E-02 | NO | BSL |
| 1,2,4,5-Tetrachlorobenzene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 1.1E+01 | NO | IFD |
| 2,4,5-Trichlorophenol | ug/L | 18 | 0 | 0% | 25 | 25 | ND | ND | 3.6E+03 | NO | IFD |
| 2,4,6-Trichlorophenol | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 3.6E+00 | NO | IFD |
| 2,4-Dichlorophenol | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 1.1E+02 | NO | IFD |
| 2,4-Dimethylphenol | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 7.3E+02 | NO | IFD |
| 2,4-Dinitrophenol | ug/L | 18 | 0 | 0% | 25 | 25 | ND | ND | 7.3E+01 | NO | IFD |
| 2,4-Dinitrotoluene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 7.3E+01 | NO | IFD |
| 2,6-Dinitrotoluene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 3.6E+01 | NO | IFD |
| 2-Chloronaphthalene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| 2-Chlorophenol | ug/L | 18 | 1 | 6% | 10 | 50 | ND | 145 | 3.0E+01 | YES | ASL |
| 2-Methylnaphthalene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| 2-Methylphenol | ug/L | 18 | 1 | 6% | 10 | 10 | ND | 88.5 | 1.8E+03 | NO | BSL |
| 2-Nitroaniline | ug/L | 18 | 0 | 0% | 25 | 25 | ND | ND | 1.1E+02 | NO | IFD |
| 2-Nitrophenol | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| 3,3'-Dichlorobenzidine | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 1.5E-01 | NO | IFD |
| 3+4-Methylphenol | ug/L | 18 | 1 | 6% | 10 | 10 | ND | 52.5 | 1.80E+02 | NO | BSL |
| 3-Nitroaniline | ug/L | 18 | 0 | 0% | 25 | 25 | ND | ND | 3.2E+00 | NO | IFD |
| 4,6-Dinitro-o-cresol | ug/L | 18 | 0 | 0% | 25 | 25 | ND | ND | 3.6E+00 | NO | IFD |
| 4-Bromophenyl phenyl ether | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| 4-Chloroaniline | ug/L | 18 | 1 | 6% | 10 | 10 | ND | 35 | 1.5E+02 | NO | BSL |
| 4-Chlorophenyl phenyl ether | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| 4-Nitroaniline | ug/L | 18 | 0 | 0% | 25 | 25 | ND | ND | 3.2E+00 | NO | IFD |
| 4-Nitrophenol | ug/L | 18 | 0 | 0% | 25 | 25 | ND | ND | NA | NO | IFD |
| Acenaphthene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 3.7E+02 | NO | IFD |
| Acenaphthylene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| Acetophenone | ug/L | 18 | 1 | 6% | 10 | 10 | ND | 60 | NA | YES | NSL |
| Anthracene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 1.8E+03 | NO | IFD |
| Atrazine | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 3.0E-01 | NO | IFD |
| Benzaldehyde | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 3.6E+03 | NO | IFD |
| Benzo(a)anthracene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 9.2E-02 | NO | IFD |
| Benzo(a)pyrene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 9.2E-03 | NO | IFD |
| Benzo(b)fluoranthene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 9.2E-02 | NO | IFD |
| Benzo(ghi)perylene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| Benzo(k)fluoranthene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 9.2E-01 | NO | IFD |
| Biphenyl | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 3.04E+02 | NO | IFD |
| Bis(2-chloroethoxy)methane | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| Bis(2-chloroethyl)ether | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 1.0E-02 | NO | IFD |
| Bis(2-chloroisopropyl)ether | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 2.7E-01 | NO | IFD |
| Bis(2-ethylhexyl)phthalate | ug/L | 18 | 3 | 17% | 10 | 10 | ND | 14.5 | 4.8E+00 | YES | ASL |
| Butyl benzyl phthalate | ug/L | 18 | 1 | 6% | 10 | 10 | ND | 36 | 7.3E+03 | NO | BSL |
| Caprolactam | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 1.8E+04 | NO | IFD |
| Carbazole | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 3.4E+00 | NO | IFD |
| Chrysene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 9.2E+00 | NO | IFD |
| Dibenzo(a,h)anthracene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 9.2E-03 | NO | IFD |
| Dibenzofuran | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 1.2E+01 | NO | IFD |
| Diethyl phthalate | ug/L | 18 | 1 | 6% | 10 | 10 | ND | 6.85 | 2.9E+04 | NO | BSL |
| Dimethyl phthalate | ug/L | 18 | 1 | 6% | 10 | 10 | ND | 19 | 3.6E+05 | NO | BSL |
| Di-n-butylphthalate | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| Di-n-octylphthalate | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 1.46E+03 | NO | IFD |
| Fluoranthene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 1.5E+03 | NO | IFD |
| Fluorene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 2.4E-02 | NO | IFD |
| Hexachlorobenzene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 4.2E-02 | NO | IFD |
| Hexachlorobutadiene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 8.6E-01 | NO | IFD |

Table H-1.4
Occurrence, Distribution and Selection of Chemicals of Potential Concern
Site-wide Shallow and Bedrock Groundwater

| Chemical | Units | Number of Samples | Number of Detects | Frequency of Detection | Minimum Reporting Limit | Maximum Reporting Limit | Minimum Detected Concentration | Maximum Detected Concentration | Criteria Tap Water PRGs | COPC (Yes/No) | Rationale for Selection or Deletion |
|---------------------------------------|-------|-------------------|-------------------|------------------------|-------------------------|-------------------------|--------------------------------|--------------------------------|-------------------------|---------------|-------------------------------------|
| Hexachlorocyclopentadiene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 2.2E+02 | NO | IFD |
| Hexachloroethane | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 4.8E+00 | NO | IFD |
| Indeno(1,2,3-cd)pyrene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 9.2E-02 | NO | IFD |
| Isophorone | ug/L | 18 | 1 | 6% | 10 | 10 | ND | 16.5 | 7.1E+01 | NO | BSL |
| Naphthalene | ug/L | 18 | 3 | 17% | 10 | 10 | ND | 30.5 | 6.2E+00 | YES | ASL |
| NDPA/DPA | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 1.4E+01 | NO | IFD |
| Nitrobenzene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 3.4E+00 | NO | IFD |
| n-Nitrosodi-n-propylamine | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 9.6E-03 | NO | IFD |
| p-Chloro-m-cresol | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| Pentachlorophenol | ug/L | 18 | 0 | 0% | 25 | 25 | ND | ND | 5.6E-01 | NO | IFD |
| Phenanthrene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | NA | NO | IFD |
| Phenol | ug/L | 18 | 1 | 6% | 10 | 10 | ND | 44 | 1.1E+04 | NO | BSL |
| Pyrene | ug/L | 18 | 0 | 0% | 10 | 10 | ND | ND | 1.8E+02 | NO | IFD |
| 1,1,1-Trichloroethane | ug/L | 88 | 22 | 25% | 10 | 10000 | ND | 51000 | 3.2E+03 | YES | ASL |
| 1,1,2,2-Tetrachloroethane | ug/L | 88 | 1 | 1% | 10 | 10000 | ND | 3.09 | 5.5E-02 | NO | IFD |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | ug/L | 88 | 13 | 15% | 10 | 10000 | ND | 333 | NA | NO | NTX |
| 1,1,2-Trichloroethane | ug/L | 88 | 23 | 26% | 10 | 10000 | ND | 154 | 2.0E-01 | YES | ASL |
| 1,1-Dichloroethane | ug/L | 88 | 48 | 55% | 10 | 10000 | ND | 7200 | 8.1E+02 | YES | ASL |
| 1,1-Dichloroethene | ug/L | 88 | 46 | 52% | 10 | 10000 | ND | 8100 | 3.5E+02 | YES | ASL |
| 1,2,3-Trichlorobenzene | ug/L | 88 | 1 | 1% | 10 | 10000 | ND | 374 | NA | NO | IFD |
| 1,2,4-Trichlorobenzene | ug/L | 88 | 5 | 6% | 10 | 10000 | ND | 126 | 7.2E+00 | YES | ASL |
| 1,2-Dibromo-3-chloropropane | ug/L | 88 | 0 | 0% | 10 | 10000 | ND | ND | 4.8E-02 | NO | IFD |
| 1,2-Dibromoethane | ug/L | 88 | 0 | 0% | 10 | 10000 | ND | ND | 5.6E-03 | NO | IFD |
| 1,2-Dichlorobenzene | ug/L | 88 | 25 | 28% | 10 | 10000 | ND | 2500 | 3.7E+02 | YES | ASL |
| 1,2-Dichloroethane | ug/L | 88 | 47 | 53% | 10 | 10000 | ND | 52500 | 1.2E-01 | YES | ASL |
| 1,2-Dichloropropane | ug/L | 88 | 4 | 5% | 10 | 10000 | ND | 1.99 | 1.6E-01 | NO | IFD |
| 1,3-Dichlorobenzene | ug/L | 88 | 12 | 14% | 10 | 10000 | ND | 110 | 1.8E+02 | NO | BSL |
| 1,4-Dichlorobenzene | ug/L | 88 | 14 | 16% | 10 | 10000 | ND | 1300 | 5.0E-01 | YES | ASL |
| 2-Butanone | ug/L | 88 | 11 | 13% | 10 | 10000 | ND | 3150 | 7.0E+03 | NO | BSL |
| 2-Hexanone | ug/L | 88 | 7 | 8% | 10 | 10000 | ND | 478 | NA | YES | NSL |
| 4-Methyl-2-pentanone | ug/L | 88 | 12 | 14% | 10 | 10000 | ND | 11000 | 6.3E+03 | YES | ASL |
| Acetone | ug/L | 88 | 20 | 23% | 10 | 10000 | ND | 4400 | 5.5E+03 | NO | BSL |
| Benzene | ug/L | 88 | 44 | 50% | 10 | 10000 | ND | 1050 | 3.5E-01 | YES | ASL |
| Bromochloromethane | ug/L | 88 | 0 | 0% | 10 | 10000 | ND | ND | NA | NO | IFD |
| Bromodichloromethane | ug/L | 88 | 6 | 7% | 10 | 10000 | ND | 6.27 | 1.8E-01 | YES | ASL |
| Bromoform | ug/L | 88 | 0 | 0% | 10 | 10000 | ND | ND | 8.5E+00 | NO | IFD |
| Bromomethane | ug/L | 88 | 0 | 0% | 10 | 10000 | ND | ND | 8.7E+00 | NO | IFD |
| Carbon disulfide | ug/L | 88 | 3 | 3% | 10 | 10000 | ND | 1.22 | 1.0E+03 | NO | IFD |
| Carbon tetrachloride | ug/L | 88 | 1 | 1% | 10 | 10000 | ND | 11000 | 1.7E-01 | NO | IFD |
| Chlorobenzene | ug/L | 88 | 34 | 39% | 10 | 10000 | ND | 3500 | 1.1E+02 | YES | ASL |
| Chloroethane | ug/L | 88 | 24 | 27% | 10 | 10000 | ND | 2850 | 4.6E+00 | YES | ASL |
| Chloroform | ug/L | 88 | 33 | 38% | 10 | 10000 | ND | 882 | 1.7E-01 | YES | ASL |
| Chloromethane | ug/L | 88 | 4 | 5% | 10 | 10000 | ND | 14 | 1.6E+02 | NO | IFD |
| cis-1,2-Dichloroethene | ug/L | 88 | 60 | 68% | 10 | 10000 | ND | 13000 | 6.10E+01 | YES | ASL |
| cis-1,3-Dichloropropene | ug/L | 88 | 0 | 0% | 10 | 10000 | ND | ND | NA | NO | IFD |
| Cyclohexane | ug/L | 88 | 11 | 13% | 10 | 10000 | ND | 770 | 1.0E+04 | NO | BSL |
| Dibromochloromethane | ug/L | 88 | 3 | 3% | 10 | 10000 | ND | 3.85 | 1.3E-01 | NO | IFD |
| Dichlorodifluoromethane | ug/L | 88 | 1 | 1% | 10 | 10000 | ND | 0.1375 | 3.9E+02 | NO | IFD |
| Ethylbenzene | ug/L | 88 | 31 | 35% | 10 | 10000 | ND | 46000 | 1.3E+03 | YES | ASL |
| Isopropylbenzene | ug/L | 88 | 34 | 39% | 10 | 10000 | ND | 36000 | 6.6E+02 | YES | ASL |
| Methyl acetate | ug/L | 88 | 0 | 0% | 10 | 10000 | ND | ND | 6.1E+03 | NO | IFD |
| Methyl tert butyl ether | ug/L | 88 | 17 | 19% | 10 | 10000 | ND | 444 | 1.1E+01 | YES | ASL |
| Methylcyclohexane | ug/L | 88 | 29 | 33% | 10 | 10000 | ND | 19000 | 5.2E+03 | YES | ASL |
| Methylene chloride | ug/L | 88 | 29 | 33% | 10 | 10000 | ND | 7900 | 4.3E+00 | YES | ASL |
| Styrene | ug/L | 88 | 0 | 0% | 10 | 10000 | ND | ND | 1.6E+03 | NO | IFD |
| Tetrachloroethene | ug/L | 88 | 51 | 58% | 10 | 10000 | ND | 13000 | 1.0E-01 | YES | ASL |
| Toluene | ug/L | 88 | 74 | 84% | 10 | 10000 | ND | 52000 | 7.2E+02 | YES | ASL |
| trans-1,2-Dichloroethene | ug/L | 88 | 27 | 31% | 10 | 10000 | ND | 49 | 1.22E+02 | NO | BSL |
| trans-1,3-Dichloropropene | ug/L | 88 | 0 | 0% | 10 | 10000 | ND | ND | NA | NO | IFD |
| Trichloroethene | ug/L | 88 | 58 | 66% | 10 | 10000 | ND | 14000 | 1.0E-01 | YES | ASL |
| Trichlorofluoromethane | ug/L | 88 | 11 | 13% | 10 | 10000 | ND | 987 | 1.3E+03 | NO | BSL |
| Vinyl chloride | ug/L | 88 | 36 | 41% | 10 | 10000 | ND | 1200 | 2.0E-02 | YES | ASL |
| Xylenes (Total) | ug/L | 88 | 35 | 40% | 10 | 10000 | ND | 150000 | 2.1E+02 | YES | ASL |

Notes:

Rationale Codes:

Selection Reason: ASL = Above Screening Level.

NSL = Detected, No Screening Level Available.

TOX = Group A Carcinogen.

Deletion Reason: BSL = Below Screening Level.

IFD = Infrequent detection (less than or equal to 5%).

NUT = Essential Nutrient.

NTX = No Toxicity Value Available.

H-2 Exposure Assumptions

**Exposure Assumptions
Current O&M Worker Scenario**

PSC Site
Rock Hill, South Carolina

| Parameter Abbreviation | Parameter | Units | Carcinogenic | Noncarcinogenic | Basis/Source |
|----------------------------------|--------------------------------------------|---------------------------|-------------------|-------------------|----------------------------------------------------------------------------|
| AE _d | Dermal absorption efficiency | Unitless | Chemical-Specific | Chemical-Specific | EPA, Region 4 Supplement to RAGS 2007 |
| AE _i | Ingestion absorption efficiency | Unitless | 1 | 1 | EPA, RAGS 1989 |
| AE _{inhal} | Inhalation Absorption efficiency | Unitless | 1 | 1 | EPA, RAGS 1989 |
| At _c /AT _n | Averaging Time | days | 25550 | 9125 | EPA, RAGS 1989 |
| BW | Body Weight | kg | 70 | 70 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 |
| ED | Exposure Duration | yrs | 25 | 25 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 |
| EF | Exposure Frequency | day/yr | 250 | 250 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 |
| FC | Fraction ingested from contaminated source | unitless | 1 | 1 | EPA, RAGS 1989 |
| IR _{air-hourly} | Hourly Inhalation Rate | m ³ /hour | 1 | 1 | EPA, Exposure Factors Handbook Revised, 1997 |
| ET _{inh} | Inhalation Exposure Time | hours | 8 | 8 | Professional judgment |
| IR _{soil} | Soil Ingestion Rate | mg/day | 50 | 50 | EPA, Exposure Factors Handbook Revised, 1997 |
| IR _w | Daily Water Ingestion Rate | L/day | 1 | 1 | EPA, RAGS Supplemental Guidance. Standard Default Exposure Factors, 1991 |
| AF | Soil to Skin Adherence Factor | mg/cm ² -event | 0.2 | 0.2 | EPA, RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004a |
| SA | Skin Surface Area | cm ² | 3300 | 3300 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 |

Exposure Assumptions
Current and Future Teen/Adolescent Trespasser-Recreational Scenarios

PSC Site
 Rock Hill, South Carolina

| Parameter Abbreviation | Parameter | Units | Carcinogenic | Noncarcinogenic | Basis/Source |
|----------------------------------|--------------------------------------------|---------------------------|-------------------|-------------------|---------------------------------------------------------------------------------------------------|
| AE _d | Dermal absorption efficiency | Unitless | Chemical-Specific | Chemical-Specific | EPA, Region 4 Supplement to RAGS 2007 |
| AE _i | Ingestion absorption efficiency | Unitless | 1 | 1 | EPA, RAGS 1989 |
| AE _{inhal} | Inhalation Absorption efficiency | Unitless | 1 | 1 | EPA, RAGS 1989 |
| At _c /AT _n | Averaging Time | days | 25550 | 4380 | EPA, RAGS, 1989; Professional judgment (noncancer) |
| BW | Body Weight | kg | 42 | 42 | EPA, Exposure Factors Handbook Revised, 1997 |
| ED | Exposure Duration | yrs | 12 | 12 | Professional judgment |
| EF | Exposure Frequency | day/yr | 144 | 144 | Professional judgment - Approx. 3 days per week of year-round exposure |
| FC | Fraction ingested from contaminated source | unitless | 1 | 1 | EPA, RAGS 1989 |
| IR _{air-hourly} | Hourly Inhalation Rate | m ³ /hour | 0.52 | 0.52 | EPA, Exposure Factors Handbook Revised, 1997 Light activity level |
| ET _{inh} | Inhalation Exposure Time | hours | 4 | 4 | Professional judgment |
| IR _{soil} | Soil Ingestion Rate | mg/day | 100 | 100 | Mean IR for child; EPA, Exposure Factors Handbook Revised, 1997 |
| IR _w | Daily Water Ingestion Rate | L/day | NA | NA | NA |
| AF | Soil to Skin Adherence Factor | mg/cm ² -event | 0.2 | 0.2 | EPA, RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004a |
| SA | Skin Surface Area | cm ² | 7605 | 7605 | Mean SA for children 6-16 (head, arms, hands, legs); EPA, Exposure Factors Handbook Revised, 1997 |

**Exposure Assumptions
Future Industrial Worker Scenario**

PSC Site
Rock Hill, South Carolina

| Parameter Abbreviation | Parameter | Units | Carcinogenic | Noncarcinogenic | Basis/Source |
|----------------------------------|--------------------------------------------|---------------------------|-------------------|-------------------|----------------------------------------------------------------------------|
| AE _d | Dermal absorption efficiency | Unitless | Chemical-Specific | Chemical-Specific | EPA, Region 4 Supplement to RAGS 2007 |
| AE _i | Ingestion absorption efficiency | Unitless | 1 | 1 | EPA, RAGS 1989 |
| AE _{inhal} | Inhalation Absorption efficiency | Unitless | 1 | 1 | EPA, RAGS 1989 |
| At _c /AT _n | Averaging Time | days | 25550 | 9125 | EPA, RAGS 1989 |
| BW | Body Weight | kg | 70 | 70 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 |
| ED | Exposure Duration | yrs | 25 | 25 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 |
| EF | Exposure Frequency | day/yr | 250 | 250 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 |
| FC | Fraction ingested from contaminated source | unitless | 1 | 1 | EPA, RAGS 1989 |
| IR _{air-hourly} | Hourly Inhalation Rate | m ³ /hour | 1 | 1 | EPA, Exposure Factors Handbook Revised, 1997 |
| ET _{inh} | Inhalation Exposure Time | hours | 8 | 8 | Professional judgment |
| IR _{soil} | Soil Ingestion Rate | mg/day | 50 | 50 | EPA, Exposure Factors Handbook Revised, 1997 |
| IR _w | Daily Water Ingestion Rate | L/day | 1 | 1 | EPA, RAGS Supplemental Guidance. Standard Default Exposure Factors, 1991 |
| AF | Soil to Skin Adherence Factor | mg/cm ² -event | 0.2 | 0.2 | EPA, RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004a |
| SA | Skin Surface Area | cm ² | 3300 | 3300 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 |

**Exposure Assumptions
Current/Future Excavation Worker Scenario**

PSC Site
Rock Hill, South Carolina

| Parameter Abbreviation | Parameter | Units | Carcinogenic | Noncarcinogenic | Basis/Source |
|----------------------------------|--------------------------------------------|---------------------------|-------------------|-------------------|---------------------------------------------------------------------------------------|
| AE _d | Dermal absorption efficiency | Unitless | Chemical-Specific | Chemical-Specific | EPA, Region 4 Supplement to RAGS 2007 |
| AE _i | Ingestion absorption efficiency | Unitless | 1 | 1 | EPA, RAGS 1989 |
| AE _{inhal} | Inhalation Absorption efficiency | Unitless | 1 | 1 | EPA, RAGS 1989 |
| At _c /AT _n | Averaging Time | days | 25550 | 365 | EPA, RAGS, 1989; Supplemental Guidance for Soil Screening Levels (2002) for noncancer |
| BW | Body Weight | kg | 70 | 70 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 |
| ED | Exposure Duration | yrs | 1 | 1 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 |
| EF | Exposure Frequency | day/yr | 250 | 250 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 |
| FC | Fraction ingested from contaminated source | unitless | 1 | 1 | EPA, RAGS 1989 |
| IR _{air-hourly} | Hourly Inhalation Rate | m ³ /hour | 1 | 1 | EPA, Exposure Factors Handbook Revised, 1997 |
| ET _{inh} | Inhalation Exposure Time | hours | 8 | 8 | Professional judgment |
| IR _{soil} | Soil Ingestion Rate | mg/day | 330 | 330 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 |
| IR _w | Daily Water Ingestion Rate | L/day | NA | NA | NA |
| AF | Soil to Skin Adherence Factor | mg/cm ² -event | 0.2 | 0.2 | EPA, RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004a |
| SA | Skin Surface Area | cm ² | 3300 | 3300 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 |

**Exposure Assumptions
Future Residential Scenario**

PSC Site
Rock Hill, South Carolina

| Parameter Abbreviation | Parameter | Units | Carcinogenic | Basis/Source | Noncarcinogenic | Basis/Source |
|----------------------------------|---------------------------------------|---------------------------|-----------------------|------------------------------------------------------------|----------------------|------------------------------------------------------------------------------------------|
| | | | Adult Resident (1-31) | | Child Resident (1-6) | |
| Parameter Abbreviation | Parameter | Units | Carcinogenic | Basis/Source | Noncarcinogenic | Basis/Source |
| AE _d | Dermal absorption efficiency | Unitless | Chemical-Specific | EPA, Region 4 Supplement to RAGS 2007 | Chemical-Specific | EPA, Region 4 Supplement to RAGS 2007 |
| AE _i | Ingestion absorption efficiency | Unitless | 1 | EPA, RAGS 1989 | 1 | EPA, RAGS 1989 |
| AE _{inhal} | Inhalation Absorption efficiency | Unitless | 1 | EPA, RAGS 1989 | 1 | EPA, RAGS 1989 |
| At _c /AT _n | Averaging Time | days | 25550 | EPA, RAGS, 1989 | 2190 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 |
| BW | Body Weight | kg | 70 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 | 15 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 |
| ED | Exposure Duration | yrs | 30 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 | 6 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 |
| EF | Exposure Frequency | day/yr | 350 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 | 350 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 |
| FC | Fraction ingested from c _i | unitless | 1 | EPA, RAGS 1989 | 1 | EPA, RAGS 1989 |
| IR _{air-hourly} | Hourly Inhalation Rate | m ³ /hour | 1 | EPA, Exposure Factors Handbook Revised, 1997 | 0.26 | EPA, Exposure Factors Handbook Revised, 1997 Light activity level for child 1-6 years |
| ET _{inh} | Inhalation Exposure Time | hours | 16 | Professional judgment | 16 | Professional judgment |
| IR _{soil} | Soil Ingestion Rate | mg/day | 50 | EPA, Exposure Factors Handbook Revised, 1997 | 200 | EPA, Region 4 Supplement to RAGS 2007 |
| IR _w | Daily Water Ingestion Rate | L/day | 2 | EPA, Region 4 Supplement to RAGS 2007 | 2 | EPA, Region 4 Supplement to RAGS 2007 |
| AF | Soil to Skin Adherence Factor | mg/cm ² -event | | | 0.2 | EPA, RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004a |
| SA | Skin Surface Area | cm ² | | | 2800 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 |
| SFS | Age-adjusted Dermal Factor | mg-year/kg-event | 360 | EPA, Supplemental Guidance for Soil Screening Levels, 2002 | | |

H-3 Exposure Point Concentration Tables

Table H-3.1
 Medium Specific Exposure Point Concentration Summary
 Current Surface Soil, Excluding Hot Spots and Concrete Pad

PSC Site
 Rock Hill, South Carolina

| Chemical | Units | Number of Samples | Number Detects | Frequency of Detection | Min Detection Limit | Max Detection Limit | Min Concentration | Max Concentration | Mean | 95%UCL | EPC | Statistic |
|---------------------|-------|-------------------|----------------|------------------------|---------------------|---------------------|-------------------|-------------------|-----------|-----------|-----------|---------------------------|
| Arsenic | mg/kg | 44 | 42 | 95% | 0.5 | 0.5 | 0.74 | 8.90 | 1.90 | 2.92 | 2.92 | 95% KM (Chebyshev) UCL |
| Iron | mg/kg | 44 | 44 | 100% | 1.6 | 1.6 | 7,400.00 | 86,000.00 | 33,065.91 | 38,116.00 | 38,116.00 | 95% Approximate Gamma UCL |
| Manganese | mg/kg | 44 | 44 | 100% | 0.5 | 0.5 | 80.00 | 1,500.00 | 549.20 | 646.10 | 646.10 | 95% Approximate Gamma UCL |
| Thallium | mg/kg | 44 | 44 | 100% | 2.4 | 2.4 | 7.75 | 91.00 | 36.91 | 42.94 | 42.94 | 95% Approximate Gamma UCL |
| Vanadium | mg/kg | 44 | 44 | 100% | 0.4 | 0.4 | 13.00 | 400.00 | 115.22 | 143.70 | 143.70 | 95% Approximate Gamma UCL |
| Di-n-butylphthalate | ug/kg | 44 | 3 | 7% | 200 | 200 | 230.00 | 240.00 | 109.09 | -- | -- | --- |
| 1,2-Dichloroethane | ug/kg | 43 | 9 | 21% | 0.18 | 0.3 | 0.36 | 35.65 | 1.68 | 1.70 | 1.70 | 95% KM (t) UCL |
| Tetrachloroethene | ug/kg | 43 | 9 | 21% | 0.14 | 0.5 | 1.40 | 35.00 | 2.13 | 4.79 | 4.79 | 95% KM (t) UCL |

Table H-3.2
 Medium Specific Exposure Point Concentration Summary Future Surface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

| Chemical | Units | Number of Samples | Number Detects | Frequency of Detection | Min Detection Limit | Max Detection Limit | Min Concentration | Max Concentration | Mean | 95%UCL | EPC | Statistic |
|---------------------|-------|-------------------|----------------|------------------------|---------------------|---------------------|-------------------|-------------------|-----------|-----------|-----------|---------------------------|
| Arsenic | mg/kg | 52 | 50 | 96% | 0.5 | 0.5 | 0.74 | 8.90 | 1.85 | 2.71 | 2.71 | 95% KM (Chebyshev) UCL |
| Iron | mg/kg | 52 | 52 | 100% | 1.6 | 1.6 | 7,400.00 | 86,000.00 | 34,575.00 | 39,124.00 | 39,124.00 | 95% Approximate Gamma UCL |
| Manganese | mg/kg | 52 | 52 | 100% | 0.5 | 0.5 | 80.00 | 7,300.00 | 664.71 | 767.30 | 767.30 | 95% H-UCL |
| Thallium | mg/kg | 52 | 52 | 100% | 2.4 | 2.4 | 7.75 | 91.00 | 38.31 | 42.93 | 42.93 | 95% Student's-t UCL |
| Vanadium | mg/kg | 52 | 52 | 100% | 0.4 | 0.4 | 13.00 | 400.00 | 122.30 | 148.10 | 148.10 | 95% Approximate Gamma UCL |
| Di-n-butylphthalate | ug/kg | 52 | 4 | 8% | 200 | 200 | 230.00 | 240.00 | 110.38 | -- | -- | --- |
| 1,2-Dichloroethane | ug/kg | 52 | 10 | 19% | 0.18 | 0.3 | 0.36 | 1,400.00 | 28.33 | 321.30 | 321.30 | 99% KM (Chebyshev) UCL |
| Tetrachloroethene | ug/kg | 52 | 14 | 27% | 0.14 | 0.5 | 0.69 | 111.00 | 5.84 | 11.41 | 11.41 | 95% KM (t) UCL |

Table H-3.3
Medium Specific Exposure Point Concentration Summary
Future Surface Soil, Hot Spot 1

PSC Site
Rock Hill, South Carolina

| Chemical | Units | Number of Samples | Number Detects | Frequency of Detection | Min Detection Limit | Max Detection Limit | Min Concentration | Max Concentration | Mean | 95%UCL | EPC | Statistic |
|---------------------|-------|-------------------|----------------|------------------------|---------------------|---------------------|-------------------|-------------------|-----------|--------|-----------|------------|
| Arsenic | mg/kg | 3 | 3 | 100% | 0.5 | 0.5 | 1.00 | 1.90 | 1.47 | NA | 1.90 | Max Detect |
| Iron | mg/kg | 3 | 3 | 100% | 1.6 | 1.6 | 20,000.00 | 54,500.00 | 34,500.00 | NA | 54,500.00 | Max Detect |
| Manganese | mg/kg | 3 | 3 | 100% | 0.5 | 0.5 | 490.00 | 1,700.00 | 963.33 | NA | 1,700.00 | Max Detect |
| Thallium | mg/kg | 3 | 3 | 100% | 2.4 | 2.4 | 21.00 | 50.00 | 33.33 | NA | 50.00 | Max Detect |
| Vanadium | mg/kg | 3 | 3 | 100% | 0.4 | 0.4 | 60.00 | 96.50 | 79.50 | NA | 96.50 | Max Detect |
| Di-n-butylphthalate | ug/kg | 3 | 1 | 33% | 200 | 200 | 2,400.00 | 2,400.00 | 866.67 | -- | -- | --- |
| 1,2-Dichloroethane | ug/kg | 4 | 0 | 0% | 0.3 | 0.3 | ND | ND | 0.15 | NA | ND | Max Detect |
| Tetrachloroethene | ug/kg | 4 | 2 | 50% | 0.5 | 0.5 | 49.00 | 2,700.00 | 687.38 | NA | 2,700.00 | Max Detect |

Table H-3.4
 Medium Specific Exposure Point Concentration Summary
 Future Surface Soil, Hot Spot 2

PSC Site
 Rock Hill, South Carolina

| Chemical | Units | Number of Samples | Number Detects | Frequency of Detection | Min Detection Limit | Max Detection Limit | Min Concentration | Max Concentration | Mean | 95%UCL | EPC | Statistic |
|---------------------|-------|-------------------|----------------|------------------------|---------------------|---------------------|-------------------|-------------------|--------|--------|--------|------------|
| Arsenic | mg/kg | NA | NA | 100% | NA | NA | NA | NA | NA | NA | NA | NA |
| Iron | mg/kg | NA | NA | 100% | NA | NA | NA | NA | NA | NA | NA | NA |
| Manganese | mg/kg | NA | NA | 100% | NA | NA | NA | NA | NA | NA | NA | NA |
| Thallium | mg/kg | NA | NA | 100% | NA | NA | NA | NA | NA | NA | NA | NA |
| Vanadium | mg/kg | NA | NA | 100% | NA | NA | NA | NA | NA | NA | NA | NA |
| Di-n-butylphthalate | ug/kg | NA | NA | 100% | NA | NA | NA | NA | NA | -- | -- | --- |
| 1,2-Dichloroethane | ug/kg | 1 | 0 | 0% | 0.3 | 0.3 | ND | ND | 0.15 | NA | ND | Max Detect |
| Tetrachloroethene | ug/kg | 1 | 1 | 100% | 0.5 | 0.5 | 800.00 | 800.00 | 800.00 | NA | 800.00 | Max Detect |

Table H-3.5
Medium Specific Exposure Point Concentration Summary
Future Surface Soil, Hot Spot 3

PSC Site
Rock Hill, South Carolina

| Chemical | Units | Number of Samples | Number Detects | Frequency of Detection | Min Detection Limit | Max Detection Limit | Min Concentration | Max Concentration | Mean | 95%UCL | EPC | Statistic |
|---------------------|-------|-------------------|----------------|------------------------|---------------------|---------------------|-------------------|-------------------|-----------|--------|-----------|------------|
| Arsenic | mg/kg | 1 | 1 | 100% | 0.5 | 0.5 | 1.80 | 1.80 | 1.80 | NA | 1.80 | Max Detect |
| Iron | mg/kg | 1 | 1 | 100% | 1.6 | 1.6 | 99,000.00 | 99,000.00 | 99,000.00 | NA | 99,000.00 | Max Detect |
| Manganese | mg/kg | 1 | 1 | 100% | 0.5 | 0.5 | 2,200.00 | 2,200.00 | 2,200.00 | NA | 2,200.00 | Max Detect |
| Thallium | mg/kg | 1 | 1 | 100% | 2.4 | 2.4 | 99.00 | 99.00 | 99.00 | NA | 99.00 | Max Detect |
| Vanadium | mg/kg | 1 | 1 | 100% | 0.4 | 0.4 | 510.00 | 510.00 | 510.00 | NA | 510.00 | Max Detect |
| Di-n-butylphthalate | ug/kg | 1 | 0 | 0% | 200 | 200 | ND | ND | 100.00 | -- | -- | --- |
| 1,2-Dichloroethane | ug/kg | 1 | 0 | 0% | 0.3 | 0.3 | ND | ND | 0.15 | NA | ND | Max Detect |
| Tetrachloroethene | ug/kg | 1 | 1 | 100% | 0.5 | 0.5 | 2,800.00 | 2,800.00 | 2,800.00 | NA | 2,800.00 | Max Detect |

Table H-3.6
 Medium Specific Exposure Point Concentration Summary
 Current Subsurface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

| Chemical | Units | Number of Samples | Number Detects | Frequency of Detection | Min Detection Limit | Max Detection Limit | Min Concentration | Max Concentration | Mean | 95%UCL | EPC | Statistic |
|---------------------------------------|-------|-------------------|----------------|------------------------|---------------------|---------------------|-------------------|-------------------|-----------|-----------|-----------|--------------------------|
| Arsenic | mg/kg | 101 | 78 | 77% | 0.5 | 0.5 | ND | 8.90 | 1.34 | 1.62 | 1.62 | 95% KM (BCA) UCL |
| Iron | mg/kg | 101 | 101 | 100% | 1.6 | 1.6 | 7,400.00 | 99,000.00 | 33,410.48 | 36,293.00 | 36,293.00 | Use 95% Student's-t UCL |
| Manganese | mg/kg | 101 | 101 | 100% | 0.5 | 0.5 | 60.00 | 7,300.00 | 616.86 | 695.50 | 695.50 | Use 95% H-UCL |
| Thallium | mg/kg | 101 | 101 | 100% | 2.4 | 2.4 | 7.75 | 99.00 | 36.45 | 39.61 | 39.61 | Use 95% Student's-t UCL |
| Vanadium | mg/kg | 101 | 101 | 100% | 0.4 | 0.4 | 12.00 | 510.00 | 120.23 | 5,563.00 | 5,563.00 | 97.5% KM (Chebyshev) UCL |
| Di-n-butylphthalate | ug/kg | 103 | 7 | 7% | 200 | 200 | ND | 2,400.00 | 129.63 | -- | -- | --- |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | ug/kg | 152 | 9 | 6% | 0.8 | 0.8 | ND | 33.00 | 0.75 | -- | -- | --- |
| 1,2-Dichloroethane | ug/kg | 152 | 53 | 35% | 0.18 | 0.3 | ND | 2,500.00 | 135.96 | 353.50 | 353.50 | 97.5% KM (Chebyshev) UCL |
| 1,4-Dichlorobenzene | ug/kg | 152 | 18 | 12% | 0.21 | 0.3 | ND | 2,205.00 | 40.04 | 170.80 | 170.80 | 97.5% KM (Chebyshev) UCL |
| Benzene | ug/kg | 152 | 40 | 26% | 0.18 | 0.4 | ND | 490.00 | 12.89 | 43.11 | 43.11 | 97.5% KM (Chebyshev) UCL |
| Chloroform | ug/kg | 152 | 27 | 18% | 0.13 | 0.2 | ND | 63.00 | 1.24 | 2.16 | 2.16 | 95% KM (t) UCL |
| cis-1,2-Dichloroethene | ug/kg | 152 | 72 | 47% | 0.16 | 0.5 | ND | 3,200.00 | 93.08 | 269.90 | 269.90 | 97.5% KM (Chebyshev) UCL |
| Tetrachloroethene | ug/kg | 152 | 70 | 46% | 0.14 | 0.5 | ND | 2,800.00 | 80.42 | 275.60 | 275.60 | 97.5% KM (Chebyshev) UCL |
| Toluene | ug/kg | 152 | 67 | 44% | 0.17 | 0.4 | ND | 220,000.00 | 2,340.66 | 11,695.00 | 11,695.00 | 97.5% KM (Chebyshev) UCL |
| Trichloroethene | ug/kg | 152 | 71 | 47% | 0.23 | 0.6 | ND | 1,700.00 | 40.32 | 126.50 | 126.50 | 97.5% KM (Chebyshev) UCL |
| Vinyl chloride | ug/kg | 152 | 28 | 18% | 0.33 | 0.7 | ND | 32.00 | 1.59 | 2.57 | 2.57 | 95% KM (t) UCL |
| Xylenes (Total) | ug/kg | 152 | 50 | 33% | 0.6 | 0.71 | ND | 300,000.00 | 2,288.89 | 14,797.00 | 14,797.00 | 97.5% KM (Chebyshev) UCL |

Table H-3.7
 Medium Specific Exposure Point Concentration Summary
 Current Subsurface Soil,
 Hot Spot 25

PSC Site
 Rock Hill, South Carolina

| Chemical | Units | Number of Samples | Number Detects | Frequency of Detection | Min Detection Limit | Max Detection Limit | Min Concentration | Max Concentration | Mean | 95%UCL | EPC | Statistic |
|---------------------------------------|-------|-------------------|----------------|------------------------|---------------------|---------------------|-------------------|-------------------|-----------|--------|-----------|------------|
| Arsenic | mg/kg | 2 | 1 | 50% | 0.5 | 0.5 | ND | 2.80 | 1.53 | NA | 2.80 | Max Detect |
| Iron | mg/kg | 2 | 2 | 100% | 1.6 | 1.6 | 22,000.00 | 22,000.00 | 22,000.00 | NA | 22,000.00 | Max Detect |
| Manganese | mg/kg | 2 | 2 | 100% | 0.5 | 0.5 | 340.00 | 340.00 | 340.00 | NA | 340.00 | Max Detect |
| Thallium | mg/kg | 2 | 2 | 100% | 2.4 | 2.4 | 20.00 | 25.00 | 22.50 | NA | 25.00 | Max Detect |
| Vanadium | mg/kg | 2 | 2 | 100% | 0.4 | 0.4 | 26.00 | 63.00 | 44.50 | NA | 63.00 | Max Detect |
| Di-n-butylphthalate | ug/kg | 2 | 1 | 50% | 200 | 200 | ND | 310.00 | 205.00 | -- | -- | --- |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | ug/kg | 2 | 0 | 0% | 0.8 | 0.8 | ND | ND | 0.40 | -- | -- | --- |
| 1,2-Dichloroethane | ug/kg | 2 | 2 | 100% | 0.3 | 0.3 | 24,000.00 | 45,000.00 | 34,500.00 | NA | 45,000.00 | Max Detect |
| 1,4-Dichlorobenzene | ug/kg | 2 | 0 | 0% | 0.3 | 0.3 | ND | ND | 0.15 | NA | ND | Max Detect |
| Benzene | ug/kg | 2 | 0 | 0% | 0.4 | 0.4 | ND | ND | 0.20 | NA | ND | Max Detect |
| Chloroform | ug/kg | 2 | 2 | 100% | 0.2 | 0.2 | 460.00 | 690.00 | 575.00 | NA | 690.00 | Max Detect |
| cis-1,2-Dichloroethene | ug/kg | 2 | 2 | 100% | 0.5 | 0.5 | 2,900.00 | 4,100.00 | 3,500.00 | NA | 4,100.00 | Max Detect |
| Tetrachloroethene | ug/kg | 2 | 2 | 100% | 0.5 | 0.5 | 280.00 | 300.00 | 290.00 | NA | 300.00 | Max Detect |
| Toluene | ug/kg | 2 | 1 | 50% | 0.4 | 0.4 | ND | 310.00 | 155.10 | NA | 310.00 | Max Detect |
| Trichloroethene | ug/kg | 2 | 2 | 100% | 0.6 | 0.6 | 310.00 | 470.00 | 390.00 | NA | 470.00 | Max Detect |
| Vinyl chloride | ug/kg | 2 | 0 | 0% | 0.7 | 0.7 | ND | ND | 0.35 | NA | ND | Max Detect |
| Xylenes (Total) | ug/kg | 2 | 1 | 50% | 0.6 | 0.6 | ND | 170.00 | 85.15 | NA | 170.00 | Max Detect |

Table H-3.8
Medium Specific Exposure Point Concentration Summary
Current Subsurface Soil,
Hot Spot 64

PSC Site
Rock Hill, South Carolina

| Chemical | Units | Number of Samples | Number Detects | Frequency of Detection | Min Detection Limit | Max Detection Limit | Min Concentration | Max Concentration | Mean | 95%UCL | EPC | Statistic |
|---------------------------------------|-------|-------------------|----------------|------------------------|---------------------|---------------------|-------------------|-------------------|------------|--------|------------|------------|
| Arsenic | mg/kg | 0 | 0 | 0% | NA | NA | NA | NA | NA | NA | NA | NA |
| Iron | mg/kg | 0 | 0 | 0% | NA | NA | NA | NA | NA | NA | NA | NA |
| Manganese | mg/kg | 0 | 0 | 0% | NA | NA | NA | NA | NA | NA | NA | NA |
| Thallium | mg/kg | 0 | 0 | 0% | NA | NA | NA | NA | NA | NA | NA | NA |
| Vanadium | mg/kg | 0 | 0 | 0% | NA | NA | NA | NA | NA | NA | NA | NA |
| Di-n-butylphthalate | ug/kg | 3 | 0 | 0% | 200 | 200 | ND | ND | 100.00 | -- | -- | --- |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | ug/kg | 3 | 0 | 0% | 0.8 | 0.8 | ND | ND | 0.40 | -- | -- | --- |
| 1,2-Dichloroethane | ug/kg | 3 | 3 | 100% | 0.18 | 0.18 | 930.00 | 11,000.00 | 7,076.67 | NA | 11,000.00 | Max Detect |
| 1,4-Dichlorobenzene | ug/kg | 3 | 2 | 67% | 0.21 | 0.21 | ND | 640.00 | 289.04 | NA | 640.00 | Max Detect |
| Benzene | ug/kg | 3 | 3 | 100% | 0.18 | 0.18 | 155.00 | 2,100.00 | 845.33 | NA | 2,100.00 | Max Detect |
| Chloroform | ug/kg | 3 | 2 | 67% | 0.13 | 0.13 | ND | 750.00 | 300.02 | NA | 750.00 | Max Detect |
| cis-1,2-Dichloroethene | ug/kg | 3 | 3 | 100% | 0.16 | 0.16 | 5,200.00 | 58,000.00 | 24,733.33 | NA | 58,000.00 | Max Detect |
| Tetrachloroethene | ug/kg | 3 | 3 | 100% | 0.14 | 0.14 | 1,200.00 | 72,000.00 | 25,033.33 | NA | 72,000.00 | Max Detect |
| Toluene | ug/kg | 3 | 3 | 100% | 0.17 | 0.17 | 2,500.00 | 370,000.00 | 129,833.33 | NA | 370,000.00 | Max Detect |
| Trichloroethene | ug/kg | 3 | 3 | 100% | 0.23 | 0.23 | 2,700.00 | 150,000.00 | 56,233.33 | NA | 150,000.00 | Max Detect |
| Vinyl chloride | ug/kg | 3 | 2 | 67% | 0.33 | 0.33 | ND | 85.80 | 47.56 | NA | 85.80 | Max Detect |
| Xylenes (Total) | ug/kg | 3 | 3 | 100% | 0.71 | 0.71 | 306.00 | 160,000.00 | 55,268.67 | NA | 160,000.00 | Max Detect |

Table H-3.9
 Medium Specific Exposure Point Concentration Summary
 Current Subsurface Soil,
 Hot Spot 6

PSC Site
 Rock Hill, South Carolina

| Chemical | Units | Number of Samples | Number Detects | Frequency of Detection | Min Detection Limit | Max Detection Limit | Min Concentration | Max Concentration | Mean | 95%UCL | EPC | Statistic |
|---------------------------------------|-------|-------------------|----------------|------------------------|---------------------|---------------------|-------------------|-------------------|-----------|--------|-----------|------------|
| Arsenic | mg/kg | 0 | 0 | 0% | NA | NA | NA | NA | NA | NA | NA | NA |
| Iron | mg/kg | 0 | 0 | 0% | NA | NA | NA | NA | NA | NA | NA | NA |
| Manganese | mg/kg | 0 | 0 | 0% | NA | NA | NA | NA | NA | NA | NA | NA |
| Thallium | mg/kg | 0 | 0 | 0% | NA | NA | NA | NA | NA | NA | NA | NA |
| Vanadium | mg/kg | 0 | 0 | 0% | NA | NA | NA | NA | NA | NA | NA | NA |
| Di-n-butylphthalate | ug/kg | 0 | 0 | 0% | NA | NA | NA | NA | NA | -- | -- | --- |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | ug/kg | 2 | 0 | 0% | 0.8 | 0.8 | ND | ND | 0.40 | -- | -- | --- |
| 1,2-Dichloroethane | ug/kg | 2 | 1 | 50% | 0.3 | 0.3 | ND | 0.37 | 0.26 | NA | 0.37 | Max Detect |
| 1,4-Dichlorobenzene | ug/kg | 2 | 0 | 0% | 0.3 | 0.3 | ND | ND | 0.15 | NA | ND | Max Detect |
| Benzene | ug/kg | 2 | 1 | 50% | 0.4 | 0.4 | ND | 1.01 | 0.61 | NA | 1.01 | Max Detect |
| Chloroform | ug/kg | 2 | 0 | 0% | 0.2 | 0.2 | ND | ND | 0.10 | NA | ND | Max Detect |
| cis-1,2-Dichloroethene | ug/kg | 2 | 2 | 100% | 0.5 | 0.5 | 3,400.00 | 23,000.00 | 13,200.00 | NA | 23,000.00 | Max Detect |
| Tetrachloroethene | ug/kg | 2 | 2 | 100% | 0.5 | 0.5 | 800.00 | 3,700.00 | 2,250.00 | NA | 3,700.00 | Max Detect |
| Toluene | ug/kg | 2 | 2 | 100% | 0.4 | 0.4 | 7.44 | 91.00 | 49.22 | NA | 91.00 | Max Detect |
| Trichloroethene | ug/kg | 2 | 2 | 100% | 0.6 | 0.6 | 31.00 | 3,200.00 | 1,615.50 | NA | 3,200.00 | Max Detect |
| Vinyl chloride | ug/kg | 2 | 2 | 100% | 0.7 | 0.7 | 4.68 | 370.00 | 187.34 | NA | 370.00 | Max Detect |
| Xylenes (Total) | ug/kg | 2 | 2 | 100% | 0.6 | 0.6 | 6.06 | 27.00 | 16.53 | NA | 27.00 | Max Detect |

Table H-3.10
 Medium Specific Exposure Point Concentration Summary
 Current Subsurface Soil,
 Hot Spot 12

PSC Site
 Rock Hill, South Carolina

| Chemical | Units | Number of Samples | Number Detects | Frequency of Detection | Min Detection Limit | Max Detection Limit | Min Concentration | Max Concentration | Mean | 95%UCL | EPC | Statistic |
|---------------------------------------|-------|-------------------|----------------|------------------------|---------------------|---------------------|-------------------|-------------------|--------------|--------|--------------|------------|
| Arsenic | mg/kg | 1 | 1 | 100% | 0.5 | 0.5 | 1.50 | 1.50 | 1.50 | NA | 1.50 | Max Detect |
| Iron | mg/kg | 1 | 1 | 100% | 1.6 | 1.6 | 49,000.00 | 49,000.00 | 49,000.00 | NA | 49,000.00 | Max Detect |
| Manganese | mg/kg | 1 | 1 | 100% | 0.5 | 0.5 | 920.00 | 920.00 | 920.00 | NA | 920.00 | Max Detect |
| Thallium | mg/kg | 1 | 1 | 100% | 2.4 | 2.4 | 52.00 | 52.00 | 52.00 | NA | 52.00 | Max Detect |
| Vanadium | mg/kg | 1 | 1 | 100% | 0.4 | 0.4 | 210.00 | 210.00 | 210.00 | NA | 210.00 | Max Detect |
| Di-n-butylphthalate | ug/kg | 1 | 1 | 100% | 200 | 200 | 920.00 | 920.00 | 920.00 | -- | -- | --- |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | ug/kg | 1 | 0 | 0% | 0.8 | 0.8 | ND | ND | 0.40 | -- | -- | --- |
| 1,2-Dichloroethane | ug/kg | 1 | 0 | 0% | 0.3 | 0.3 | ND | ND | 0.15 | NA | ND | Max Detect |
| 1,4-Dichlorobenzene | ug/kg | 1 | 0 | 0% | 0.3 | 0.3 | ND | ND | 0.15 | NA | ND | Max Detect |
| Benzene | ug/kg | 1 | 1 | 100% | 0.4 | 0.4 | 5,600.00 | 5,600.00 | 5,600.00 | NA | 5,600.00 | Max Detect |
| Chloroform | ug/kg | 1 | 0 | 0% | 0.2 | 0.2 | ND | ND | 0.10 | NA | ND | Max Detect |
| cis-1,2-Dichloroethene | ug/kg | 1 | 1 | 100% | 0.5 | 0.5 | 390.00 | 390.00 | 390.00 | NA | 390.00 | Max Detect |
| Tetrachloroethene | ug/kg | 1 | 1 | 100% | 0.5 | 0.5 | 300.00 | 300.00 | 300.00 | NA | 300.00 | Max Detect |
| Toluene | ug/kg | 1 | 1 | 100% | 0.4 | 0.4 | 1,900,000.00 | 1,900,000.00 | 1,900,000.00 | NA | 1,900,000.00 | Max Detect |
| Trichloroethene | ug/kg | 1 | 1 | 100% | 0.6 | 0.6 | 240.00 | 240.00 | 240.00 | NA | 240.00 | Max Detect |
| Vinyl chloride | ug/kg | 1 | 0 | 0% | 0.7 | 0.7 | ND | ND | 0.35 | NA | ND | Max Detect |
| Xylenes (Total) | ug/kg | 1 | 1 | 100% | 0.6 | 0.6 | 650,000.00 | 650,000.00 | 650,000.00 | NA | 650,000.00 | Max Detect |

Table H-3.11
Medium Specific Exposure Point Concentration Summary
Current Subsurface Soil,
Hot Spot 18

PSC Site
Rock Hill, South Carolina

| Chemical | Units | Number of Samples | Number Detects | Frequency of Detection | Min Detection Limit | Max Detection Limit | Min Concentration | Max Concentration | Mean | 95%UCL | EPC | Statistic |
|---------------------------------------|-------|-------------------|----------------|------------------------|---------------------|---------------------|-------------------|-------------------|-----------|--------|-----------|------------|
| Arsenic | mg/kg | 1 | 1 | 100% | 0.5 | 0.5 | 0.92 | 0.92 | 0.92 | NA | 0.92 | Max Detect |
| Iron | mg/kg | 1 | 1 | 100% | 1.6 | 1.6 | 21,000.00 | 21,000.00 | 21,000.00 | NA | 21,000.00 | Max Detect |
| Manganese | mg/kg | 1 | 1 | 100% | 0.5 | 0.5 | 830.00 | 830.00 | 830.00 | NA | 830.00 | Max Detect |
| Thallium | mg/kg | 1 | 1 | 100% | 2.4 | 2.4 | 22.00 | 22.00 | 22.00 | NA | 22.00 | Max Detect |
| Vanadium | mg/kg | 1 | 1 | 100% | 0.4 | 0.4 | 42.00 | 42.00 | 42.00 | NA | 42.00 | Max Detect |
| Di-n-butylphthalate | ug/kg | 1 | 1 | 100% | 200 | 200 | 260.00 | 260.00 | 260.00 | -- | -- | --- |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | ug/kg | 1 | 0 | 0% | 0.8 | 0.8 | ND | ND | 0.40 | -- | -- | --- |
| 1,2-Dichloroethane | ug/kg | 1 | 1 | 100% | 0.3 | 0.3 | 4,800.00 | 4,800.00 | 4,800.00 | NA | 4,800.00 | Max Detect |
| 1,4-Dichlorobenzene | ug/kg | 1 | 1 | 100% | 0.3 | 0.3 | 4,000.00 | 4,000.00 | 4,000.00 | NA | 4,000.00 | Max Detect |
| Benzene | ug/kg | 1 | 0 | 0% | 0.4 | 0.4 | ND | ND | 0.20 | NA | ND | Max Detect |
| Chloroform | ug/kg | 1 | 0 | 0% | 0.2 | 0.2 | ND | ND | 0.10 | NA | ND | Max Detect |
| cis-1,2-Dichloroethene | ug/kg | 1 | 1 | 100% | 0.5 | 0.5 | 460.00 | 460.00 | 460.00 | NA | 460.00 | Max Detect |
| Tetrachloroethene | ug/kg | 1 | 1 | 100% | 0.5 | 0.5 | 31.00 | 31.00 | 31.00 | NA | 31.00 | Max Detect |
| Toluene | ug/kg | 1 | 1 | 100% | 0.4 | 0.4 | 44.00 | 44.00 | 44.00 | NA | 44.00 | Max Detect |
| Trichloroethene | ug/kg | 1 | 1 | 100% | 0.6 | 0.6 | 452.00 | 452.00 | 452.00 | NA | 452.00 | Max Detect |
| Vinyl chloride | ug/kg | 1 | 0 | 0% | 0.7 | 0.7 | ND | ND | 0.35 | NA | ND | Max Detect |
| Xylenes (Total) | ug/kg | 1 | 0 | 0% | 0.6 | 0.6 | ND | ND | 0.30 | NA | ND | Max Detect |

Table H-3.12
Medium Specific Exposure Point Concentration Summary
Shallow Groundwater (Excludes Bedrock)

PSC Site
Rock Hill, SC

| Chemical | Units | Number of Samples | Number Detects | Frequency of Detection | Min Detection Limit | Max Detection Limit | Min Concentration | Max Concentration | Mean | 95%UCL | EPC | Statistic |
|----------------------------|-------|-------------------|----------------|------------------------|---------------------|---------------------|-------------------|-------------------|----------|--------|----------|-----------|
| Iron | mg/L | 14 | 12 | 86% | 0.02 | 0.02 | ND | 12.50 | 1.56 | NA | 1.56 | Mean |
| Manganese | mg/L | 14 | 14 | 100% | 0.001 | 0.001 | 0.03 | 12.00 | 2.14 | NA | 2.14 | Mean |
| 2-Chlorophenol | ug/L | 14 | 1 | 7% | 5 | 5 | ND | 145.00 | 12.68 | NA | 12.68 | Mean |
| Bis(2-ethylhexyl)phthalate | ug/L | 14 | 2 | 14% | 4 | 4 | ND | 14.50 | 3.19 | NA | 3.19 | Mean |
| Naphthalene | ug/L | 14 | 3 | 21% | 3 | 3 | ND | 30.50 | 4.37 | NA | 4.37 | Mean |
| 1,1,1-Trichloroethane | ug/L | 60 | 17 | 28% | 0.19 | 0.3 | ND | 51,000.00 | 1,644.00 | NA | 1,644.00 | Mean |
| 1,1,2-Trichloroethane | ug/L | 60 | 19 | 32% | 0.3 | 0.34 | ND | 154.00 | 5.96 | NA | 5.96 | Mean |
| 1,1-Dichloroethane | ug/L | 60 | 34 | 57% | 0.2 | 0.31 | ND | 7,200.00 | 215.83 | NA | 215.83 | Mean |
| 1,1-Dichloroethene | ug/L | 60 | 33 | 55% | 0.16 | 0.4 | ND | 8,100.00 | 289.02 | NA | 289.02 | Mean |
| 1,2-Dichlorobenzene | ug/L | 60 | 20 | 33% | 0.16 | 0.43 | ND | 2,500.00 | 43.03 | NA | 43.03 | Mean |
| 1,2-Dichloroethane | ug/L | 60 | 34 | 57% | 0.14 | 0.4 | ND | 52,500.00 | 2,069.20 | NA | 2,069.20 | Mean |
| 1,4-Dichlorobenzene | ug/L | 60 | 11 | 18% | 0.3 | 0.31 | ND | 1,300.00 | 21.95 | NA | 21.95 | Mean |
| 4-Methyl-2-pentanone | ug/L | 60 | 10 | 17% | 0.56 | 1.15 | ND | 11,000.00 | 351.49 | NA | 351.49 | Mean |
| Benzene | ug/L | 60 | 37 | 62% | 0.11 | 0.3 | ND | 1,050.00 | 45.03 | NA | 45.03 | Mean |
| Chlorobenzene | ug/L | 60 | 28 | 47% | 0.11 | 0.5 | ND | 3,000.00 | 76.06 | NA | 76.06 | Mean |
| Chloroethane | ug/L | 60 | 19 | 32% | 0.3 | 0.78 | ND | 2,850.00 | 96.15 | NA | 96.15 | Mean |
| Chloroform | ug/L | 60 | 21 | 35% | 0.29 | 0.3 | ND | 882.00 | 19.22 | NA | 19.22 | Mean |
| cis-1,2-Dichloroethene | ug/L | 60 | 41 | 68% | 0.3 | 0.4 | ND | 13,000.00 | 703.26 | NA | 703.26 | Mean |
| Ethylbenzene | ug/L | 60 | 26 | 43% | 0.13 | 0.3 | ND | 46,000.00 | 972.05 | NA | 972.05 | Mean |
| Isopropylbenzene | ug/L | 60 | 30 | 50% | 0.12 | 0.3 | ND | 36,000.00 | 680.54 | NA | 680.54 | Mean |
| Methyl tert butyl ether | ug/L | 60 | 15 | 25% | 0.4 | 0.6 | ND | 444.00 | 21.56 | NA | 21.56 | Mean |
| Methylcyclohexane | ug/L | 60 | 25 | 42% | 0.5 | 0.99 | ND | 19,000.00 | 403.25 | NA | 403.25 | Mean |
| Methylene chloride | ug/L | 60 | 22 | 37% | 0.36 | 0.8 | ND | 7,900.00 | 201.55 | NA | 201.55 | Mean |
| Tetrachloroethene | ug/L | 60 | 34 | 57% | 0.27 | 0.5 | ND | 13,000.00 | 475.08 | NA | 475.08 | Mean |
| Toluene | ug/L | 60 | 51 | 85% | 0.11 | 0.3 | ND | 52,000.00 | 2,395.05 | NA | 2,395.05 | Mean |
| Trichloroethene | ug/L | 60 | 40 | 67% | 0.12 | 0.32 | ND | 14,000.00 | 389.20 | NA | 389.20 | Mean |
| Vinyl chloride | ug/L | 60 | 29 | 48% | 0.4 | 0.4 | ND | 1,200.00 | 63.09 | NA | 63.09 | Mean |
| Xylenes (Total) | ug/L | 60 | 31 | 52% | 0.4 | 0.45 | ND | 150,000.00 | 3,337.07 | NA | 3,337.07 | Mean |

Table H-3.13
Medium Specific Exposure Point Concentration Summary
Shallow and Bedrock Groundwater

PSC Site
Rock Hill, SC

| Chemical | Units | Number of Samples | Number Detects | Frequency of Detection | Min Detection Limit | Max Detection Limit | Min Concentration | Max Concentration | Mean | 95%UCL | EPC | Statistic |
|----------------------------|-------|-------------------|----------------|------------------------|---------------------|---------------------|-------------------|-------------------|----------|--------|----------|-----------|
| Iron | mg/L | 18 | 15 | 83% | 0.02 | 0.02 | ND | 12.50 | 1.31 | NA | 1.31 | Mean |
| Manganese | mg/L | 18 | 18 | 100% | 0.001 | 0.001 | 0.02 | 12.00 | 1.68 | NA | 1.68 | Mean |
| 2-Chlorophenol | ug/L | 18 | 1 | 6% | 5 | 5 | ND | 145.00 | 10.42 | NA | 10.42 | Mean |
| Bis(2-ethylhexyl)phthalate | ug/L | 18 | 3 | 17% | 4 | 4 | ND | 14.50 | 3.20 | NA | 3.20 | Mean |
| Naphthalene | ug/L | 18 | 3 | 17% | 3 | 3 | ND | 30.50 | 3.73 | NA | 3.73 | Mean |
| 1,1,1-Trichloroethane | ug/L | 88 | 22 | 25% | 0.19 | 0.3 | ND | 51,000.00 | 1,129.57 | NA | 1,129.57 | Mean |
| 1,1,2-Trichloroethane | ug/L | 88 | 23 | 26% | 0.3 | 0.34 | ND | 154.00 | 4.61 | NA | 4.61 | Mean |
| 1,1-Dichloroethane | ug/L | 88 | 48 | 55% | 0.2 | 0.31 | ND | 7,200.00 | 160.04 | NA | 160.04 | Mean |
| 1,1-Dichloroethene | ug/L | 88 | 46 | 52% | 0.16 | 0.4 | ND | 8,100.00 | 206.02 | NA | 206.02 | Mean |
| 1,2,4-Trichlorobenzene | ug/L | 88 | 5 | 6% | 0.16 | 0.43 | ND | 126.00 | 1.56 | NA | 1.56 | Mean |
| 1,2-Dichlorobenzene | ug/L | 88 | 25 | 28% | 0.16 | 0.43 | ND | 2,500.00 | 46.01 | NA | 46.01 | Mean |
| 1,2-Dichloroethane | ug/L | 88 | 47 | 53% | 0.14 | 0.4 | ND | 52,500.00 | 1,519.78 | NA | 1,519.78 | Mean |
| 1,4-Dichlorobenzene | ug/L | 88 | 14 | 16% | 0.3 | 0.31 | ND | 1,300.00 | 27.54 | NA | 27.54 | Mean |
| 4-Methyl-2-pentanone | ug/L | 88 | 12 | 14% | 0.56 | 1.15 | ND | 11,000.00 | 242.03 | NA | 242.03 | Mean |
| Benzene | ug/L | 88 | 44 | 50% | 0.11 | 0.3 | ND | 1,050.00 | 31.46 | NA | 31.46 | Mean |
| Bromodichloromethane | ug/L | 88 | 6 | 7% | 0.2 | 0.3 | ND | 6.27 | 0.37 | NA | 0.37 | Mean |
| Chlorobenzene | ug/L | 88 | 34 | 39% | 0.11 | 0.5 | ND | 3,500.00 | 118.88 | NA | 118.88 | Mean |
| Chloroethane | ug/L | 88 | 24 | 27% | 0.3 | 0.78 | ND | 2,850.00 | 98.27 | NA | 98.27 | Mean |
| Chloroform | ug/L | 88 | 33 | 38% | 0.29 | 0.3 | ND | 882.00 | 15.04 | NA | 15.04 | Mean |
| cis-1,2-Dichloroethene | ug/L | 88 | 60 | 68% | 0.3 | 0.4 | ND | 13,000.00 | 510.22 | NA | 510.22 | Mean |
| Ethylbenzene | ug/L | 88 | 31 | 35% | 0.13 | 0.3 | ND | 46,000.00 | 675.84 | NA | 675.84 | Mean |
| Isopropylbenzene | ug/L | 88 | 34 | 39% | 0.12 | 0.3 | ND | 36,000.00 | 464.64 | NA | 464.64 | Mean |
| Methyl tert butyl ether | ug/L | 88 | 17 | 19% | 0.4 | 0.6 | ND | 444.00 | 14.77 | NA | 14.77 | Mean |
| Methylcyclohexane | ug/L | 88 | 29 | 33% | 0.5 | 0.99 | ND | 19,000.00 | 275.45 | NA | 275.45 | Mean |
| Methylene chloride | ug/L | 88 | 29 | 33% | 0.36 | 0.8 | ND | 7,900.00 | 151.97 | NA | 151.97 | Mean |
| Tetrachloroethene | ug/L | 88 | 51 | 58% | 0.27 | 0.5 | ND | 13,000.00 | 329.73 | NA | 329.73 | Mean |
| Toluene | ug/L | 88 | 74 | 84% | 0.11 | 0.3 | ND | 52,000.00 | 1,744.11 | NA | 1,744.11 | Mean |
| Trichloroethene | ug/L | 88 | 58 | 66% | 0.12 | 0.32 | ND | 14,000.00 | 274.48 | NA | 274.48 | Mean |
| Vinyl chloride | ug/L | 88 | 36 | 41% | 0.4 | 0.4 | ND | 1,200.00 | 53.44 | NA | 53.44 | Mean |
| Xylenes (Total) | ug/L | 88 | 35 | 40% | 0.4 | 0.45 | ND | 150,000.00 | 2,314.63 | NA | 2,314.63 | Mean |

H-4 Pro-UCL Output

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File WorkSheet.wst
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

1,2-Dichloroethane

General Statistics

| | | | |
|--------------------------|----|---------------------------|--------|
| Number of Valid Samples | 41 | Number of Detected Data | 8 |
| Number of Unique Samples | 8 | Number of Non-Detect Data | 33 |
| | | Percent Non-Detects | 80.49% |

Raw Statistics

| | |
|--------------------|-------|
| Minimum Detected | 0.36 |
| Maximum Detected | 9.6 |
| Mean of Detected | 3.954 |
| SD of Detected | 3.936 |
| Minimum Non-Detect | 0.18 |
| Maximum Non-Detect | 35.65 |

Log-transformed Statistics

| | |
|--------------------|--------|
| Minimum Detected | -1.022 |
| Maximum Detected | 2.262 |
| Mean of Detected | 0.749 |
| SD of Detected | 1.307 |
| Minimum Non-Detect | -1.715 |
| Maximum Non-Detect | 3.574 |

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 | 41 |
| Number treated as Detected | 0 |
| Single DL Non-Detect Percentage | 100.00% |

UCL Statistics

Normal Distribution Test with Detected Values Only

| | |
|--------------------------------|-------|
| Shapiro Wilk Test Statistic | 0.816 |
| 5% Shapiro Wilk Critical Value | 0.818 |

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

| | |
|--------------------------------|-------|
| Shapiro Wilk Test Statistic | 0.904 |
| 5% Shapiro Wilk Critical Value | 0.818 |

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

| | |
|--------------------------|-------|
| DL/2 Substitution Method | |
| Mean | 1.319 |
| SD | 3.466 |
| 95% DL/2 (t) UCL | 2.23 |

Maximum Likelihood Estimate(MLE) Method N/A
MLE method failed to converge properly

Assuming Lognormal Distribution

| | |
|--------------------------|--------|
| DL/2 Substitution Method | |
| Mean | -1.302 |
| SD | 1.388 |
| 95% H-Stat (DL/2) UCL | 0.853 |

| | |
|------------------------------|-------|
| Log ROS Method | |
| Mean in Log Scale | -3.74 |
| SD in Log Scale | 3.075 |
| Mean in Original Scale | 0.804 |
| SD in Original Scale | 2.276 |
| 95% Percentile Bootstrap UCL | 1.404 |
| 95% BCA Bootstrap UCL | 1.625 |

Gamma Distribution Test with Detected Values Only

| | |
|-------------------------|-------|
| k star (bias corrected) | 0.665 |
| Theta Star | 5.949 |
| nu star | 10.63 |

| | |
|-----------------------|-------|
| A-D Test Statistic | 0.447 |
| 5% A-D Critical Value | 0.738 |
| K-S Test Statistic | 0.738 |
| 5% K-S Critical Value | 0.302 |

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

| | |
|----------------------------------------------|-------|
| Gamma ROS Statistics using Extrapolated Data | |
| Minimum | 0 |
| Maximum | 9.6 |
| Mean | 2.619 |
| Median | 2.353 |

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

| | |
|-----------------------------------|-------|
| Kaplan-Meier (KM) Method | |
| Mean | 1.079 |
| SD | 2.186 |
| SE of Mean | 0.369 |
| 95% KM (t) UCL | 1.701 |
| 95% KM (z) UCL | 1.686 |
| 95% KM (jackknife) UCL | 1.584 |
| 95% KM (bootstrap t) UCL | 1.924 |
| 95% KM (BCA) UCL | 2.873 |
| 95% KM (Percentile Bootstrap) UCL | 2.011 |
| 95% KM (Chebyshev) UCL | 2.689 |

Pro-UCL
Current Surface Soil

| | | | |
|---------------------------|-------|------------------------------|-------|
| SD | 2.475 | 97.5% KM (Chebyshev) UCL | 3.386 |
| k star | 0.176 | 99% KM (Chebyshev) UCL | 4.755 |
| Theta star | 14.87 | | |
| Nu star | 14.44 | Potential UCLs to Use | |
| AppChi2 | 6.873 | 95% KM (t) UCL | 1.701 |
| 95% Gamma Approximate UCL | 5.502 | | |
| 95% Adjusted Gamma UCL | 5.66 | | |

Note: DL/2 is not a recommended method.

Arsenic

General Statistics

| | | | |
|--------------------------|----|---------------------------|-------|
| Number of Valid Samples | 42 | Number of Detected Data | 40 |
| Number of Unique Samples | 26 | Number of Non-Detect Data | 2 |
| | | Percent Non-Detects | 4.76% |

Raw Statistics

| | |
|--------------------|-------|
| Minimum Detected | 0.74 |
| Maximum Detected | 8.9 |
| Mean of Detected | 2.02 |
| SD of Detected | 1.434 |
| Minimum Non-Detect | 0.5 |
| Maximum Non-Detect | 0.5 |

Log-transformed Statistics

| | |
|--------------------|--------|
| Minimum Detected | -0.301 |
| Maximum Detected | 2.186 |
| Mean of Detected | 0.562 |
| SD of Detected | 0.491 |
| Minimum Non-Detect | -0.693 |
| Maximum Non-Detect | -0.693 |

UCL Statistics

Normal Distribution Test with Detected Values Only

| | |
|--------------------------------|-------|
| Shapiro Wilk Test Statistic | 0.629 |
| 5% Shapiro Wilk Critical Value | 0.94 |

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

| | |
|--------------------------------|------|
| Shapiro Wilk Test Statistic | 0.93 |
| 5% Shapiro Wilk Critical Value | 0.94 |

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

| | |
|--------------------------|-------|
| DL/2 Substitution Method | |
| Mean | 1.935 |
| SD | 1.45 |
| 95% DL/2 (t) UCL | 2.312 |

Assuming Lognormal Distribution

| | |
|--------------------------|-------|
| DL/2 Substitution Method | |
| Mean | 0.47 |
| SD | 0.637 |
| 95% H-Stat (DL/2) UCL | 2.055 |

Maximum Likelihood Estimate(MLE) Method

| | |
|--------------------|-------|
| Mean | 1.91 |
| SD | 1.474 |
| 95% MLE (t) UCL | 2.293 |
| 95% MLE (Tiku) UCL | 2.276 |

Log ROS Method

| | |
|------------------------------|-------|
| Mean in Log Scale | 0.508 |
| SD in Log Scale | 0.539 |
| Mean in Original Scale | 1.95 |
| SD in Original Scale | 1.434 |
| 95% Percentile Bootstrap UCL | 2.332 |
| 95% BCA Bootstrap UCL | 2.423 |

Gamma Distribution Test with Detected Values Only

| | |
|-------------------------|-------|
| k star (bias corrected) | 3.455 |
| Theta Star | 0.585 |
| nu star | 276.4 |

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

| | |
|-----------------------|-------|
| A-D Test Statistic | 1.426 |
| 5% A-D Critical Value | 0.753 |
| K-S Test Statistic | 0.753 |
| 5% K-S Critical Value | 0.14 |

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

| | |
|---------|-------|
| Minimum | 0 |
| Maximum | 8.9 |
| Mean | 1.924 |
| Median | 1.7 |
| SD | 1.465 |

Nonparametric Statistics

| | |
|-----------------------------------|-------|
| Kaplan-Meier (KM) Method | |
| Mean | 1.959 |
| SD | 1.409 |
| SE of Mean | 0.22 |
| 95% KM (t) UCL | 2.329 |
| 95% KM (z) UCL | 2.321 |
| 95% KM (jackknife) UCL | 2.327 |
| 95% KM (bootstrap t) UCL | 2.705 |
| 95% KM (BCA) UCL | 2.372 |
| 95% KM (Percentile Bootstrap) UCL | 2.353 |
| 95% KM (Chebyshev) UCL | 2.918 |
| 97.5% KM (Chebyshev) UCL | 3.334 |

| | | | |
|---------------------------|-------|------------------------------|-------|
| k star | 0.74 | 99% KM (Chebyshev) UCL | 4.149 |
| Theta star | 2.599 | | |
| Nu star | 62.16 | Potential UCLs to Use | |
| AppChi2 | 45.03 | 95% KM (Chebyshev) UCL | 2.918 |
| 95% Gamma Approximate UCL | 2.656 | | |
| 95% Adjusted Gamma UCL | 2.687 | | |

Note: DL/2 is not a recommended method.

Iron

General Statistics

Number of Valid Samples 42

Number of Unique Samples 30

Raw Statistics

Minimum 7400
Maximum 86000
Mean 32855
Median 28000
SD 18593
Coefficient of Variation 0.566
Skewness 1.092

Log-transformed Statistics

Minimum of Log Data 8.909
Maximum of Log Data 11.36
Mean of log Data 10.25
SD of log Data 0.575

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.871
Shapiro Wilk Critical Value 0.942

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic 0.939
Shapiro Wilk Critical Value 0.942

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 37683

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL 38090
95% Modified-t UCL 37764

Assuming Lognormal Distribution

95% H-UCL 39596
95% Chebyshev (MVUE) UCL 46664
97.5% Chebyshev (MVUE) UCL 52545
99% Chebyshev (MVUE) UCL 64097

Gamma Distribution Test

k star (bias corrected) 3.176
Theta Star 10345
nu star 266.8
Approximate Chi Square Value (.05) 230
Adjusted Level of Significance 0.0443
Adjusted Chi Square Value 228.7

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Nonparametric Statistics

95% CLT UCL 37574
95% Jackknife UCL 37683
95% Standard Bootstrap UCL 37602
95% Bootstrap-t UCL 38267
95% Hall's Bootstrap UCL 38242
95% Percentile Bootstrap UCL 37533
95% BCA Bootstrap UCL 37976
95% Chebyshev(Mean, Sd) UCL 45361
97.5% Chebyshev(Mean, Sd) UCL 50772
99% Chebyshev(Mean, Sd) UCL 61401

Assuming Gamma Distribution

95% Approximate Gamma UCL 38116
95% Adjusted Gamma UCL 38318

Potential UCL to Use

Use 95% Approximate Gamma UCL 38116

Manganese

General Statistics

Number of Valid Samples 42

Number of Unique Samples 33

Raw Statistics

Minimum 80
Maximum 1500

Log-transformed Statistics

Minimum of Log Data 4.382
Maximum of Log Data 7.313

Mean 549.6
Median 455
SD 327.6
Coefficient of Variation 0.596
Skewness 1.009

Mean of log Data 6.126
SD of log Data 0.645

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.881
Shapiro Wilk Critical Value 0.942

Data not Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 634.7

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL 641.2
95% Modified-t UCL 636

Gamma Distribution Test

k star (bias corrected) 2.699
Theta Star 203.6
nu star 226.7

Approximate Chi Square Value (.05) 192.9
Adjusted Level of Significance 0.0443
Adjusted Chi Square Value 191.8

Anderson-Darling Test Statistic 0.235
Anderson-Darling 5% Critical Value 0.756
Kolmogorov-Smirnov Test Statistic 0.0761
Kolmogorov-Smirnov 5% Critical Value 0.137

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL 646.1
95% Adjusted Gamma UCL 649.9

Potential UCL to Use

Lognormal Distribution Test

Shapiro Wilk Test Statistic 0.933
Shapiro Wilk Critical Value 0.942

Data not Lognormal at 5% Significance Level

Assuming Lognormal Distribution

95% H-UCL 689.9

95% Chebyshev (MVUE) UCL 821.9
97.5% Chebyshev (MVUE) UCL 935.2
99% Chebyshev (MVUE) UCL 1158

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

95% CLT UCL 632.8
95% Jackknife UCL 634.7
95% Standard Bootstrap UCL 631.4
95% Bootstrap-t UCL 639.5
95% Hall's Bootstrap UCL 642.8
95% Percentile Bootstrap UCL 636.9
95% BCA Bootstrap UCL 638.3
95% Chebyshev(Mean, Sd) UCL 770
97.5% Chebyshev(Mean, Sd) UCL 865.3
99% Chebyshev(Mean, Sd) UCL 1053

Use 95% Approximate Gamma UCL 646.1

Tetrachloroethene

General Statistics

Number of Valid Samples 41
Number of Unique Samples 9

Number of Detected Data 9
Number of Non-Detect Data 32
Percent Non-Detects 78.05%

Raw Statistics

Minimum Detected 1.4
Maximum Detected 35
Mean of Detected 9.346
SD of Detected 11.04
Minimum Non-Detect 0.14
Maximum Non-Detect 0.5

Log-transformed Statistics

Minimum Detected 0.336
Maximum Detected 3.555
Mean of Detected 1.69
SD of Detected 1.099
Minimum Non-Detect -1.966
Maximum Non-Detect -0.693

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 32
Number treated as Detected 9
Single DL Non-Detect Percentage 78.05%

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic 0.75
5% Shapiro Wilk Critical Value 0.829

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic 0.954
5% Shapiro Wilk Critical Value 0.829

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

| | |
|-----------------------------------------|-------|
| DL/2 Substitution Method | |
| Mean | 2.225 |
| SD | 6.245 |
| 95% DL/2 (t) UCL | 3.867 |
| Maximum Likelihood Estimate(MLE) Method | N/A |
| MLE yields a negative mean | |

Assuming Lognormal Distribution

| | |
|------------------------------|--------|
| DL/2 Substitution Method | |
| Mean | -0.866 |
| SD | 1.515 |
| 95% H-Stat (DL/2) UCL | 1.301 |
| Log ROS Method | |
| Mean in Log Scale | -1.985 |
| SD in Log Scale | 2.639 |
| Mean in Original Scale | 2.181 |
| SD in Original Scale | 6.263 |
| 95% Percentile Bootstrap UCL | 4.001 |
| 95% BCA Bootstrap UCL | 4.643 |

Gamma Distribution Test with Detected Values Only

| | |
|-------------------------|-------|
| k star (bias corrected) | 0.776 |
| Theta Star | 12.05 |
| nu star | 13.96 |
| A-D Test Statistic | 0.365 |
| 5% A-D Critical Value | 0.743 |
| K-S Test Statistic | 0.743 |
| 5% K-S Critical Value | 0.287 |

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

| | |
|----------------------------------------------|-------|
| Gamma ROS Statistics using Extrapolated Data | |
| Minimum | 0 |
| Maximum | 35 |
| Mean | 7.247 |
| Median | 6.953 |
| SD | 6.362 |
| k star | 0.345 |
| Theta star | 21.03 |
| Nu star | 28.26 |
| AppChi2 | 17.13 |
| 95% Gamma Approximate UCL | 11.95 |
| 95% Adjusted Gamma UCL | 12.18 |

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 | 3.144 |
| SD | 5.883 |
| SE of Mean | 0.974 |
| 95% KM (t) UCL | 4.785 |
| 95% KM (z) UCL | 4.747 |
| 95% KM (jackknife) UCL | 4.588 |
| 95% KM (bootstrap t) UCL | 8.25 |
| 95% KM (BCA) UCL | 5.842 |
| 95% KM (Percentile Bootstrap) UCL | 5.26 |
| 95% KM (Chebyshev) UCL | 7.392 |
| 97.5% KM (Chebyshev) UCL | 9.23 |
| 99% KM (Chebyshev) UCL | 12.84 |

Potential UCLs to Use

95% KM (t) UCL 4.785

Thallium

General Statistics

Number of Valid Samples 42

Number of Unique Samples 32

Raw Statistics

| | |
|--------------------------|-------|
| Minimum | 7.75 |
| Maximum | 91 |
| Mean | 36.81 |
| Median | 32 |
| SD | 20.82 |
| Coefficient of Variation | 0.566 |
| Skewness | 0.857 |

Log-transformed Statistics

| | |
|---------------------|-------|
| Minimum of Log Data | 2.048 |
| Maximum of Log Data | 4.511 |
| Mean of log Data | 3.44 |
| SD of log Data | 0.607 |

Relevant UCL Statistics

Normal Distribution Test

| | |
|-----------------------------|-------|
| Shapiro Wilk Test Statistic | 0.886 |
| Shapiro Wilk Critical Value | 0.942 |

Data not Normal at 5% Significance Level

Lognormal Distribution Test

| | |
|-----------------------------|-------|
| Shapiro Wilk Test Statistic | 0.927 |
| Shapiro Wilk Critical Value | 0.942 |

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

| | |
|-----------------------------------------|-------|
| 95% Student's-t UCL | 42.21 |
| 95% UCLs (Adjusted for Skewness) | |

Assuming Lognormal Distribution

| | |
|--------------------------|-------|
| 95% H-UCL | 45.24 |
| 95% Chebyshev (MVUE) UCL | 53.6 |

95% Adjusted-CLT UCL 42.55
95% Modified-t UCL 42.29

97.5% Chebyshev (MVUE) UCL 60.65
99% Chebyshev (MVUE) UCL 74.5

Gamma Distribution Test

k star (bias corrected) 2.963
Theta Star 12.42
nu star 248.9
Approximate Chi Square Value (.05) 213.3
Adjusted Level of Significance 0.0443
Adjusted Chi Square Value 212.2

Anderson-Darling Test Statistic 0.199
Anderson-Darling 5% Critical Value 0.755
Kolmogorov-Smirnov Test Statistic 0.0825
Kolmogorov-Smirnov 5% Critical Value 0.137

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL 42.94
95% Adjusted Gamma UCL 43.17

Potential UCL to Use

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

95% CLT UCL 42.09
95% Jackknife UCL 42.21
95% Standard Bootstrap UCL 42.05
95% Bootstrap-t UCL 42.78
95% Hall's Bootstrap UCL 42.61
95% Percentile Bootstrap UCL 42.1
95% BCA Bootstrap UCL 42.37
95% Chebyshev(Mean, Sd) UCL 50.81
97.5% Chebyshev(Mean, Sd) UCL 56.87
99% Chebyshev(Mean, Sd) UCL 68.77

Use 95% Approximate Gamma UCL 42.94

Vanadium

General Statistics

Number of Valid Samples 42

Number of Unique Samples 37

Raw Statistics

Minimum 13
Maximum 400
Mean 114.8
Median 81
SD 97.38
Coefficient of Variation 0.848
Skewness 1.37

Log-transformed Statistics

Minimum of Log Data 2.565
Maximum of Log Data 5.991
Mean of log Data 4.386
SD of log Data 0.891

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.813
Shapiro Wilk Critical Value 0.942

Data not Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 140.1
95% UCLs (Adjusted for Skewness)
95% Adjusted-CLT UCL 142.9
95% Modified-t UCL 140.6

Gamma Distribution Test

k star (bias corrected) 1.451
Theta Star 79.13
nu star 121.9
Approximate Chi Square Value (.05) 97.4
Adjusted Level of Significance 0.0443
Adjusted Chi Square Value 96.62

Anderson-Darling Test Statistic 0.35
Anderson-Darling 5% Critical Value 0.766
Kolmogorov-Smirnov Test Statistic 0.0909
Kolmogorov-Smirnov 5% Critical Value 0.139

Data appear Gamma Distributed at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic 0.922
Shapiro Wilk Critical Value 0.942

Data not Lognormal at 5% Significance Level

Assuming Lognormal Distribution

95% H-UCL 163.3
95% Chebyshev (MVUE) UCL 198.5
97.5% Chebyshev (MVUE) UCL 233.3
99% Chebyshev (MVUE) UCL 301.7

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

95% CLT UCL 139.5
95% Jackknife UCL 140.1
95% Standard Bootstrap UCL 140.2
95% Bootstrap-t UCL 145.7
95% Hall's Bootstrap UCL 145.8
95% Percentile Bootstrap UCL 139.6
95% BCA Bootstrap UCL 142.3
95% Chebyshev(Mean, Sd) UCL 180.3
97.5% Chebyshev(Mean, Sd) UCL 208.7

Pro-UCL
Current Surface Soil

Assuming Gamma Distribution

95% Approximate Gamma UCL 143.7
95% Adjusted Gamma UCL 144.9

99% Chebyshev(Mean, Sd) UCL 264.3

Potential UCL to Use

Use 95% Approximate Gamma UCL 143.7

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File Surface Soil wo HSs.xls
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

1,2-Dichloroethane

General Statistics

| | | | |
|--------------------------|----|---------------------------|--------|
| Number of Valid Samples | 50 | Number of Detected Data | 9 |
| Number of Unique Samples | 9 | Number of Non-Detect Data | 41 |
| | | Percent Non-Detects | 82.00% |

Raw Statistics

| | |
|--------------------|-------|
| Minimum Detected | 0.36 |
| Maximum Detected | 1400 |
| Mean of Detected | 159.1 |
| SD of Detected | 465.4 |
| Minimum Non-Detect | 0.18 |
| Maximum Non-Detect | 35.65 |

Log-transformed Statistics

| | |
|--------------------|--------|
| Minimum Detected | -1.022 |
| Maximum Detected | 7.244 |
| Mean of Detected | 1.47 |
| SD of Detected | 2.487 |
| Minimum Non-Detect | -1.715 |
| Maximum Non-Detect | 3.574 |

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 | 49 |
| Number treated as Detected | 1 |
| Single DL Non-Detect Percentage | 98.00% |

UCL Statistics

Normal Distribution Test with Detected Values Only

| | |
|--------------------------------|-------|
| Shapiro Wilk Test Statistic | 0.397 |
| 5% Shapiro Wilk Critical Value | 0.829 |

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

| | |
|--------------------------------|-------|
| Shapiro Wilk Test Statistic | 0.834 |
| 5% Shapiro Wilk Critical Value | 0.829 |

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

| | |
|--------------------------|-------|
| DL/2 Substitution Method | |
| Mean | 29.1 |
| SD | 197.9 |
| 95% DL/2 (t) UCL | 76.02 |

Maximum Likelihood Estimate(MLE) Method N/A
MLE method failed to converge properly

Assuming Lognormal Distribution

| | |
|--------------------------|--------|
| DL/2 Substitution Method | |
| Mean | -1.236 |
| SD | 1.77 |
| 95% H-Stat (DL/2) UCL | 3.469 |

| | |
|------------------------------|--------|
| Log ROS Method | |
| Mean in Log Scale | -6.633 |
| SD in Log Scale | 5.385 |
| Mean in Original Scale | 28.64 |
| SD in Original Scale | 197.9 |
| 95% Percentile Bootstrap UCL | 84.62 |
| 95% BCA Bootstrap UCL | 113 |

Gamma Distribution Test with Detected Values Only

| | |
|-------------------------|-------|
| k star (bias corrected) | 0.21 |
| Theta Star | 757.5 |
| nu star | 3.78 |

Data not Gamma Distributed at 5% Significance Level

| | |
|-----------------------|-------|
| A-D Test Statistic | 1.664 |
| 5% A-D Critical Value | 0.844 |
| K-S Test Statistic | 0.844 |
| 5% K-S Critical Value | 0.307 |

Assuming Gamma Distribution

| | |
|----------------------------------------------|-------|
| Gamma ROS Statistics using Extrapolated Data | |
| Minimum | 0 |
| Maximum | 1400 |
| Mean | 130.1 |
| Median | 134.8 |
| SD | 201.5 |

Data Distribution Test with Detected Values Only

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

| | |
|-----------------------------------|-------|
| Kaplan-Meier (KM) Method | |
| Mean | 28.94 |
| SD | 195.9 |
| SE of Mean | 29.38 |
| 95% KM (t) UCL | 78.2 |
| 95% KM (z) UCL | 77.27 |
| 95% KM (jackknife) UCL | 75.71 |
| 95% KM (bootstrap t) UCL | 3999 |
| 95% KM (BCA) UCL | 92.34 |
| 95% KM (Percentile Bootstrap) UCL | 84.95 |
| 95% KM (Chebyshev) UCL | 157 |
| 97.5% KM (Chebyshev) UCL | 212.4 |

Pro-UCL
 Future Surface Soil

| | | | |
|---------------------------|-------|------------------------------|-------|
| k star | 0.154 | 99% KM (Chebyshev) UCL | 321.3 |
| Theta star | 846.3 | | |
| Nu star | 15.37 | Potential UCLs to Use | |
| AppChi2 | 7.521 | 99% KM (Chebyshev) UCL | 321.3 |
| 95% Gamma Approximate UCL | 265.9 | | |
| 95% Adjusted Gamma UCL | 271.8 | | |

Note: DL/2 is not a recommended method.

Arsenic

General Statistics

| | | | |
|--------------------------|----|---------------------------|-------|
| Number of Valid Samples | 50 | Number of Detected Data | 48 |
| Number of Unique Samples | 27 | Number of Non-Detect Data | 2 |
| | | Percent Non-Detects | 4.00% |

Raw Statistics

| | |
|--------------------|-------|
| Minimum Detected | 0.74 |
| Maximum Detected | 8.9 |
| Mean of Detected | 1.946 |
| SD of Detected | 1.33 |
| Minimum Non-Detect | 0.5 |
| Maximum Non-Detect | 0.5 |

Log-transformed Statistics

| | |
|--------------------|--------|
| Minimum Detected | -0.301 |
| Maximum Detected | 2.186 |
| Mean of Detected | 0.539 |
| SD of Detected | 0.462 |
| Minimum Non-Detect | -0.693 |
| Maximum Non-Detect | -0.693 |

UCL Statistics

Normal Distribution Test with Detected Values Only

| | |
|--------------------------------|-------|
| Shapiro Wilk Test Statistic | 0.618 |
| 5% Shapiro Wilk Critical Value | 0.947 |

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

| | |
|--------------------------------|-------|
| Shapiro Wilk Test Statistic | 0.93 |
| 5% Shapiro Wilk Critical Value | 0.947 |

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

| | |
|--------------------------|-------|
| DL/2 Substitution Method | |
| Mean | 1.878 |
| SD | 1.345 |
| 95% DL/2 (t) UCL | 2.197 |

Assuming Lognormal Distribution

| | |
|--------------------------|-------|
| DL/2 Substitution Method | |
| Mean | 0.462 |
| SD | 0.591 |
| 95% H-Stat (DL/2) UCL | 2.227 |

Maximum Likelihood Estimate(MLE) Method

| | |
|--------------------|-------|
| Mean | 1.859 |
| SD | 1.362 |
| 95% MLE (t) UCL | 2.182 |
| 95% MLE (Tiku) UCL | 2.168 |

Log ROS Method

| | |
|------------------------------|-------|
| Mean in Log Scale | 0.495 |
| SD in Log Scale | 0.502 |
| Mean in Original Scale | 1.891 |
| SD in Original Scale | 1.33 |
| 95% Percentile Bootstrap UCL | 2.227 |
| 95% BCA Bootstrap UCL | 2.306 |

Gamma Distribution Test with Detected Values Only

| | |
|-------------------------|-------|
| k star (bias corrected) | 3.86 |
| Theta Star | 0.504 |
| nu star | 370.5 |

Data Distribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

| | |
|-----------------------|-------|
| A-D Test Statistic | 1.626 |
| 5% A-D Critical Value | 0.753 |
| K-S Test Statistic | 0.753 |
| 5% K-S Critical Value | 0.128 |

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

| | |
|----------------------------------------------|-------|
| Gamma ROS Statistics using Extrapolated Data | |
| Minimum | 0 |
| Maximum | 8.9 |
| Mean | 1.868 |
| Median | 1.675 |
| SD | 1.358 |
| k star | 0.915 |
| Theta star | 2.041 |

Nonparametric Statistics

| | |
|-----------------------------------|-------|
| Kaplan-Meier (KM) Method | |
| Mean | 1.897 |
| SD | 1.311 |
| SE of Mean | 0.187 |
| 95% KM (t) UCL | 2.211 |
| 95% KM (z) UCL | 2.206 |
| 95% KM (jackknife) UCL | 2.21 |
| 95% KM (bootstrap t) UCL | 2.494 |
| 95% KM (BCA) UCL | 2.236 |
| 95% KM (Percentile Bootstrap) UCL | 2.238 |
| 95% KM (Chebyshev) UCL | 2.714 |
| 97.5% KM (Chebyshev) UCL | 3.067 |
| 99% KM (Chebyshev) UCL | 3.761 |

| | |
|---------------------------|-------|
| Nu star | 91.52 |
| AppChi2 | 70.46 |
| 95% Gamma Approximate UCL | 2.426 |
| 95% Adjusted Gamma UCL | 2.446 |

Potential UCLs to Use

95% KM (Chebyshev) UCL 2.714

Note: DL/2 is not a recommended method.

Iron

General Statistics

Number of Valid Samples 50

Number of Unique Samples 34

Raw Statistics

| | |
|--------------------------|-------|
| Minimum | 7400 |
| Maximum | 86000 |
| Mean | 34458 |
| Median | 30500 |
| SD | 17624 |
| Coefficient of Variation | 0.511 |
| Skewness | 0.856 |

Log-transformed Statistics

| | |
|---------------------|-------|
| Minimum of Log Data | 8.909 |
| Maximum of Log Data | 11.36 |
| Mean of log Data | 10.31 |
| SD of log Data | 0.551 |

Relevant UCL Statistics

Normal Distribution Test

| | |
|-----------------------------|-------|
| Shapiro Wilk Test Statistic | 0.941 |
| Shapiro Wilk Critical Value | 0.947 |

Data not Normal at 5% Significance Level

Lognormal Distribution Test

| | |
|-----------------------------|-------|
| Shapiro Wilk Test Statistic | 0.972 |
| Shapiro Wilk Critical Value | 0.947 |

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 38637

95% UCLs (Adjusted for Skewness)

| | |
|----------------------|-------|
| 95% Adjusted-CLT UCL | 38880 |
| 95% Modified-t UCL | 38687 |

Assuming Lognormal Distribution

95% H-UCL 40671

| | |
|----------------------------|-------|
| 95% Chebyshev (MVUE) UCL | 47418 |
| 97.5% Chebyshev (MVUE) UCL | 52850 |
| 99% Chebyshev (MVUE) UCL | 63519 |

Gamma Distribution Test

| | |
|------------------------------------|--------|
| k star (bias corrected) | 3.606 |
| Theta Star | 9556 |
| nu star | 360.6 |
| Approximate Chi Square Value (.05) | 317.6 |
| Adjusted Level of Significance | 0.0452 |
| Adjusted Chi Square Value | 316.4 |

Anderson-Darling Test Statistic 0.179

Anderson-Darling 5% Critical Value 0.754

Kolmogorov-Smirnov Test Statistic 0.0816

Kolmogorov-Smirnov 5% Critical Value 0.126

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL 39124

95% Adjusted Gamma UCL 39272

Potential UCL to Use

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

| | |
|-------------------------------|-------|
| 95% CLT UCL | 38558 |
| 95% Jackknife UCL | 38637 |
| 95% Standard Bootstrap UCL | 38495 |
| 95% Bootstrap-t UCL | 39101 |
| 95% Hall's Bootstrap UCL | 39100 |
| 95% Percentile Bootstrap UCL | 38590 |
| 95% BCA Bootstrap UCL | 38628 |
| 95% Chebyshev(Mean, Sd) UCL | 45322 |
| 97.5% Chebyshev(Mean, Sd) UCL | 50023 |
| 99% Chebyshev(Mean, Sd) UCL | 59257 |

Use 95% Approximate Gamma UCL 39124

Manganese

General Statistics

Number of Valid Samples 50

Number of Unique Samples 40

Raw Statistics

| | |
|---------|-------|
| Minimum | 80 |
| Maximum | 7300 |
| Mean | 669.7 |
| Median | 455 |
| SD | 1005 |

Log-transformed Statistics

| | |
|---------------------|-------|
| Minimum of Log Data | 4.382 |
| Maximum of Log Data | 8.896 |
| Mean of log Data | 6.166 |
| SD of log Data | 0.726 |

Coefficient of Variation 1.501
 Skewness 6.089

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.392
 Shapiro Wilk Critical Value 0.947

Data not Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 908.1

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL 1034
 95% Modified-t UCL 928.5

Gamma Distribution Test

k star (bias corrected) 1.531
 Theta Star 437.4
 nu star 153.1

Approximate Chi Square Value (.05) 125.5
 Adjusted Level of Significance 0.0452
 Adjusted Chi Square Value 124.8

Anderson-Darling Test Statistic 2.017
 Anderson-Darling 5% Critical Value 0.766
 Kolmogorov-Smirnov Test Statistic 0.155
 Kolmogorov-Smirnov 5% Critical Value 0.127

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL 817
 95% Adjusted Gamma UCL 821.8

Potential UCL to Use

Lognormal Distribution Test

Shapiro Wilk Test Statistic 0.958
 Shapiro Wilk Critical Value 0.947

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

95% H-UCL 767.3

95% Chebyshev (MVUE) UCL 919.9
 97.5% Chebyshev (MVUE) UCL 1051
 99% Chebyshev (MVUE) UCL 1309

Data Distribution

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL 903.5
 95% Jackknife UCL 908.1
 95% Standard Bootstrap UCL 911
 95% Bootstrap-t UCL 1354
 95% Hall's Bootstrap UCL 1802
 95% Percentile Bootstrap UCL 938.8
 95% BCA Bootstrap UCL 1117
 95% Chebyshev(Mean, Sd) UCL 1289
 97.5% Chebyshev(Mean, Sd) UCL 1558
 99% Chebyshev(Mean, Sd) UCL 2084

Use 95% H-UCL 767.3

Tetrachloroethene

General Statistics

Number of Valid Samples 50
 Number of Unique Samples 14

Number of Detected Data 14
 Number of Non-Detect Data 36
 Percent Non-Detects 72.00%

Raw Statistics

Minimum Detected 0.69
 Maximum Detected 111
 Mean of Detected 21.08
 SD of Detected 35.67
 Minimum Non-Detect 0.14
 Maximum Non-Detect 0.5

Log-transformed Statistics

Minimum Detected -0.371
 Maximum Detected 4.71
 Mean of Detected 1.838
 SD of Detected 1.611
 Minimum Non-Detect -1.966
 Maximum Non-Detect -0.693

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 36
 Number treated as Detected 14
 Single DL Non-Detect Percentage 72.00%

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic 0.616
 5% Shapiro Wilk Critical Value 0.874

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic 0.944
 5% Shapiro Wilk Critical Value 0.874

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method
 Mean 6.065
 SD 20.66

Assuming Lognormal Distribution

DL/2 Substitution Method
 Mean -0.611
 SD 1.792

95% DL/2 (t) UCL 10.96 95% H-Stat (DL/2) UCL 6.24

Maximum Likelihood Estimate(MLE) Method N/A
MLE yields a negative mean

Log ROS Method
Mean in Log Scale -2.451
SD in Log Scale 3.469
Mean in Original Scale 5.966
SD in Original Scale 20.69
95% Percentile Bootstrap UCL 11.29
95% BCA Bootstrap UCL 14.02

Gamma Distribution Test with Detected Values Only

k star (bias corrected) 0.457
Theta Star 46.09
nu star 12.81

Data Distribution Test with Detected Values Only

Data Follow Appr. Gamma Distribution at 5% Significance Level

A-D Test Statistic 0.855
5% A-D Critical Value 0.791
K-S Test Statistic 0.791
5% K-S Critical Value 0.241

Nonparametric Statistics

Kaplan-Meier (KM) Method
Mean 6.4
SD 20.36
SE of Mean 2.988
95% KM (t) UCL 11.41
95% KM (z) UCL 11.32
95% KM (jackknife) UCL 11.09
95% KM (bootstrap t) UCL 24.91
95% KM (BCA) UCL 11.83
95% KM (Percentile Bootstrap) UCL 11.87
95% KM (Chebyshev) UCL 19.43
97.5% KM (Chebyshev) UCL 25.06
99% KM (Chebyshev) UCL 36.13

Data follow Appr. Gamma Distribution at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data
Minimum 0
Maximum 111
Mean 16.54
Median 14.27
SD 20.17
k star 0.289
Theta star 57.16
Nu star 28.94
AppChi2 17.66
95% Gamma Approximate UCL 27.11
95% Adjusted Gamma UCL 27.52

Potential UCLs to Use

95% KM (t) UCL 11.41

Note: DL/2 is not a recommended method.

Thallium

General Statistics

Number of Valid Samples 50

Number of Unique Samples 37

Raw Statistics

Minimum 7.75
Maximum 91
Mean 38.28
Median 36.5
SD 19.6
Coefficient of Variation 0.512
Skewness 0.675

Log-transformed Statistics

Minimum of Log Data 2.048
Maximum of Log Data 4.511
Mean of log Data 3.5
SD of log Data 0.576

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.953
Shapiro Wilk Critical Value 0.947

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic 0.959
Shapiro Wilk Critical Value 0.947

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 42.93

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL 43.12
95% Modified-t UCL 42.97

Assuming Lognormal Distribution

95% H-UCL 45.84
95% Chebyshev (MVUE) UCL 53.69
97.5% Chebyshev (MVUE) UCL 60.08
99% Chebyshev (MVUE) UCL 72.61

Gamma Distribution Test

k star (bias corrected) 3.402

Data Distribution

Data appear Normal at 5% Significance Level

Theta Star 11.25
nu star 340.2
Approximate Chi Square Value (.05) 298.4
Adjusted Level of Significance 0.0452
Adjusted Chi Square Value 297.3

Anderson-Darling Test Statistic 0.183
Anderson-Darling 5% Critical Value 0.755
Kolmogorov-Smirnov Test Statistic 0.0647
Kolmogorov-Smirnov 5% Critical Value 0.126

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL 43.63
95% Adjusted Gamma UCL 43.8

Potential UCL to Use

Nonparametric Statistics

95% CLT UCL 42.84
95% Jackknife UCL 42.93
95% Standard Bootstrap UCL 42.79
95% Bootstrap-t UCL 43.12
95% Hall's Bootstrap UCL 43.07
95% Percentile Bootstrap UCL 43.13
95% BCA Bootstrap UCL 43.27
95% Chebyshev(Mean, Sd) UCL 50.36
97.5% Chebyshev(Mean, Sd) UCL 55.59
99% Chebyshev(Mean, Sd) UCL 65.86

Use 95% Student's-t UCL 42.93

Vanadium

General Statistics

Number of Valid Samples 50

Number of Unique Samples 39

Raw Statistics

Minimum 13
Maximum 400
Mean 122.3
Median 100
SD 92.82
Coefficient of Variation 0.759
Skewness 1.171

Log-transformed Statistics

Minimum of Log Data 2.565
Maximum of Log Data 5.991
Mean of log Data 4.491
SD of log Data 0.858

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.89
Shapiro Wilk Critical Value 0.947

Data not Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 144.3

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL 146.2
95% Modified-t UCL 144.6

Gamma Distribution Test

k star (bias corrected) 1.643
Theta Star 74.39
nu star 164.3
Approximate Chi Square Value (.05) 135.7
Adjusted Level of Significance 0.0452
Adjusted Chi Square Value 134.9

Anderson-Darling Test Statistic 0.269
Anderson-Darling 5% Critical Value 0.765
Kolmogorov-Smirnov Test Statistic 0.0821
Kolmogorov-Smirnov 5% Critical Value 0.127

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL 148.1
95% Adjusted Gamma UCL 148.9

Potential UCL to Use

Lognormal Distribution Test

Shapiro Wilk Test Statistic 0.961
Shapiro Wilk Critical Value 0.947

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

95% H-UCL 168.2
95% Chebyshev (MVUE) UCL 204.4
97.5% Chebyshev (MVUE) UCL 237.6
99% Chebyshev (MVUE) UCL 302.8

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

95% CLT UCL 143.8
95% Jackknife UCL 144.3
95% Standard Bootstrap UCL 143.2
95% Bootstrap-t UCL 147.2
95% Hall's Bootstrap UCL 146.2
95% Percentile Bootstrap UCL 143.9
95% BCA Bootstrap UCL 147.1
95% Chebyshev(Mean, Sd) UCL 179.5
97.5% Chebyshev(Mean, Sd) UCL 204.2
99% Chebyshev(Mean, Sd) UCL 252.9

Use 95% Approximate Gamma UCL 148.1

General UCL Statistics for Data Sets with Non-Detects

User Selected Options
 From File Subsurface Soil wo HSs.wst
 Full Precision OFF
 Confidence Coefficient 95%
 Number of Bootstrap Operations 2000

1,2-Dichloroethane

| General Statistics | | | |
|---------------------------|-----|---------------------------|--------|
| Number of Valid Samples | 152 | Number of Detected Data | 53 |
| Number of Unique Samples | 51 | Number of Non-Detect Data | 99 |
| | | Percent Non-Detects | 65.13% |

| Raw Statistics | | Log-transformed Statistics | |
|-----------------------|-------|-----------------------------------|--------|
| Minimum Detected | 0.36 | Minimum Detected | -1.022 |
| Maximum Detected | 2500 | Maximum Detected | 7.824 |
| Mean of Detected | 399.3 | Mean of Detected | 3.263 |
| SD of Detected | 637.6 | SD of Detected | 2.978 |
| Minimum Non-Detect | 0.18 | Minimum Non-Detect | -1.715 |
| Maximum Non-Detect | 35.65 | Maximum Non-Detect | 3.574 |

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 131
 Number treated as Detected 21
 Single DL Non-Detect Percentage 86.18%

| UCL Statistics | | Lognormal Distribution Test with Detected Values Only | |
|-----------------------------------------------------------|-------|--------------------------------------------------------------|-------|
| Normal Distribution Test with Detected Values Only | | Lilliefors Test Statistic | 0.167 |
| Lilliefors Test Statistic | 0.323 | 5% Lilliefors Critical Value | 0.122 |
| 5% Lilliefors Critical Value | 0.122 | | |
| 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 | 139.4 | Mean | -0.134 |
| SD | 420 | SD | 3.075 |
| 95% DL/2 (t) UCL | 195.8 | 95% H-Stat (DL/2) UCL | 314.1 |

| | | | |
|-----------------------------------------|-----|------------------------------|-------|
| Maximum Likelihood Estimate(MLE) Method | N/A | Log ROS Method | |
| MLE yields a negative mean | | Mean in Log Scale | -2.47 |
| | | SD in Log Scale | 5.358 |
| | | Mean in Original Scale | 139.3 |
| | | SD in Original Scale | 420 |
| | | 95% Percentile Bootstrap UCL | 196 |
| | | 95% BCA Bootstrap UCL | 201.9 |

| Gamma Distribution Test with Detected Values Only | | Data Distribution Test with Detected Values Only | |
|----------------------------------------------------------|-------|-------------------------------------------------------------|--|
| k star (bias corrected) | 0.257 | Data do not follow a Discernable Distribution (0.05) | |
| Theta Star | 1554 | | |
| nu star | 27.24 | | |

| Assuming Gamma Distribution | | Nonparametric Statistics | |
|------------------------------------------------------------|-------|-----------------------------------|-------|
| A-D Test Statistic | 2.963 | Kaplan-Meier (KM) Method | |
| 5% A-D Critical Value | 0.881 | Mean | 139.5 |
| K-S Test Statistic | 0.881 | SD | 418.6 |
| 5% K-S Critical Value | 0.134 | SE of Mean | 34.28 |
| Data not Gamma Distributed at 5% Significance Level | | 95% KM (t) UCL | 196.2 |
| | | 95% KM (z) UCL | 195.8 |
| | | 95% KM (jackknife) UCL | 195.8 |
| | | 95% KM (bootstrap t) UCL | 211.7 |
| | | 95% KM (BCA) UCL | 201 |
| | | 95% KM (Percentile Bootstrap) UCL | 199.4 |
| | | 95% KM (Chebyshev) UCL | 288.9 |
| | | 97.5% KM (Chebyshev) UCL | 353.5 |
| | | 99% KM (Chebyshev) UCL | 480.5 |

| Assuming Gamma Distribution | | Potential UCLs to Use | |
|----------------------------------------------|-------|------------------------------|-------|
| Gamma ROS Statistics using Extrapolated Data | | 97.5% KM (Chebyshev) UCL | 353.5 |
| Minimum | 0 | | |
| Maximum | 2500 | | |
| Mean | 348.2 | | |
| Median | 358.2 | | |
| SD | 398.5 | | |
| k star | 0.246 | | |
| Theta star | 1414 | | |
| Nu star | 74.88 | | |
| AppChi2 | 55.95 | | |
| 95% Gamma Approximate UCL | 466 | | |
| 95% Adjusted Gamma UCL | 467.3 | | |

Note: DL/2 is not a recommended method.

1,4-Dichlorobenzene

| General Statistics | | | |
|---------------------------|-----|---------------------------|--------|
| Number of Valid Samples | 152 | Number of Detected Data | 18 |
| Number of Unique Samples | 18 | Number of Non-Detect Data | 134 |
| | | Percent Non-Detects | 88.16% |

| Raw Statistics | | Log-transformed Statistics | |
|-----------------------|-------|-----------------------------------|--------|
| Minimum Detected | 0.45 | Minimum Detected | -0.799 |
| Maximum Detected | 2205 | Maximum Detected | 7.698 |
| Mean of Detected | 345.9 | Mean of Detected | 3.282 |
| SD of Detected | 663.4 | SD of Detected | 2.704 |
| Minimum Non-Detect | 0.21 | Minimum Non-Detect | -1.561 |
| Maximum Non-Detect | 0.3 | Maximum Non-Detect | -1.204 |

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 134
 Number treated as Detected 18
 Single DL Non-Detect Percentage 88.16%

UCL Statistics

Normal Distribution Test with Detected Values Only

| | |
|------------------------------|-------|
| Lilliefors Test Statistic | 0.598 |
| 5% Lilliefors Critical Value | 0.897 |

Data not Normal at 5% Significance Level

Assuming Normal Distribution

| | |
|--------------------------|-------|
| DL/2 Substitution Method | |
| Mean | 41.09 |
| SD | 249.2 |
| 95% DL/2 (t) UCL | 74.54 |

Maximum Likelihood Estimate(MLE) Method N/A

MLE yields a negative mean

Gamma Distribution Test with Detected Values Only

| | |
|-------------------------|-------|
| k star (bias corrected) | 0.265 |
| Theta Star | 1307 |
| nu star | 9.526 |

| | |
|-----------------------|-------|
| A-D Test Statistic | 0.984 |
| 5% A-D Critical Value | 0.853 |
| K-S Test Statistic | 0.853 |
| 5% K-S Critical Value | 0.222 |

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

| | |
|----------------------------------------------|-------|
| Gamma ROS Statistics using Extrapolated Data | |
| Minimum | 0 |
| Maximum | 19366 |
| Mean | 3600 |
| Median | 894.4 |
| SD | 5144 |
| k star | 0.109 |
| Theta star | 33049 |
| Nu star | 33.11 |
| AppChi2 | 20.96 |
| 95% Gamma Approximate UCL | 5688 |
| 95% Adjusted Gamma UCL | 5713 |

Note: DL/2 is not a recommended method.

Arsenic

General Statistics

| | |
|--------------------------|-----|
| Number of Valid Samples | 101 |
| Number of Unique Samples | 40 |

Raw Statistics

| | |
|--------------------|-------|
| Minimum Detected | 0.55 |
| Maximum Detected | 8.9 |
| Mean of Detected | 1.671 |
| SD of Detected | 1.146 |
| Minimum Non-Detect | 0.5 |
| Maximum Non-Detect | 0.5 |

UCL Statistics

Normal Distribution Test with Detected Values Only

| | |
|------------------------------|-----|
| Lilliefors Test Statistic | 0.2 |
| 5% Lilliefors Critical Value | 0.1 |

Data not Normal at 5% Significance Level

Assuming Normal Distribution

| | |
|--------------------------|-------|
| DL/2 Substitution Method | |
| Mean | 1.348 |
| SD | 1.17 |
| 95% DL/2 (t) UCL | 1.541 |

Maximum Likelihood Estimate(MLE) Method

| | |
|--------------------|-------|
| Mean | 1.209 |
| SD | 1.356 |
| 95% MLE (t) UCL | 1.433 |
| 95% MLE (Tiku) UCL | 1.436 |

Gamma Distribution Test with Detected Values Only

| | |
|-------------------------|-------|
| k star (bias corrected) | 3.67 |
| Theta Star | 0.455 |
| nu star | 572.5 |

| | |
|-----------------------|-------|
| A-D Test Statistic | 1.21 |
| 5% A-D Critical Value | 0.757 |
| K-S Test Statistic | 0.757 |
| 5% K-S Critical Value | 0.102 |

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Lognormal Distribution Test with Detected Values Only

| | |
|------------------------------|-------|
| Lilliefors Test Statistic | 0.945 |
| 5% Lilliefors Critical Value | 0.897 |

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

| | |
|--------------------------|--------|
| DL/2 Substitution Method | |
| Mean | -1.359 |
| SD | 1.938 |
| 95% H-Stat (DL/2) UCL | 2.754 |

Log ROS Method

| | |
|------------------------------|--------|
| Mean in Log Scale | -8.561 |
| SD in Log Scale | 6.985 |
| Mean in Original Scale | 40.99 |
| SD in Original Scale | 249.2 |
| 95% Percentile Bootstrap UCL | 77.79 |
| 95% BCA Bootstrap UCL | 89.46 |

Data Distribution Test with Detected Values Only

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

| | |
|-----------------------------------|-------|
| Kaplan-Meier (KM) Method | |
| Mean | 41.36 |
| SD | 248.4 |
| SE of Mean | 20.73 |
| 95% KM (t) UCL | 75.67 |
| 95% KM (z) UCL | 75.46 |
| 95% KM (jackknife) UCL | 74.58 |
| 95% KM (bootstrap t) UCL | 106.2 |
| 95% KM (BCA) UCL | 82.31 |
| 95% KM (Percentile Bootstrap) UCL | 77.71 |
| 95% KM (Chebyshev) UCL | 131.7 |
| 97.5% KM (Chebyshev) UCL | 170.8 |
| 99% KM (Chebyshev) UCL | 247.6 |

Potential UCLs to Use

| | |
|--------------------------|-------|
| 97.5% KM (Chebyshev) UCL | 170.8 |
|--------------------------|-------|

Log-transformed Statistics

| | |
|--------------------|--------|
| Minimum Detected | -0.598 |
| Maximum Detected | 2.186 |
| Mean of Detected | 0.377 |
| SD of Detected | 0.495 |
| Minimum Non-Detect | -0.693 |
| Maximum Non-Detect | -0.693 |

Lognormal Distribution Test with Detected Values Only

| | |
|------------------------------|-------|
| Lilliefors Test Statistic | 0.078 |
| 5% Lilliefors Critical Value | 0.1 |

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

| | |
|--------------------------|---------|
| DL/2 Substitution Method | |
| Mean | -0.0248 |
| SD | 0.861 |
| 95% H-Stat (DL/2) UCL | 1.69 |

Log ROS Method

| | |
|------------------------------|-------|
| Mean in Log Scale | 0.121 |
| SD in Log Scale | 0.655 |
| Mean in Original Scale | 1.403 |
| SD in Original Scale | 1.123 |
| 95% Percentile Bootstrap UCL | 1.597 |
| 95% BCA Bootstrap UCL | 1.65 |

Data Distribution Test with Detected Values Only

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

| | |
|--------------------------|-------|
| Kaplan-Meier (KM) Method | |
| Mean | 1.416 |
| SD | 1.105 |
| SE of Mean | 0.111 |
| 95% KM (t) UCL | 1.6 |
| 95% KM (z) UCL | 1.598 |

| | | | |
|----------------------------------------------|-------|-----------------------------------|-------|
| Gamma ROS Statistics using Extrapolated Data | | 95% KM (jackknife) UCL | 1.592 |
| Minimum | 0 | 95% KM (bootstrap t) UCL | 1.658 |
| Maximum | 8.9 | 95% KM (BCA) UCL | 1.623 |
| Mean | 1.458 | 95% KM (Percentile Bootstrap) UCL | 1.608 |
| Median | 1.3 | 95% KM (Chebyshev) UCL | 1.899 |
| SD | 1.098 | 97.5% KM (Chebyshev) UCL | 2.107 |
| k star | 0.969 | 99% KM (Chebyshev) UCL | 2.518 |
| Theta star | 1.505 | | |
| Nu star | 195.6 | Potential UCLs to Use | |
| AppChi2 | 164.3 | 95% KM (BCA) UCL | 1.623 |
| 95% Gamma Approximate UCL | 1.736 | | |
| 95% Adjusted Gamma UCL | 1.741 | | |

Note: DL/2 is not a recommended method.

Benzene

| | | | |
|---------------------------|-------|-----------------------------------|--------|
| General Statistics | | | |
| Number of Valid Samples | 152 | Number of Detected Data | 40 |
| Number of Unique Samples | 38 | Number of Non-Detect Data | 112 |
| | | Percent Non-Detects | 73.68% |
| Raw Statistics | | Log-transformed Statistics | |
| Minimum Detected | 0.335 | Minimum Detected | -1.094 |
| Maximum Detected | 490 | Maximum Detected | 6.194 |
| Mean of Detected | 49.74 | Mean of Detected | 1.867 |
| SD of Detected | 106.2 | SD of Detected | 2.067 |
| Minimum Non-Detect | 0.18 | Minimum Non-Detect | -1.715 |
| Maximum Non-Detect | 0.4 | Maximum Non-Detect | -0.916 |

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 | 113 |
| Number treated as Detected | 39 |
| Single DL Non-Detect Percentage | 74.34% |

| | | | |
|-----------------------------------------------------------|-------|--------------------------------------------------------------|--------|
| UCL Statistics | | Lognormal Distribution Test with Detected Values Only | |
| Normal Distribution Test with Detected Values Only | | Lilliefors Test Statistic | 0.917 |
| Lilliefors Test Statistic | 0.54 | 5% Lilliefors Critical Value | 0.94 |
| 5% Lilliefors Critical Value | 0.94 | Data not Lognormal at 5% Significance Level | |
| Data not Normal at 5% Significance Level | | Assuming Lognormal Distribution | |
| Assuming Normal Distribution | | DL/2 Substitution Method | |
| DL/2 Substitution Method | | Mean | -0.816 |
| Mean | 13.22 | SD | 1.941 |
| SD | 58.25 | 95% H-Stat (DL/2) UCL | 4.776 |
| 95% DL/2 (t) UCL | 21.04 | | |
| Maximum Likelihood Estimate(MLE) Method | N/A | Log ROS Method | |
| MLE yields a negative mean | | Mean in Log Scale | -3.517 |
| | | SD in Log Scale | 4.285 |
| | | Mean in Original Scale | 13.13 |
| | | SD in Original Scale | 58.27 |
| | | 95% Percentile Bootstrap UCL | 21.37 |
| | | 95% BCA Bootstrap UCL | 24.81 |

| | | | |
|----------------------------------------------------------|-------|-------------------------------------------------------------|--|
| Gamma Distribution Test with Detected Values Only | | Data Distribution Test with Detected Values Only | |
| k star (bias corrected) | 0.324 | Data do not follow a Discernable Distribution (0.05) | |
| Theta Star | 153.5 | | |
| nu star | 25.93 | | |

| | | | |
|------------------------------------------------------------|-------|-----------------------------------|-------|
| A-D Test Statistic | | Nonparametric Statistics | |
| A-D Test Statistic | 3.088 | Kaplan-Meier (KM) Method | |
| 5% A-D Critical Value | 0.85 | Mean | 13.34 |
| K-S Test Statistic | 0.85 | SD | 58.03 |
| 5% K-S Critical Value | 0.151 | SE of Mean | 4.767 |
| Data not Gamma Distributed at 5% Significance Level | | 95% KM (t) UCL | 21.23 |
| Assuming Gamma Distribution | | 95% KM (z) UCL | 21.18 |
| Gamma ROS Statistics using Extrapolated Data | | 95% KM (jackknife) UCL | 21.08 |
| Minimum | 0 | 95% KM (bootstrap t) UCL | 26.47 |
| Maximum | 490 | 95% KM (BCA) UCL | 22.17 |
| Mean | 44.21 | 95% KM (Percentile Bootstrap) UCL | 21.77 |
| Median | 42.57 | 95% KM (Chebyshev) UCL | 34.12 |
| SD | 58.02 | 97.5% KM (Chebyshev) UCL | 43.11 |
| k star | 0.23 | 99% KM (Chebyshev) UCL | 60.77 |
| Theta star | 191.8 | | |
| Nu star | 70.06 | Potential UCLs to Use | |
| AppChi2 | 51.79 | 97.5% KM (Chebyshev) UCL | 43.11 |
| 95% Gamma Approximate UCL | 59.81 | | |
| 95% Adjusted Gamma UCL | 59.98 | | |

Note: DL/2 is not a recommended method.

Chloroform

| | | | |
|---------------------------|-------|-----------------------------------|--------|
| General Statistics | | | |
| Number of Valid Samples | 152 | Number of Detected Data | 27 |
| Number of Unique Samples | 27 | Number of Non-Detect Data | 125 |
| | | Percent Non-Detects | 82.24% |
| Raw Statistics | | Log-transformed Statistics | |
| Minimum Detected | 0.23 | Minimum Detected | -1.47 |
| Maximum Detected | 63 | Maximum Detected | 4.143 |
| Mean of Detected | 6.749 | Mean of Detected | 0.947 |
| SD of Detected | 12.15 | SD of Detected | 1.474 |
| Minimum Non-Detect | 0.13 | Minimum Non-Detect | -2.04 |

Maximum Non-Detect 0.2 Maximum Non-Detect -1.609

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 125
Number treated as Detected 27
Single DL Non-Detect Percentage 82.24%

UCL Statistics

Normal Distribution Test with Detected Values Only

Lilliefors Test Statistic 0.512
5% Lilliefors Critical Value 0.923

Data not Normal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method
Mean 1.275
SD 5.65
95% DL/2 (t) UCL 2.033

Maximum Likelihood Estimate(MLE) Method N/A
MLE yields a negative mean

Lognormal Distribution Test with Detected Values Only

Lilliefors Test Statistic 0.959
5% Lilliefors Critical Value 0.923

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

DL/2 Substitution Method
Mean -1.805
SD 1.431
95% H-Stat (DL/2) UCL 0.618

Log ROS Method
Mean in Log Scale -3.976
SD in Log Scale 3.318
Mean in Original Scale 1.237
SD in Original Scale 5.658
95% Percentile Bootstrap UCL 2.076
95% BCA Bootstrap UCL 2.582

Gamma Distribution Test with Detected Values Only

k star (bias corrected) 0.591
Theta Star 11.42
nu star 31.9

A-D Test Statistic 0.633
5% A-D Critical Value 0.795
K-S Test Statistic 0.795
5% K-S Critical Value 0.176

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data
Minimum 0
Maximum 63
Mean 7.903
Median 5.046
SD 9.092
k star 0.14
Theta star 56.38
Nu star 42.61
AppChi2 28.64
95% Gamma Approximate UCL 11.76
95% Adjusted Gamma UCL 11.8

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 1.388
SD 5.607
SE of Mean 0.463
95% KM (t) UCL 2.155
95% KM (z) UCL 2.15
95% KM (jackknife) UCL 2.135
95% KM (bootstrap t) UCL 3.171
95% KM (BCA) UCL 2.302
95% KM (Percentile Bootstrap) UCL 2.25
95% KM (Chebyshev) UCL 3.408
97.5% KM (Chebyshev) UCL 4.282
99% KM (Chebyshev) UCL 5.999

Potential UCLs to Use

95% KM (t) UCL 2.155

cis-1,2-Dichloroethene

General Statistics

Number of Valid Samples 152
Number of Unique Samples 69

Number of Detected Data 72
Number of Non-Detect Data 80
Percent Non-Detects 52.63%

Raw Statistics

Minimum Detected 0.55
Maximum Detected 3200
Mean of Detected 201.4
SD of Detected 477.8
Minimum Non-Detect 0.16
Maximum Non-Detect 0.5

Log-transformed Statistics

Minimum Detected -0.598
Maximum Detected 8.071
Mean of Detected 3.23
SD of Detected 2.401
Minimum Non-Detect -1.833
Maximum Non-Detect -0.693

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 80
Number treated as Detected 72
Single DL Non-Detect Percentage 52.63%

UCL Statistics

Normal Distribution Test with Detected Values Only

Lilliefors Test Statistic 0.337
5% Lilliefors Critical Value 0.104

Data not Normal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method
Mean 95.52
SD 342.8
95% DL/2 (t) UCL 141.5

Maximum Likelihood Estimate(MLE) Method N/A
MLE yields a negative mean

Lognormal Distribution Test with Detected Values Only

Lilliefors Test Statistic 0.0935
5% Lilliefors Critical Value 0.104

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

DL/2 Substitution Method
Mean 0.71
SD 2.924
95% H-Stat (DL/2) UCL 409.2

Log ROS Method
Mean in Log Scale -0.14
SD in Log Scale 3.985
Mean in Original Scale 95.51
SD in Original Scale 342.8
95% Percentile Bootstrap UCL 145.3
95% BCA Bootstrap UCL 164

Gamma Distribution Test with Detected Values Only

k star (bias corrected) 0.323

Data Distribution Test with Detected Values Only

Data appear Lognormal at 5% Significance Level

| | |
|-----------------------|-------|
| Theta Star | 623.4 |
| nu star | 46.53 |
| A-D Test Statistic | 1.771 |
| 5% A-D Critical Value | 0.859 |
| K-S Test Statistic | 0.859 |
| 5% K-S Critical Value | 0.114 |

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

| | |
|----------------------------------------------|-------|
| Gamma ROS Statistics using Extrapolated Data | |
| Minimum | 0 |
| Maximum | 3200 |
| Mean | 259.8 |
| Median | 59 |
| SD | 438.8 |
| k star | 0.134 |
| Theta star | 1941 |
| Nu star | 40.69 |
| AppChi2 | 27.07 |
| 95% Gamma Approximate UCL | 390.5 |
| 95% Adjusted Gamma UCL | 392 |

Note: DL/2 is not a recommended method.

Iron

General Statistics

| | |
|-------------------------|-----|
| Number of Valid Samples | 101 |
|-------------------------|-----|

Raw Statistics

| | |
|--------------------------|-------|
| Minimum | 7400 |
| Maximum | 99000 |
| Mean | 33417 |
| Median | 31000 |
| SD | 17412 |
| Coefficient of Variation | 0.521 |
| Skewness | 0.987 |

Relevant UCL Statistics

Normal Distribution Test

| | |
|---------------------------|--------|
| Lilliefors Test Statistic | 0.0717 |
| Lilliefors Critical Value | 0.0882 |

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

| | |
|---------------------|-------|
| 95% Student's-t UCL | 36293 |
|---------------------|-------|

95% UCLs (Adjusted for Skewness)

| | |
|----------------------|-------|
| 95% Adjusted-CLT UCL | 36449 |
| 95% Modified-t UCL | 36322 |

Gamma Distribution Test

| | |
|--------------------------------------|--------|
| k star (bias corrected) | 3.577 |
| Theta Star | 9342 |
| nu star | 722.6 |
| Approximate Chi Square Value (.05) | 661.2 |
| Adjusted Level of Significance | 0.0476 |
| Adjusted Chi Square Value | 660.4 |
| Anderson-Darling Test Statistic | 0.306 |
| Anderson-Darling 5% Critical Value | 0.757 |
| Kolmogorov-Smirnov Test Statistic | 0.0609 |
| Kolmogorov-Smirnov 5% Critical Value | 0.0896 |

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

| | |
|---------------------------|-------|
| 95% Approximate Gamma UCL | 36518 |
| 95% Adjusted Gamma UCL | 36565 |

Potential UCL to Use

Nonparametric Statistics

| | |
|-----------------------------------|-------|
| Kaplan-Meier (KM) Method | |
| Mean | 95.7 |
| SD | 341.6 |
| SE of Mean | 27.9 |
| 95% KM (t) UCL | 141.9 |
| 95% KM (z) UCL | 141.6 |
| 95% KM (jackknife) UCL | 141.7 |
| 95% KM (bootstrap t) UCL | 182 |
| 95% KM (BCA) UCL | 155 |
| 95% KM (Percentile Bootstrap) UCL | 142.9 |
| 95% KM (Chebyshev) UCL | 217.3 |
| 97.5% KM (Chebyshev) UCL | 269.9 |
| 99% KM (Chebyshev) UCL | 373.3 |

Potential UCLs to Use
97.5% KM (Chebyshev) UCL 269.9

Log-transformed Statistics

| | |
|---------------------|-------|
| Minimum of Log Data | 8.909 |
| Maximum of Log Data | 11.5 |
| Mean of log Data | 10.27 |
| SD of log Data | 0.558 |

Lognormal Distribution Test

| | |
|---------------------------|--------|
| Lilliefors Test Statistic | 0.0847 |
| Lilliefors Critical Value | 0.0882 |

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

| | |
|----------------------------|-------|
| 95% H-UCL | 37605 |
| 95% Chebyshev (MVUE) UCL | 42580 |
| 97.5% Chebyshev (MVUE) UCL | 46368 |
| 99% Chebyshev (MVUE) UCL | 53808 |

Data appear Normal at 5% Significance Level

Nonparametric Statistics

| | |
|-------------------------------|-------|
| 95% CLT UCL | 36267 |
| 95% Jackknife UCL | 36293 |
| 95% Standard Bootstrap UCL | 36314 |
| 95% Bootstrap-t UCL | 36350 |
| 95% Hall's Bootstrap UCL | 36407 |
| 95% Percentile Bootstrap UCL | 36135 |
| 95% BCA Bootstrap UCL | 36416 |
| 95% Chebyshev(Mean, Sd) UCL | 40969 |
| 97.5% Chebyshev(Mean, Sd) UCL | 44237 |
| 99% Chebyshev(Mean, Sd) UCL | 50656 |

Use 95% Student's-t UCL 36293

Manganese

General Statistics

| | |
|-------------------------|-----|
| Number of Valid Samples | 101 |
|-------------------------|-----|

Raw Statistics

| | |
|--------------------------|-------|
| Minimum | 60 |
| Maximum | 7300 |
| Mean | 619 |
| Median | 450 |
| SD | 808.3 |
| Coefficient of Variation | 1.306 |
| Skewness | 6.214 |

Relevant UCL Statistics

Normal Distribution Test

| | |
|---------------------------|--------|
| Lilliefors Test Statistic | 0.245 |
| Lilliefors Critical Value | 0.0882 |

Data not Normal at 5% Significance Level

Assuming Normal Distribution

| | |
|---------------------|-------|
| 95% Student's-t UCL | 752.5 |
|---------------------|-------|

Lognormal Distribution Test

| | |
|---------------------------|--------|
| Lilliefors Test Statistic | 0.062 |
| Lilliefors Critical Value | 0.0882 |

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

| | |
|-----------|-------|
| 95% H-UCL | 695.5 |
|-----------|-------|

95% UCLs (Adjusted for Skewness)
 95% Adjusted-CLT UCL 804.4
 95% Modified-t UCL 760.8

Gamma Distribution Test

k star (bias corrected) 1.588
 Theta Star 389.7
 nu star 320.8
 Approximate Chi Square Value (.05) 280.3
 Adjusted Level of Significance 0.0476
 Adjusted Chi Square Value 279.8

Anderson-Darling Test Statistic 2.018
 Anderson-Darling 5% Critical Value 0.769
 Kolmogorov-Smirnov Test Statistic 0.119
 Kolmogorov-Smirnov 5% Critical Value 0.0907

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL 708.4
 95% Adjusted Gamma UCL 709.8

Potential UCL to Use

95% Chebyshev (MVUE) UCL 816.7
 97.5% Chebyshev (MVUE) UCL 913.4
 99% Chebyshev (MVUE) UCL 1103

Data Distribution

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL 751.3
 95% Jackknife UCL 752.5
 95% Standard Bootstrap UCL 749.4
 95% Bootstrap-t UCL 884.4
 95% Hall's Bootstrap UCL 1348
 95% Percentile Bootstrap UCL 753.9
 95% BCA Bootstrap UCL 833.9
 95% Chebyshev(Mean, Sd) UCL 969.6
 97.5% Chebyshev(Mean, Sd) UCL 1121
 99% Chebyshev(Mean, Sd) UCL 1419

Use 95% H-UCL 695.5

Tetrachloroethene

General Statistics

Number of Valid Samples 152
 Number of Unique Samples 64

Number of Detected Data 70
 Number of Non-Detect Data 82
 Percent Non-Detects 53.95%

Raw Statistics

Minimum Detected 0.54
 Maximum Detected 2800
 Mean of Detected 179
 SD of Detected 545.3
 Minimum Non-Detect 0.14
 Maximum Non-Detect 0.5

Log-transformed Statistics

Minimum Detected -0.616
 Maximum Detected 7.937
 Mean of Detected 2.527
 SD of Detected 2.241
 Minimum Non-Detect -1.966
 Maximum Non-Detect -0.693

**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 82
 Number treated as Detected 70
 Single DL Non-Detect Percentage 53.95%

UCL Statistics

Normal Distribution Test with Detected Values Only

Lilliefors Test Statistic 0.414
 5% Lilliefors Critical Value 0.106

Data not Normal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method
 Mean 82.53
 SD 379.3
 95% DL/2 (t) UCL 133.4

Maximum Likelihood Estimate(MLE) Method N/A

MLE yields a negative mean

Lognormal Distribution Test with Detected Values Only

Lilliefors Test Statistic 0.103
 5% Lilliefors Critical Value 0.106

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

DL/2 Substitution Method
 Mean 0.257
 SD 2.623
 95% H-Stat (DL/2) UCL 93.75

Log ROS Method

Mean in Log Scale -0.854

SD in Log Scale 3.872

Mean in Original Scale 82.48

SD in Original Scale 379.3

95% Percentile Bootstrap UCL 135.9

95% BCA Bootstrap UCL 152.2

Gamma Distribution Test with Detected Values Only

k star (bias corrected) 0.263
 Theta Star 681
 nu star 36.79

A-D Test Statistic 6.352
 5% A-D Critical Value 0.881
 K-S Test Statistic 0.881
 5% K-S Critical Value 0.116

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data
 Minimum 0.54
 Maximum 2800
 Mean 239.2
 Median 40.02
 SD 454.6
 k star 0.374
 Theta star 640.2
 Nu star 113.6
 AppChi2 89.99
 95% Gamma Approximate UCL 302
 95% Adjusted Gamma UCL 302.6

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method
 Mean 82.71
 SD 378
 SE of Mean 30.88
 95% KM (t) UCL 133.8
 95% KM (z) UCL 133.5
 95% KM (jackknife) UCL 133.6
 95% KM (bootstrap t) UCL 172.9
 95% KM (BCA) UCL 137.9
 95% KM (Percentile Bootstrap) UCL 134.7
 95% KM (Chebyshev) UCL 217.3
 97.5% KM (Chebyshev) UCL 275.6
 99% KM (Chebyshev) UCL 390

Potential UCLs to Use

97.5% KM (Chebyshev) UCL 275.6

Thallium

General Statistics

Number of Valid Samples 101

Number of Unique Samples 56

Raw Statistics

Minimum 7.75
Maximum 99
Mean 36.52
Median 33
SD 18.7
Coefficient of Variation 0.512
Skewness 0.839

Log-transformed Statistics

Minimum of Log Data 2.048
Maximum of Log Data 4.595
Mean of log Data 3.458
SD of log Data 0.558

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic 0.0796
Lilliefors Critical Value 0.0882

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 39.61

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL 39.75
95% Modified-t UCL 39.64

Gamma Distribution Test

k star (bias corrected) 3.617
Theta Star 10.1
nu star 730.7
Approximate Chi Square Value (.05) 669
Adjusted Level of Significance 0.0476
Adjusted Chi Square Value 668.1

Anderson-Darling Test Statistic 0.204
Anderson-Darling 5% Critical Value 0.757
Kolmogorov-Smirnov Test Statistic 0.0547
Kolmogorov-Smirnov 5% Critical Value 0.0896
Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL 39.89
95% Adjusted Gamma UCL 39.94

Potential UCL to Use

Lognormal Distribution Test

Lilliefors Test Statistic 0.09
Lilliefors Critical Value 0.0882

Data not Lognormal at 5% Significance Level

Assuming Lognormal Distribution

95% H-UCL 41.14
95% Chebyshev (MVUE) UCL 46.57
97.5% Chebyshev (MVUE) UCL 50.71
99% Chebyshev (MVUE) UCL 58.84

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL 39.58
95% Jackknife UCL 39.61
95% Standard Bootstrap UCL 39.55
95% Bootstrap-t UCL 39.68
95% Hall's Bootstrap UCL 39.7
95% Percentile Bootstrap UCL 39.53
95% BCA Bootstrap UCL 39.84
95% Chebyshev(Mean, Sd) UCL 44.63
97.5% Chebyshev(Mean, Sd) UCL 48.14
99% Chebyshev(Mean, Sd) UCL 55.04

Use 95% Student's-t UCL 39.61

Toluene

General Statistics

Number of Valid Samples 152
Number of Unique Samples 61

Number of Detected Data 67
Number of Non-Detect Data 85
Percent Non-Detects 55.92%

Raw Statistics

Minimum Detected 0.45
Maximum Detected 220000
Mean of Detected 5450
SD of Detected 27325
Minimum Non-Detect 0.17
Maximum Non-Detect 0.4

Log-transformed Statistics

Minimum Detected -0.799
Maximum Detected 12.3
Mean of Detected 3.32
SD of Detected 3.769
Minimum Non-Detect -1.772
Maximum Non-Detect -0.916

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 85
Number treated as Detected 67
Single DL Non-Detect Percentage 55.92%

UCL Statistics

Normal Distribution Test with Detected Values Only

Lilliefors Test Statistic 0.421
5% Lilliefors Critical Value 0.108

Data not Normal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method
Mean 2402
SD 18268
95% DL/2 (t) UCL 4855

Maximum Likelihood Estimate(MLE) Method
MLE yields a negative mean

Lognormal Distribution Test with Detected Values Only

Lilliefors Test Statistic 0.159
5% Lilliefors Critical Value 0.108

Data not Lognormal at 5% Significance Level

Assuming Lognormal Distribution

DL/2 Substitution Method
Mean 0.473
SD 3.564
95% H-Stat (DL/2) UCL 4088

Log ROS Method
Mean in Log Scale -2.579
SD in Log Scale 6.523
Mean in Original Scale 2402
SD in Original Scale 18268
95% Percentile Bootstrap UCL 5302
95% BCA Bootstrap UCL 6998

Gamma Distribution Test with Detected Values Only

k star (bias corrected) 0.149
Theta Star 36463
nu star 20.03

A-D Test Statistic 6.645
5% A-D Critical Value 0.953
K-S Test Statistic 0.953
5% K-S Critical Value 0.123

Data not Gamma Distributed at 5% Significance Level

Data Distribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method
Mean 2402
SD 18208
SE of Mean 1488
95% KM (t) UCL 4865

| Assuming Gamma Distribution | | 95% KM (z) UCL | 4850 |
|----------------------------------------------|--------|-----------------------------------|-------|
| Gamma ROS Statistics using Extrapolated Data | | 95% KM (jackknife) UCL | 4855 |
| Minimum | 0.45 | 95% KM (bootstrap t) UCL | 17694 |
| Maximum | 220000 | 95% KM (BCA) UCL | 5265 |
| Mean | 6915 | 95% KM (Percentile Bootstrap) UCL | 5138 |
| Median | 4226 | 95% KM (Chebyshev) UCL | 8888 |
| SD | 18805 | 97.5% KM (Chebyshev) UCL | 11695 |
| k star | 0.281 | 99% KM (Chebyshev) UCL | 17208 |
| Theta star | 24642 | | |
| Nu star | 85.3 | Potential UCLs to Use | |
| AppChi2 | 65.01 | 97.5% KM (Chebyshev) UCL | 11695 |
| 95% Gamma Approximate UCL | 9073 | | |
| 95% Adjusted Gamma UCL | 9096 | | |

Note: DL/2 is not a recommended method.

Trichloroethene

| General Statistics | | | |
|---------------------------|-------|-----------------------------------|--------|
| Number of Valid Samples | 152 | Number of Detected Data | 71 |
| Number of Unique Samples | 64 | Number of Non-Detect Data | 81 |
| | | Percent Non-Detects | 53.29% |
| Raw Statistics | | Log-transformed Statistics | |
| Minimum Detected | 0.4 | Minimum Detected | -0.916 |
| Maximum Detected | 1700 | Maximum Detected | 7.438 |
| Mean of Detected | 88.25 | Mean of Detected | 2.498 |
| SD of Detected | 237 | SD of Detected | 2.085 |
| Minimum Non-Detect | 0.23 | Minimum Non-Detect | -1.47 |
| Maximum Non-Detect | 0.6 | Maximum Non-Detect | -0.511 |

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 | 83 |
| Number treated as Detected | 69 |
| Single DL Non-Detect Percentage | 54.61% |

| UCL Statistics | | | |
|-----------------------------------------------------------|-------|--------------------------------------------------------------|--------|
| Normal Distribution Test with Detected Values Only | | Lognormal Distribution Test with Detected Values Only | |
| Lilliefors Test Statistic | 0.355 | Lilliefors Test Statistic | 0.0898 |
| 5% Lilliefors Critical Value | 0.105 | 5% Lilliefors Critical Value | 0.105 |
| Data not Normal at 5% Significance Level | | Data appear Lognormal at 5% Significance Level | |

Assuming Normal Distribution

| | |
|-----------------------------------------|-------|
| DL/2 Substitution Method | |
| Mean | 41.37 |
| SD | 167.3 |
| 95% DL/2 (t) UCL | 63.82 |
| Maximum Likelihood Estimate(MLE) Method | N/A |
| MLE yields a negative mean | |

Assuming Lognormal Distribution

| | |
|------------------------------|--------|
| DL/2 Substitution Method | |
| Mean | 0.45 |
| SD | 2.404 |
| 95% H-Stat (DL/2) UCL | 58.15 |
| Log ROS Method | |
| Mean in Log Scale | -0.532 |
| SD in Log Scale | 3.533 |
| Mean in Original Scale | 41.31 |
| SD in Original Scale | 167.3 |
| 95% Percentile Bootstrap UCL | 66.68 |
| 95% BCA Bootstrap UCL | 71.79 |

| | |
|----------------------------------------------------------|-------|
| Gamma Distribution Test with Detected Values Only | |
| k star (bias corrected) | 0.336 |
| Theta Star | 262.9 |
| nu star | 47.67 |

Data Distribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

| | |
|-----------------------|-------|
| A-D Test Statistic | 3.448 |
| 5% A-D Critical Value | 0.856 |
| K-S Test Statistic | 0.856 |
| 5% K-S Critical Value | 0.114 |

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

| | |
|----------------------------------------------|-------|
| Gamma ROS Statistics using Extrapolated Data | |
| Minimum | 0 |
| Maximum | 1700 |
| Mean | 113 |
| Median | 26.13 |
| SD | 201.8 |
| k star | 0.165 |
| Theta star | 686.2 |
| Nu star | 50.08 |
| AppChi2 | 34.83 |
| 95% Gamma Approximate UCL | 162.5 |
| 95% Adjusted Gamma UCL | 163.1 |

Note: DL/2 is not a recommended method.

Nonparametric Statistics

| | |
|-----------------------------------|-------|
| Kaplan-Meier (KM) Method | |
| Mean | 41.44 |
| SD | 166.7 |
| SE of Mean | 13.62 |
| 95% KM (t) UCL | 63.98 |
| 95% KM (z) UCL | 63.84 |
| 95% KM (jackknife) UCL | 63.81 |
| 95% KM (bootstrap t) UCL | 89 |
| 95% KM (BCA) UCL | 69.74 |
| 95% KM (Percentile Bootstrap) UCL | 66.08 |
| 95% KM (Chebyshev) UCL | 100.8 |
| 97.5% KM (Chebyshev) UCL | 126.5 |
| 99% KM (Chebyshev) UCL | 176.9 |

Potential UCLs to Use

| | |
|--------------------------|-------|
| 97.5% KM (Chebyshev) UCL | 126.5 |
|--------------------------|-------|

Vanadium

| General Statistics | | | |
|---------------------------|--------|-----------------------------------|--------|
| Number of Valid Samples | 405 | Number of Detected Data | 179 |
| Number of Unique Samples | 127 | Number of Non-Detect Data | 226 |
| | | Percent Non-Detects | 55.80% |
| Raw Statistics | | Log-transformed Statistics | |
| Minimum Detected | 0.73 | Minimum Detected | -0.315 |
| Maximum Detected | 300000 | Maximum Detected | 12.61 |
| Mean of Detected | 2064 | Mean of Detected | 3.844 |
| SD of Detected | 22490 | SD of Detected | 2.132 |

| | | | |
|--------------------|------|--------------------|--------|
| Minimum Non-Detect | 0.33 | Minimum Non-Detect | -1.109 |
| Maximum Non-Detect | 0.71 | Maximum Non-Detect | -0.342 |

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 | 226 |
| Number treated as Detected | 179 |
| Single DL Non-Detect Percentage | 55.80% |

UCL Statistics

Normal Distribution Test with Detected Values Only

| | |
|------------------------------|--------|
| Lilliefors Test Statistic | 0.484 |
| 5% Lilliefors Critical Value | 0.0662 |

Data not Normal at 5% Significance Level

Assuming Normal Distribution

| | |
|--------------------------|-------|
| DL/2 Substitution Method | |
| Mean | 912.4 |
| SD | 14964 |
| 95% DL/2 (t) UCL | 2138 |

Maximum Likelihood Estimate(MLE) Method
MLE yields a negative mean

Lognormal Distribution Test with Detected Values Only

| | |
|------------------------------|--------|
| Lilliefors Test Statistic | 0.0969 |
| 5% Lilliefors Critical Value | 0.0662 |

Data not Lognormal at 5% Significance Level

Assuming Lognormal Distribution

| | |
|--------------------------|-------|
| DL/2 Substitution Method | |
| Mean | 1.025 |
| SD | 2.89 |
| 95% H-Stat (DL/2) UCL | 138.4 |

| | |
|------------------------------|-------|
| Log ROS Method | |
| Mean in Log Scale | 0.729 |
| SD in Log Scale | 3.488 |
| Mean in Original Scale | 912.6 |
| SD in Original Scale | 14964 |
| 95% Percentile Bootstrap UCL | 2387 |
| 95% BCA Bootstrap UCL | 3784 |

Gamma Distribution Test with Detected Values Only

| | |
|-------------------------|-------|
| k star (bias corrected) | 0.195 |
| Theta Star | 10559 |
| nu star | 69.98 |

| | |
|-----------------------|--------|
| A-D Test Statistic | 29.74 |
| 5% A-D Critical Value | 0.922 |
| K-S Test Statistic | 0.922 |
| 5% K-S Critical Value | 0.0767 |

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

| | |
|----------------------------------------------|--------|
| Gamma ROS Statistics using Extrapolated Data | |
| Minimum | 0.73 |
| Maximum | 300000 |
| Mean | 2174 |
| Median | 1600 |
| SD | 14948 |
| k star | 0.384 |
| Theta star | 5655 |
| Nu star | 311.4 |
| AppChi2 | 271.5 |
| 95% Gamma Approximate UCL | 2493 |
| 95% Adjusted Gamma UCL | 2494 |

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

| | |
|-----------------------------------|-------|
| Kaplan-Meier (KM) Method | |
| Mean | 912.7 |
| SD | 14945 |
| SE of Mean | 744.7 |
| 95% KM (t) UCL | 2140 |
| 95% KM (z) UCL | 2138 |
| 95% KM (jackknife) UCL | 2139 |
| 95% KM (bootstrap t) UCL | 16179 |
| 95% KM (BCA) UCL | 2425 |
| 95% KM (Percentile Bootstrap) UCL | 2374 |
| 95% KM (Chebyshev) UCL | 4159 |
| 97.5% KM (Chebyshev) UCL | 5563 |
| 99% KM (Chebyshev) UCL | 8322 |

Potential UCLs to Use

| | |
|--------------------------|------|
| 97.5% KM (Chebyshev) UCL | 5563 |
|--------------------------|------|

Vinyl chloride

General Statistics

| | |
|--------------------------|-----|
| Number of Valid Samples | 152 |
| Number of Unique Samples | 27 |

| | |
|---------------------------|--------|
| Number of Detected Data | 28 |
| Number of Non-Detect Data | 124 |
| Percent Non-Detects | 81.58% |

Raw Statistics

| | |
|--------------------|-------|
| Minimum Detected | 0.73 |
| Maximum Detected | 32 |
| Mean of Detected | 7.456 |
| SD of Detected | 8.41 |
| Minimum Non-Detect | 0.33 |
| Maximum Non-Detect | 0.7 |

Log-transformed Statistics

| | |
|--------------------|--------|
| Minimum Detected | -0.315 |
| Maximum Detected | 3.466 |
| Mean of Detected | 1.405 |
| SD of Detected | 1.162 |
| Minimum Non-Detect | -1.109 |
| Maximum Non-Detect | -0.357 |

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 | 124 |
| Number treated as Detected | 28 |
| Single DL Non-Detect Percentage | 81.58% |

UCL Statistics

Normal Distribution Test with Detected Values Only

| | |
|------------------------------|-------|
| Lilliefors Test Statistic | 0.77 |
| 5% Lilliefors Critical Value | 0.924 |

Data not Normal at 5% Significance Level

Assuming Normal Distribution

| | |
|--------------------------|-------|
| DL/2 Substitution Method | |
| Mean | 1.62 |
| SD | 4.516 |
| 95% DL/2 (t) UCL | 2.226 |

Maximum Likelihood Estimate(MLE) Method
MLE yields a negative mean

Lognormal Distribution Test with Detected Values Only

| | |
|------------------------------|-------|
| Lilliefors Test Statistic | 0.939 |
| 5% Lilliefors Critical Value | 0.924 |

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

| | |
|--------------------------|--------|
| DL/2 Substitution Method | |
| Mean | -0.756 |
| SD | 1.18 |
| 95% H-Stat (DL/2) UCL | 1.177 |

| | |
|------------------------------|--------|
| Log ROS Method | |
| Mean in Log Scale | -2.439 |
| SD in Log Scale | 2.625 |
| Mean in Original Scale | 1.488 |
| SD in Original Scale | 4.558 |
| 95% Percentile Bootstrap UCL | 2.14 |
| 95% BCA Bootstrap UCL | 2.284 |

Gamma Distribution Test with Detected Values Only

Data Distribution Test with Detected Values Only

| | |
|-------------------------|-------|
| k star (bias corrected) | 0.881 |
| Theta Star | 8.466 |
| nu star | 49.32 |
| A-D Test Statistic | 0.623 |
| 5% A-D Critical Value | 0.776 |
| K-S Test Statistic | 0.776 |
| 5% K-S Critical Value | 0.17 |

Data appear Gamma Distributed at 5% Significance Level

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

| | |
|---------------------------|-------|
| Minimum | 0 |
| Maximum | 32 |
| Mean | 9.333 |
| Median | 7.719 |
| SD | 8.088 |
| k star | 0.201 |
| Theta star | 46.44 |
| Nu star | 61.09 |
| AppChi2 | 44.11 |
| 95% Gamma Approximate UCL | 12.92 |
| 95% Adjusted Gamma UCL | 12.96 |

Nonparametric Statistics

| | |
|-----------------------------------|-------|
| Kaplan-Meier (KM) Method | |
| Mean | 1.969 |
| SD | 4.4 |
| SE of Mean | 0.363 |
| 95% KM (t) UCL | 2.571 |
| 95% KM (z) UCL | 2.567 |
| 95% KM (jackknife) UCL | 2.494 |
| 95% KM (bootstrap t) UCL | 2.733 |
| 95% KM (BCA) UCL | 2.746 |
| 95% KM (Percentile Bootstrap) UCL | 2.616 |
| 95% KM (Chebyshev) UCL | 3.553 |
| 97.5% KM (Chebyshev) UCL | 4.239 |
| 99% KM (Chebyshev) UCL | 5.585 |

Potential UCLs to Use

| | |
|----------------|-------|
| 95% KM (t) UCL | 2.571 |
|----------------|-------|

Note: DL/2 is not a recommended method.

Xylenes (Total)

General Statistics

| | |
|--------------------------|-----|
| Number of Valid Samples | 152 |
| Number of Unique Samples | 50 |

| | |
|---------------------------|--------|
| Number of Detected Data | 50 |
| Number of Non-Detect Data | 102 |
| Percent Non-Detects | 67.11% |

Raw Statistics

| | |
|--------------------|--------|
| Minimum Detected | 0.73 |
| Maximum Detected | 300000 |
| Mean of Detected | 7141 |
| SD of Detected | 42437 |
| Minimum Non-Detect | 0.6 |
| Maximum Non-Detect | 0.71 |

Log-transformed Statistics

| | |
|--------------------|--------|
| Minimum Detected | -0.315 |
| Maximum Detected | 12.61 |
| Mean of Detected | 3.916 |
| SD of Detected | 3.169 |
| Minimum Non-Detect | -0.511 |
| Maximum Non-Detect | -0.342 |

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 | 102 |
| Number treated as Detected | 50 |
| Single DL Non-Detect Percentage | 67.11% |

UCL Statistics

Normal Distribution Test with Detected Values Only

| | |
|------------------------------|-------|
| Lilliefors Test Statistic | 0.176 |
| 5% Lilliefors Critical Value | 0.947 |

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

| | |
|------------------------------|-------|
| Lilliefors Test Statistic | 0.925 |
| 5% Lilliefors Critical Value | 0.947 |

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

| | |
|--------------------------|-------|
| DL/2 Substitution Method | |
| Mean | 2349 |
| SD | 24408 |
| 95% DL/2 (t) UCL | 5626 |

Maximum Likelihood Estimate(MLE) Method N/A

MLE yields a negative mean

Assuming Lognormal Distribution

| | |
|--------------------------|-------|
| DL/2 Substitution Method | |
| Mean | 0.506 |
| SD | 3 |
| 95% H-Stat (DL/2) UCL | 439.4 |

Log ROS Method

| | |
|------------------------------|--------|
| Mean in Log Scale | -2.875 |
| SD in Log Scale | 6.097 |
| Mean in Original Scale | 2349 |
| SD in Original Scale | 24408 |
| 95% Percentile Bootstrap UCL | 6266 |
| 95% BCA Bootstrap UCL | 10020 |

Gamma Distribution Test with Detected Values Only

| | |
|-------------------------|-------|
| k star (bias corrected) | 0.158 |
| Theta Star | 45068 |
| nu star | 15.84 |

| | |
|-----------------------|-------|
| A-D Test Statistic | 5.954 |
| 5% A-D Critical Value | 0.938 |
| K-S Test Statistic | 0.938 |
| 5% K-S Critical Value | 0.141 |

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

| | |
|---------------------------|---------|
| Minimum | 0 |
| Maximum | 1654576 |
| Mean | 156322 |
| Median | 267.3 |
| SD | 342456 |
| k star | 0.0758 |
| Theta star | 2062297 |
| Nu star | 23.04 |
| AppChi2 | 13.12 |
| 95% Gamma Approximate UCL | 274484 |
| 95% Adjusted Gamma UCL | 275992 |

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

| | |
|-----------------------------------|-------|
| Kaplan-Meier (KM) Method | |
| Mean | 2349 |
| SD | 24327 |
| SE of Mean | 1993 |
| 95% KM (t) UCL | 5648 |
| 95% KM (z) UCL | 5628 |
| 95% KM (jackknife) UCL | 5626 |
| 95% KM (bootstrap t) UCL | 42654 |
| 95% KM (BCA) UCL | 6378 |
| 95% KM (Percentile Bootstrap) UCL | 6295 |
| 95% KM (Chebyshev) UCL | 11038 |
| 97.5% KM (Chebyshev) UCL | 14797 |
| 99% KM (Chebyshev) UCL | 22182 |

Potential UCLs to Use

| | |
|--------------------------|-------|
| 97.5% KM (Chebyshev) UCL | 14797 |
|--------------------------|-------|

H-5 Risk Calculations

Appendix H-5.1
Surface Soil
Excluding Hot Spots
Current O&M Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|------------|
| Scenario Timeframe: | Current |
| Receptor Population: | O&M Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | | | |
|-------------------------|---------------------|--------------------------------------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|--------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | | | |
| Soil | Surface Soil | Excluding Hot Spots and Beneath Structures | Arsenic | 5.E-07 | 2.E-07 | 6.E-10 | | | 6.E-07 | 3.E-03 | 1.E-03 | NA | | | 4.E-03 | | | |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 2.E-02 | 1.E-02 | NA | | | 3.E-02 | | | |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 9.E-03 | 6.E-03 | 3.E-03 | | | 2.E-02 | | | |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 2.E-01 | 1.E-01 | NA | | | 3.E-01 | | | |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 4.E-02 | 3.E-02 | NA | | | 7.E-02 | | | |
| | | | 1,2-Dichloroethane | 2.E-11 | 8.E-12 | 2.E-15 | | | 2.E-11 | NA | NA | 3.E-08 | | | 3.E-08 | | | |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Tetrachloroethene | 3.E-10 | 1.E-10 | 1.E-15 | | | 4.E-10 | 1.E-07 | 7.E-08 | 9.E-06 | | | 9.E-06 | | | |
| | | | Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Trichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Xylenes | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | | | | Chemical Total | 5.E-07 | 2.E-07 | 6.E-10 | 0.E+00 | 0.E+00 | 6.E-07 | 3.E-01 | 2.E-01 | 3.E-03 | 0.E+00 | 0.E+00 | 4.E-01 |
| | | | | | | Exposure Point Total | | | | | | 6.E-07 | | | | | | 4.E-01 |
| | | | Exposure Medium Total | | | | | | 6.E-07 | | | | | | 4.E-01 | | | |
| Soil Total | | | | | | | | | 6.E-07 | | | | | | 4.E-01 | | | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 3.E-03 | 3.E-03 | | | |
| | | | 1,1,2-Trichloroethane | | | | | 1.E-08 | 1.E-08 | | | | | 2.E-04 | 2.E-04 | | | |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | 1.E-03 | 1.E-03 | | | |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | 2.E-02 | 2.E-02 | | | |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | 2.E-04 | 2.E-04 | | | |
| | | | 1,2-Dichloroethane | | | | | 1.E-05 | 1.E-05 | | | | | 4.E-04 | 4.E-04 | | | |
| | | | 1,4-Dichlorobenzene | | | | | 5.E-08 | 5.E-08 | | | | | 3.E-05 | 3.E-05 | | | |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | 1.E-04 | 1.E-04 | | | |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | 8.795E-06 | 9.E-06 | | | |
| | | | Benzene | | | | | 3.E-07 | 3.E-07 | | | | | 4.E-03 | 4.E-03 | | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 | | | |
| | | | Chloroethane | | | | | 2.E-07 | 2.E-07 | | | | | 6.E-04 | 6.E-04 | | | |
| | | | Chloroform | | | | | 3.E-07 | 3.E-07 | | | | | 8.E-04 | 8.E-04 | | | |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | 7.E-03 | 7.E-03 | | | |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | 3.E-03 | 3.E-03 | | | |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Isopropylbenzene | | | | | | 0.E+00 | | | | | 9.E-03 | 9.E-03 | | | |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Methyl tert butyl ether | | | | | | 0.E+00 | | | | | 3.E-06 | 3.E-06 | | | |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | 6.E-03 | 6.E-03 | | | |
| | | | Methylene chloride | | | | | 4.E-08 | 4.E-08 | | | | | 2.E-04 | 2.E-04 | | | |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | 3.E-04 | 3.E-04 | | | |
| | | | Tetrachloroethene | | | | | 8.E-06 | 8.E-06 | | | | | 1.E-01 | 1.E-01 | | | |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | 1.E-03 | 1.E-03 | | | |
| | | | Trichloroethene | | | | | 7.E-05 | 7.E-05 | | | | | 5.E-02 | 5.E-02 | | | |
| | | | Vinyl chloride | | | | | 2.E-06 | 2.E-06 | | | | | 1.E-02 | 1.E-02 | | | |
| Xylenes (Total) | | | | | NA | 0.E+00 | | | | | 1.E-01 | 1.E-01 | | | | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 9.E-05 | 9.E-05 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-01 | 3.E-01 | | | |
| | | | Exposure Point Total | | | | | | 9.E-05 | | | | | | 3.E-01 | | | |
| | | | Exposure Medium Total | | | | | | 9.E-05 | | | | | | 3.E-01 | | | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,1,2-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,1-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,1-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,2,4-Trichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,2-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 2-Chlorophenol | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 4-Methyl-2-pentanone | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Bromodichloromethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Ethylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Isopropylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 | | | | | | |
| Methyl tert butyl ether | | | | | | 0.E+00 | | | | | | 0.E+00 | | | | | | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|------------|
| Scenario Timeframe: | Current |
| Receptor Population: | O&M Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|-----------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Methylcyclohexane | | | | | | | | | | | | |
| | | | Methylene chloride | | | | | | | | | | | | |
| | | | Naphthalene | | | | | | | | | | | | |
| | | | Tetrachloroethene | | | | | | | | | | | | |
| | | | Toluene | | | | | | | | | | | | |
| | | | Trichloroethene | | | | | | | | | | | | |
| | | | Vinyl chloride | | | | | | | | | | | | |
| | | | Xylenes (Total) | | | | | | | | | | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 |
| | | | Exposure Point Total | | | | | | | | | | | | |
| | | | Exposure Medium Total | | | | | | | | | | | | |
| | | | Groundwater Total | | | | | | 9.E-05 | | | | | | 3.E-01 |

Total Risk Across All Media = 9.E-05

Total Hazard Across All Media = 0.8

Current O&M Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Surface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|--------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------|---------------------------|---------------------------------------------------------|
| Arsenic | 2.9 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 9125 | 8.5E-07 | 3.0E-04 | 2.8E-03 | 1% |
| Iron | 38116 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 9125 | 1.1E-02 | 7.0E-01 | 1.6E-02 | 6% |
| Manganese | 646 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 9125 | 1.9E-04 | 2.0E-02 | 9.5E-03 | 4% |
| Thallium | 43 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 9125 | 1.3E-05 | 7.0E-05 | 1.8E-01 | 72% |
| Vanadium | 144 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 9125 | 4.2E-05 | 1.0E-03 | 4.2E-02 | 17% |
| 1,2-Dichloroethane | 0.0017 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 9125 | 5.0E-10 | NA | NA | 0% |
| Tetrachloroethene | 0.0048 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 9125 | 1.4E-09 | 1.0E-02 | 1.4E-07 | 0% |

Hazard Index = 2.5E-01

Notes:

(1): Soil EPCs (see Appendix H-3)

**Current O&M Worker Scenario
Estimation of Noncancer Hazard from Dermal Contact
Surface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | $RfD_{dermal-adj}$ Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|--------------------|-----------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 2.9 | 3,300 | 0.2 | 0.03 | 150 | 25 | 1 | 1.0E-06 | 70 | 9125 | 3.4E-07 | 9.5E-01 | 2.9E-04 | 1.2E-03 | 1% |
| Iron | 38116 | 3,300 | 0.2 | 0.01 | 150 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.5E-03 | 2.0E-01 | 1.4E-01 | 1.1E-02 | 6% |
| Manganese | 646 | 3,300 | 0.2 | 0.01 | 150 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.5E-05 | 2.0E-01 | 4.0E-03 | 6.3E-03 | 4% |
| Thallium | 43 | 3,300 | 0.2 | 0.01 | 150 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.7E-06 | 2.0E-01 | 1.4E-05 | 1.2E-01 | 72% |
| Vanadium | 144 | 3,300 | 0.2 | 0.01 | 150 | 25 | 1 | 1.0E-06 | 70 | 9125 | 5.6E-06 | 2.0E-01 | 2.0E-04 | 2.8E-02 | 17% |
| 1,2-Dichloroethane | 0.0017 | 3,300 | 0.2 | 0.03 | 150 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.0E-10 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 0.0048 | 3,300 | 0.2 | 0.03 | 150 | 25 | 1 | 1.0E-06 | 70 | 9125 | 5.6E-10 | 8.0E-01 | 8.0E-03 | 7.0E-08 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

| |
|-------------------------------|
| Hazard Index = 1.6E-01 |
|-------------------------------|

**Current O&M Worker Scenario
 Estimation of Noncancer Hazard from Inhalation Exposure
 Surface Soil, Excluding Hot Spots**

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m^3/kg)
- VF = volatilization factor (m^3/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m^3/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m^3/kg) | VF Volatilization Factor ⁽³⁾ (m^3/kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m^3/hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|--------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 2.9 | 6.80E+08 | NA | 1 | 150 | 25 | 8 | 70 | 9125 | 2.0E-10 | NA | NA | 0% |
| Iron | 38116 | 6.80E+08 | NA | 1 | 150 | 25 | 8 | 70 | 9125 | 2.6E-06 | NA | NA | 0% |
| Manganese | 646 | 6.80E+08 | NA | 1 | 150 | 25 | 8 | 70 | 9125 | 4.5E-08 | 1.43E-05 | 3.1E-03 | 100% |
| Thallium | 43 | 6.80E+08 | NA | 1 | 150 | 25 | 8 | 70 | 9125 | 3.0E-09 | NA | NA | 0% |
| Vanadium | 144 | 6.80E+08 | NA | 1 | 150 | 25 | 8 | 70 | 9125 | 9.9E-09 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.0017 | NA | 3.91E+03 | 1 | 150 | 25 | 8 | 70 | 9125 | 2.0E-08 | 7.00E-01 | 2.9E-08 | 0% |
| Tetrachloroethene | 0.0048 | NA | 2.55E+03 | 1 | 150 | 25 | 8 | 70 | 9125 | 8.8E-08 | 1.00E-02 | 8.8E-06 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
- (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

| |
|-------------------------------|
| Hazard Index = 3.1E-03 |
|-------------------------------|

Current O&M Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Surface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|--------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 2.9 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 25,550 | 3.0E-07 | 1.5E+00 | 4.6E-07 | 100% |
| Iron | 38116 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 25,550 | 4.0E-03 | NA | NA | 0% |
| Manganese | 646 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 25,550 | 6.8E-05 | NA | NA | 0% |
| Thallium | 43 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 25,550 | 4.5E-06 | NA | NA | 0% |
| Vanadium | 144 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 25,550 | 1.5E-05 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.0017 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 25,550 | 1.8E-10 | 9.1E-02 | 1.6E-11 | 0% |
| Tetrachloroethene | 0.0048 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 25,550 | 5.0E-10 | 5.4E-01 | 2.7E-10 | 0% |

Excess Lifetime Cancer Risk = 4.6E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Current O&M Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Surface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|--------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 2.9 | 3,300 | 0.2 | 0.03 | 150 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.2E-07 | 9.5E-01 | 1.6E+00 | 1.9E-07 | 100% |
| Iron | 38116 | 3,300 | 0.2 | 0.01 | 150 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 5.3E-04 | 2.0E-01 | NA | NA | 0% |
| Manganese | 646 | 3,300 | 0.2 | 0.01 | 150 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 8.9E-06 | 2.0E-01 | NA | NA | 0% |
| Thallium | 43 | 3,300 | 0.2 | 0.01 | 150 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 6.0E-07 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 144 | 3,300 | 0.2 | 0.01 | 150 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.0E-06 | 2.0E-01 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.0017 | 3,300 | 0.2 | 0.03 | 150 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 7.1E-11 | 8.0E-01 | 1.1E-01 | 8.0E-12 | 0% |
| Tetrachloroethene | 0.0048 | 3,300 | 0.2 | 0.03 | 150 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.0E-10 | 8.0E-01 | 6.8E-01 | 1.3E-10 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
 - (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online
- "NA" = Not applicable

| | |
|--------------------------------------|----------------|
| Excess Lifetime Cancer Risk = | 1.9E-07 |
|--------------------------------------|----------------|

Current O&M Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Surface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposures (1): Soil EPCs (see Appendix H-3)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | CSF_{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|--------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 2.9 | 1.32E+09 | NA | 1 | 150 | 25 | 8 | 70 | 25,550 | 3.7E-11 | 1.51E+01 | 5.6E-10 | 100% |
| Iron | 38116 | 1.32E+09 | NA | 1 | 150 | 25 | 8 | 70 | 25,550 | 4.9E-07 | NA | NA | 0% |
| Manganese | 646 | 1.32E+09 | NA | 1 | 150 | 25 | 8 | 70 | 25,550 | 8.2E-09 | NA | NA | 0% |
| Thallium | 43 | 1.32E+09 | NA | 1 | 150 | 25 | 8 | 70 | 25,550 | 5.5E-10 | NA | NA | 0% |
| Vanadium | 144 | 1.32E+09 | NA | 1 | 150 | 25 | 8 | 70 | 25,550 | 1.8E-09 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.0017 | 1.32E+09 | 3.91E+03 | 1 | 150 | 25 | 8 | 70 | 25,550 | 2.2E-14 | 9.10E-02 | 2.0E-15 | 0% |
| Tetrachloroethene | 0.0048 | 1.32E+09 | 2.55E+03 | 1 | 150 | 25 | 8 | 70 | 25,550 | 6.1E-14 | 2.10E-02 | 1.3E-15 | 0% |

Excess Lifetime Cancer Risk = 5.6E-10

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Appendix H-5.2

Surface Soil

Excluding Hot Spots

Current Trespasser/Recreational

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------------|
| Scenario Timeframe: | Current |
| Receptor Population: | Trespasser/Recreational |
| Receptor: | Teen/Adolescent |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|-----------------------|-------------------------------------|---------------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| Soil | Surface Soil and Beneath Structures | Excluding Hot Spots | Arsenic | 7.E-07 | 3.E-07 | 2.E-10 | | | 1.E-06 | 9.E-03 | 4.E-03 | NA | | | 1.E-02 |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 5.E-02 | 4.E-02 | NA | | | 9.E-02 |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 3.E-02 | 2.E-02 | 1.E-03 | | | 5.E-02 |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 6.E-01 | 4.E-01 | NA | | | 1.E+00 |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 1.E-01 | 1.E-01 | NA | | | 2.E-01 |
| | | | 1,2-Dichloroethane | 6.E-11 | 2.E-10 | 3.E-10 | | | 6.E-10 | NA | NA | 1.E-08 | | | 1.E-08 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Tetrachloroethene | 4.E-10 | 2.E-10 | 1.E-10 | | | 8.E-10 | 5.E-07 | 3.E-07 | 4.E-06 | | | 4.E-06 |
| | | | Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Trichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Xylenes | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chemical Total | 7.E-07 | 3.E-07 | 7.E-10 | 0.E+00 | 0.E+00 | 1.E-06 | 8.E-01 | 6.E-01 | 1.E-03 | 0.E+00 | 0.E+00 | 1.E+00 |
| | | | Exposure Point Total | | | | | | 1.E-06 | | | | | | 1.E+00 |
| | | | Exposure Medium Total | | | | | | 1.E-06 | | | | | | 1.E+00 |
| Soil Total | | | | | | | | | 1.E-06 | | | | | | 1.E+00 |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1,2-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 2-Chlorophenol | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 4-Methyl-2-pentanone | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Ethylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Isopropylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Methylcyclohexane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Methylene chloride | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Naphthalene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Tetrachloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Trichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 |
| Xylenes (Total) | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | |
| | | | Exposure Point Total | | | | | | 0.E+00 | | | | | 0.E+00 | |
| | | | Exposure Medium Total | | | | | | 0.E+00 | | | | | 0.E+00 | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1,2-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2,4-Trichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 2-Chlorophenol | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 4-Methyl-2-pentanone | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bromodichloromethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Ethylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Isopropylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------------|
| Scenario Timeframe: | Current |
| Receptor Population: | Trespasser/Recreational |
| Receptor: | Teen/Adolescent |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | | | |
|--------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|--------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | | | |
| | | | Manganese | | | | | | | | | | | | | | 0.E+00 | |
| | | | Methyl tert butyl ether | | | | | | | | | | | | | | | 0.E+00 |
| | | | Methylcyclohexane | | | | | | | | | | | | | | | 0.E+00 |
| | | | Methylene chloride | | | | | | | | | | | | | | | 0.E+00 |
| | | | Naphthalene | | | | | | | | | | | | | | | 0.E+00 |
| | | | Tetrachloroethene | | | | | | | | | | | | | | | 0.E+00 |
| | | | Toluene | | | | | | | | | | | | | | | 0.E+00 |
| | | | Trichloroethene | | | | | | | | | | | | | | | 0.E+00 |
| | | | Vinyl chloride | | | | | | | | | | | | | | | 0.E+00 |
| | | | Xylenes (Total) | | | | | | | | | | | | | | | 0.E+00 |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 |
| | | | Exposure Point Total | | | | | | | | | | | | | | | 0.E+00 |
| | | | Exposure Medium Total | | | | | | | | | | | | | | | 0.E+00 |
| | | | Groundwater Total | | | | | | | | | | | | | | | 0.E+00 |

Total Risk Across All Media = 1.E-06

Total Hazard Across All Media = 1

**Current Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Surface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient (mg/kg-day) | Percent Distribution of Risk (%) |
|--------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|-----------------------------------|-------------------------------------------|
| Arsenic | 2.9 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 2.7E-06 | 3.0E-04 | 9.1E-03 | 1% |
| Iron | 38116 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 3.6E-02 | 7.0E-01 | 5.1E-02 | 6% |
| Manganese | 646 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 6.1E-04 | 2.0E-02 | 3.0E-02 | 4% |
| Thallium | 43 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 4.0E-05 | 7.0E-05 | 5.8E-01 | 72% |
| Vanadium | 144 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 1.4E-04 | 1.0E-03 | 1.4E-01 | 17% |
| 1,2-Dichloroethane | 0.0017 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 1.6E-09 | NA | NA | 0% |
| Tetrachloroethene | 0.0048 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 4.5E-09 | 1.0E-02 | 4.5E-07 | 0% |

Hazard Index = 8.0E-01

Notes:

(1): Soil EPCs (see Appendix H-3)

**Current Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Noncancer Hazard from Dermal Contact
Surface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | RF _{dermal-adj} Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|--------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 2.9 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 1.2E-06 | 9.5E-01 | 2.9E-04 | 4.4E-03 | 1% |
| Iron | 38116 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 5.4E-03 | 2.0E-01 | 1.4E-01 | 3.9E-02 | 6% |
| Manganese | 646 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 9.2E-05 | 2.0E-01 | 4.0E-03 | 2.3E-02 | 4% |
| Thallium | 43 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 6.1E-06 | 2.0E-01 | 1.4E-05 | 4.4E-01 | 72% |
| Vanadium | 144 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 2.1E-05 | 2.0E-01 | 2.0E-04 | 1.0E-01 | 17% |
| 1,2-Dichloroethane | 0.0017 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 7.3E-10 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 0.0048 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 2.1E-09 | 8.0E-01 | 8.0E-03 | 2.6E-07 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 6.1E-01

**Current Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Surface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{inhal\ lung} = (C_s / PEF) * IR_{air-hourly} * EF * ED * ET_{inh} / BW * AT_c \text{ (non-VOCs)}$$

$$ADD_{inhal\ lung} = (C_s / VF) * IR_{air-hourly} * EF * ED * ET_{inh} / BW * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)
 PEF = particulate emission factor (m^3/kg)
 VF = volatilization factor (m^3/kg)
 $IR_{air-hourly}$ = inhalation rate for the receptor of concern during exposure period (m^3/hr)
 EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
 ED = exposure duration: the typical duration of each exposure event (year)
 ET_{inh} = exposure time (hr/day)
 BW = body weight (kg)
 AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m^3/kg) | VF Volatilization Factor ⁽³⁾ (m^3/kg) | $IR_{air-hourly}$ Hourly Inhalation Rate (m^3/hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|--------------------|-----------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------|----------------------------------------------------|----------------------------------------------------------|------------------------------------------------------|----------------------------|----------------------------------------------------|
| Arsenic | 2.9 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 8.3E-11 | NA | NA | 0% |
| Iron | 38116 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 1.1E-06 | NA | NA | 0% |
| Manganese | 646 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 1.9E-08 | 1.43E-05 | 1.3E-03 | 100% |
| Thallium | 43 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 1.2E-09 | NA | NA | 0% |
| Vanadium | 144 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 4.1E-09 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.0017 | NA | 3.91E+03 | 0.52 | 144 | 12 | 4 | 42 | 4380 | 8.5E-09 | 7.00E-01 | 1.2E-08 | 0% |
| Tetrachloroethene | 0.0048 | NA | 2.55E+03 | 0.52 | 144 | 12 | 4 | 42 | 4380 | 3.7E-08 | 1.00E-02 | 3.7E-06 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
 - (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

| |
|-------------------------------|
| Hazard Index = 1.3E-03 |
|-------------------------------|

**Current Teen/Adolescent Trespasser-Recreational Scenario
 Estimation of Cancer Risk from Incidental Ingestion
 Surface Soil, Excluding Hot Spots**

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) | |
|--------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|----|
| Arsenic | 2.9 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 4.7E-07 | 1.5E+00 | 7.0E-07 | 100% | |
| Iron | 38116 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 6.1E-03 | NA | NA | 0% | |
| Manganese | 646 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 1.0E-04 | NA | NA | 0% | |
| Thallium | 43 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 6.9E-06 | NA | NA | 0% | |
| Vanadium | 144 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 2.3E-05 | NA | NA | 0% | |
| 1,2-Dichloroethane | 0.0017 | | | chemical is considered mutagenic, see Table xx for risk calculation | | | | | | | | 6.0E-11 | 0% |
| Tetrachloroethene | 0.0048 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 7.7E-10 | 5.4E-01 | 4.2E-10 | 0% | |

Excess Lifetime Cancer Risk = 7.0E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Current Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Cancer Risk from Dermal Contact
Surface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|--------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 2.9 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 2.1E-07 | 9.5E-01 | 1.6E+00 | 3.4E-07 | 100% |
| Iron | 38116 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 9.3E-04 | 2.0E-01 | NA | NA | 0% |
| Manganese | 646 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 1.6E-05 | 2.0E-01 | NA | NA | 0% |
| Thallium | 43 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 1.1E-06 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 144 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 3.5E-06 | 2.0E-01 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.0017 | | | | chemical is considered mutagenic, see Table xx for risk calculation | | | | | | | | | 1.7E-10 | 0% |
| Tetrachloroethene | 0.0048 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 3.5E-10 | 8.0E-01 | 6.8E-01 | 2.4E-10 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
 - (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online
- "NA" = Not applicable

Excess Lifetime Cancer Risk = 3.4E-07

**Current Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Cancer Risk from Inhalation Exposure
Surface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m^3/kg)

VF = volatilization factor (m^3/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m^3/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m^3/kg) | VF Volatilization Factor ⁽³⁾ (m^3/kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m^3/hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) | |
|--------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|-----|
| Arsenic | 2.9 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 1.4E-11 | 1.51E+01 | 2.2E-10 | 32% | |
| Iron | 38116 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 1.9E-07 | NA | NA | 0% | |
| Manganese | 646 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 3.2E-09 | NA | NA | 0% | |
| Thallium | 43 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 2.1E-10 | NA | NA | 0% | |
| Vanadium | 144 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 7.1E-10 | NA | NA | 0% | |
| 1,2-Dichloroethane | 0.0017 | | | chemical is considered mutagenic, see Table xx for risk calculation | | | | | | | | | 3.2E-10 | 48% |
| Tetrachloroethene | 0.0048 | NA | 2.55E+03 | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 6.3E-09 | 2.10E-02 | 1.3E-10 | 20% | |

Excess Lifetime Cancer Risk = 6.7E-10

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

| Parameter | CS (mg/kg) | 0-2 Years Child Mult. (1/day) | 2-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | CSF (mg/kg*day) ⁻¹ | CSF adjustment factor | | | | ED | | | | EP | Risk | | | | Total Risk | |
|--------------------|---------------|-------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------|-----------------------|-----|------|-------|-----|-----|------|-------|----|------|-----|----------|-------|------------|------------------------|
| | | | | | | | 0-2 | 2-6 | 6-15 | 15-30 | 0-2 | 2-6 | 6-15 | 15-30 | | 0-2 | 2-6 | 6-15 | 15-30 | | |
| 1,2-Dichloroethane | 0.0017 | | | 2.90E-06 | | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | NA | NA | 1.73E-10 | NA | 1.73E-10 | Dermal Risk |
| 1,2-Dichloroethane | 0.0017 | | | 1.01E-06 | | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | NA | NA | 6.04E-11 | NA | 6.04E-11 | Ingestion risk |
| 1,2-Dichloroethane | 0.0017 | | | 5.40E-06 | | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | NA | NA | 3.22E-10 | NA | 3.22E-10 | inhalation risk |

Appendix H-5.4
Surface Soil
Excluding Hot Spots
Future Industrial Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | | | |
|----------------------------|-----------------|---------------------|----------------------------|---------------------|-------------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|--------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | | | |
| Soil | Surface Soil | Excluding Hot Spots | Arsenic | 7.E-07 | 3.E-07 | 9.E-10 | | | 1.E-06 | 4.E-03 | 2.E-03 | NA | | | 6.E-03 | | | |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 3.E-02 | 2.E-02 | NA | | | 5.E-02 | | | |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 2.E-02 | 1.E-02 | 6.E-03 | | | 4.E-02 | | | |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 3.E-01 | 2.E-01 | NA | | | 5.E-01 | | | |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 7.E-02 | 5.E-02 | NA | | | 1.E-01 | | | |
| | | | 1,2-Dichloroethane | NA | NA | 2.E-07 | | | 2.E-07 | NA | NA | 9.E-06 | | | 9.E-06 | | | |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Tetrachloroethene | 1.E-09 | 5.E-10 | 3.E-09 | | | 4.E-09 | 5.E-07 | 3.E-07 | 3.E-05 | | | 3.E-05 | | | |
| | | | Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Trichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Xylenes | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | | | | Chemical Total | 7.E-07 | 3.E-07 | 2.E-07 | 0.E+00 | 0.E+00 | 1.E-06 | 4.E-01 | 3.E-01 | 6.E-03 | 0.E+00 | 0.E+00 | 7.E-01 |
| | | | | | | Exposure Point Total | | | | | | 1.E-06 | | | | | | 7.E-01 |
| | | | Exposure Medium Total | | | | | | 1.E-06 | | | | | | 7.E-01 | | | |
| Soil Total | | | | | | | | | 1.E-06 | | | | | | 7.E-01 | | | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 | | | |
| | | | 1,1,2-Trichloroethane | | | | | 2.E-08 | 2.E-08 | | | | | 3.E-04 | 3.E-04 | | | |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 | | | |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | 3.E-02 | 3.E-02 | | | |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | 4.E-04 | 4.E-04 | | | |
| | | | 1,2-Dichloroethane | | | | | 2.E-05 | 2.E-05 | | | | | 7.E-04 | 7.E-04 | | | |
| | | | 1,4-Dichlorobenzene | | | | | 8.E-08 | 8.E-08 | | | | | 4.E-05 | 4.E-05 | | | |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | 2.E-04 | 2.E-04 | | | |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | 1.E-05 | 1.E-05 | | | |
| | | | Benzene | | | | | 6.E-07 | 6.E-07 | | | | | 7.E-03 | 7.E-03 | | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | NA | 0.E+00 | | | | | 0.E+00 | 0.E+00 | | | |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | 4.E-03 | 4.E-03 | | | |
| | | | Chloroethane | | | | | 3.E-07 | 3.E-07 | | | | | 1.E-03 | 1.E-03 | | | |
| | | | Chloroform | | | | | 5.E-07 | 5.E-07 | | | | | 1.E-03 | 1.E-03 | | | |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 | | | |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 | | | |
| | | | Iron | | | | | NA | 0.E+00 | | | | | 0.E+00 | 0.E+00 | | | |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 | | | |
| | | | Manganese | | | | | NA | 0.E+00 | | | | | 0.E+00 | 0.E+00 | | | |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | | 4.431E-06 | 4.E-06 | | | |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 | | | |
| | | | Methylene chloride | | | | | 7.E-08 | 7.E-08 | | | | | 4.E-04 | 4.E-04 | | | |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | 5.E-04 | 5.E-04 | | | |
| | | | Tetrachloroethene | | | | | 1.E-05 | 1.E-05 | | | | | 2.E-01 | 2.E-01 | | | |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 | | | |
| | | | Trichloroethene | | | | | 1.E-04 | 1.E-04 | | | | | 9.E-02 | 9.E-02 | | | |
| | | | Vinyl chloride | | | | | 3.E-06 | 3.E-06 | | | | | 2.E-02 | 2.E-02 | | | |
| | | | Xylenes (Total) | | | | | NA | 0.E+00 | | | | | 2.E-01 | 2.E-01 | | | |
| | | | | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 2.E-04 | 2.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E-01 | |
| | | | | | | Exposure Point Total | | | | | | 2.E-04 | | | | | 6.E-01 | |
| | | | | | | Exposure Medium Total | | | | | | 2.E-04 | | | | | 6.E-01 | |
| | | | Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | 2.E-01 | |
| | | | | | | 1,1,2-Trichloroethane | 2.E-06 | 2.E-06 | | | | 5.E-06 | 3.E-02 | 3.E-02 | | | 6.E-02 | |
| 1,1-Dichloroethane | NA | NA | | | | | | | 0.E+00 | 2.E-02 | 2.E-02 | | | 4.E-02 | | | | |
| 1,1-Dichloroethene | NA | NA | | | | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | 2.E-01 | | | | |
| 1,2,4-Trichlorobenzene | | 0.E+00 | | | | | | | 0.E+00 | | 0.E+00 | | | 0.E+00 | | | | |
| 1,2-Dichlorobenzene | NA | NA | | | | | | | 0.E+00 | NA | NA | | | 0.E+00 | | | | |
| 1,2-Dichloroethane | 1.E-03 | 1.E-03 | | | | | | | 3.E-03 | NA | NA | | | 0.E+00 | | | | |
| 1,4-Dichlorobenzene | 4.E-06 | 4.E-06 | | | | | | | 7.E-06 | 1.E-02 | 1.E-02 | | | 3.E-02 | | | | |
| 2-Chlorophenol | NA | NA | | | | | | | 0.E+00 | 5.E-02 | 5.E-02 | | | 1.E-01 | | | | |
| 4-Methyl-2-pentanone | NA | NA | | | | | | | 0.E+00 | 9.E-02 | 9.E-02 | | | 2.E-01 | | | | |
| Benzene | 2.E-05 | 2.E-05 | | | | | | | 3.E-05 | 2.E-01 | 2.E-01 | | | 4.E-01 | | | | |
| Bis(2-ethylhexyl)phthalate | 3.E-07 | 3.E-07 | | | | | | | 6.E-07 | 3.E-03 | 3.E-03 | | | 6.E-03 | | | | |
| Bromodichloromethane | | 0.E+00 | | | | | | | 0.E+00 | | 0.E+00 | | | 0.E+00 | | | | |
| Chlorobenzene | NA | NA | | | | | | | 0.E+00 | 7.E-02 | 7.E-02 | | | 1.E-01 | | | | |
| Chloroethane | 2.E-06 | 2.E-06 | | | | | | | 4.E-06 | 5.E-03 | 5.E-03 | | | 9.E-03 | | | | |
| Chloroform | 1.E-06 | 1.E-06 | | | | | | | 3.E-06 | 4.E-02 | 4.E-02 | | | 7.E-02 | | | | |
| cis-1,2-Dichloroethene | NA | NA | | | | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | 3.E+00 | | | | |
| Ethylbenzene | NA | NA | | | | | | | 0.E+00 | 2.E-01 | 2.E-01 | | | 4.E-01 | | | | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Iron | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 |
| | | | Isopropylbenzene | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 3.E-01 |
| | | | Manganese | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 6.E-01 |
| | | | Methyl tert butyl ether | 6.E-07 | 6.E-07 | | | | 1.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 1.E-05 | 1.E-05 | | | | 2.E-05 | 7.E-02 | 7.E-02 | | | | 1.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 4.E-03 | 4.E-03 | | | | 9.E-03 |
| | | | Tetrachloroethene | 2.E-03 | 2.E-03 | | | | 4.E-03 | 9.E-01 | 9.E-01 | | | | 2.E+00 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 6.E-01 | 6.E-01 | | | | 1.E+00 |
| | | | Trichloroethene | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+01 | 3.E+01 | | | | 5.E+01 |
| | | | Vinyl chloride | 3.E-04 | 3.E-04 | | | | 6.E-04 | 4.E-01 | 4.E-01 | | | | 8.E-01 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 |
| | | | Chemical Total | 5.E-03 | 5.E-03 | 0.E+00 | 0.E+00 | 0.E+00 | 9.E-03 | 3.E+01 | 3.E+01 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E+01 |
| | | | Exposure Point Total | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Exposure Medium Total | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Groundwater Total | | | | | | 9.E-03 | | | | | | 6.E+01 |

Total Risk Across All Media = 9.E-03

Total Hazard Across All Media = 62

Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Surface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|--------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 2.7 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.3E-06 | 3.0E-04 | 4.4E-03 | 1% |
| Iron | 39124 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.9E-02 | 7.0E-01 | 2.7E-02 | 6% |
| Manganese | 767 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 3.8E-04 | 2.0E-02 | 1.9E-02 | 4% |
| Thallium | 43 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.1E-05 | 7.0E-05 | 3.0E-01 | 71% |
| Vanadium | 148 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 7.2E-05 | 1.0E-03 | 7.2E-02 | 17% |
| 1,2-Dichloroethane | 0.32 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.6E-07 | NA | NA | 0% |
| Tetrachloroethene | 0.011 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 5.4E-09 | 1.0E-02 | 5.4E-07 | 0% |

Hazard Index = 4.2E-01

Notes:

(1): Soil EPCs (see Appendix H-3)

**Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Dermal Contact
Surface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | RfD _{dermal-adj} Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk |
|--------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------|------------------------------------|
| Arsenic | 2.7 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 5.2E-07 | 9.5E-01 | 2.9E-04 | 1.8E-03 | 1% |
| Iron | 39124 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.5E-03 | 2.0E-01 | 1.4E-01 | 1.8E-02 | 6% |
| Manganese | 767 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 5.0E-05 | 2.0E-01 | 4.0E-03 | 1.2E-02 | 4% |
| Thallium | 43 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.8E-06 | 2.0E-01 | 1.4E-05 | 2.0E-01 | 71% |
| Vanadium | 148 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 9.6E-06 | 2.0E-01 | 2.0E-04 | 4.8E-02 | 17% |
| 1,2-Dichloroethane | 0.32 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 6.2E-08 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 0.011 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.1E-09 | 8.0E-01 | 8.0E-03 | 2.7E-07 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 2.8E-01

Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Surface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|--------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 2.7 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 3.1E-10 | NA | NA | 0% |
| Iron | 39124 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 4.5E-06 | NA | NA | 0% |
| Manganese | 767 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 8.8E-08 | 1.43E-05 | 6.2E-03 | 99% |
| Thallium | 43 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 4.9E-09 | NA | NA | 0% |
| Vanadium | 148 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 1.7E-08 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.32 | NA | 3.91E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 6.4E-06 | 7.00E-01 | 9.2E-06 | 0% |
| Tetrachloroethene | 0.011 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 3.4E-07 | 1.00E-02 | 3.4E-05 | 1% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Hazard Index = 6.2E-03

Future Industrial Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Surface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|--------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 2.7 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 4.7E-07 | 1.5E+00 | 7.1E-07 | 100% |
| Iron | 39124 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 6.8E-03 | NA | NA | 0% |
| Manganese | 767 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.3E-04 | NA | NA | 0% |
| Thallium | 43 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 7.5E-06 | NA | NA | 0% |
| Vanadium | 148 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 2.6E-05 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.32 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 5.6E-08 | 9.1E-02 | NA | 0% |
| Tetrachloroethene | 0.011 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.9E-09 | 5.4E-01 | 1.0E-09 | 0% |

Excess Lifetime Cancer Risk = 7.1E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Surface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|--------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 2.7 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.9E-07 | 9.5E-01 | 1.6E+00 | 2.9E-07 | 100% |
| Iron | 39124 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 9.0E-04 | 2.0E-01 | NA | NA | 0% |
| Manganese | 767 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.8E-05 | 2.0E-01 | NA | NA | 0% |
| Thallium | 43 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 9.9E-07 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 148 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 3.4E-06 | 2.0E-01 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.32 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.2E-08 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 0.011 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 7.6E-10 | 8.0E-01 | 6.8E-01 | 5.1E-10 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
 - (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online
- "NA" = Not applicable

Excess Lifetime Cancer Risk = 3.0E-07

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Surface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|--------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 2.7 | 1.32E+09 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 5.7E-11 | 1.51E+01 | 8.7E-10 | 0% |
| Iron | 39124 | 1.32E+09 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 8.3E-07 | NA | NA | 0% |
| Manganese | 767 | 1.32E+09 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 1.6E-08 | NA | NA | 0% |
| Thallium | 43 | 1.32E+09 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 9.1E-10 | NA | NA | 0% |
| Vanadium | 148 | 1.32E+09 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.1E-09 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.32 | NA | 3.91E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.3E-06 | 9.10E-02 | 2.1E-07 | 98% |
| Tetrachloroethene | 0.011 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 1.2E-07 | 2.10E-02 | 2.5E-09 | 1% |

Excess Lifetime Cancer Risk = 2.1E-07

- Notes:
- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
 - (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

Appendix H-5.3
Surface Soil
Excluding Hot Spots
Future Trespasser/Recreational

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Trespasser/Recreational |
| Receptor: | Teen/Adolescent |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|-----------------------|---------------------|---------------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| Soil | Surface Soil | Excluding Hot Spots | Arsenic | 7.E-07 | 3.E-07 | 2.E-10 | | | 1.E-06 | 8.E-03 | 4.E-03 | NA | | | 1.E-02 |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 5.E-02 | 4.E-02 | NA | | | 9.E-02 |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 4.E-02 | 3.E-02 | 2.E-03 | | | 6.E-02 |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 6.E-01 | 4.E-01 | NA | | | 1.E+00 |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 1.E-01 | 1.E-01 | NA | | | 2.E-01 |
| | | | 1,2-Dichloroethane | 1.E-08 | 3.E-08 | 6.E-08 | | | 1.E-07 | NA | NA | 2.E-06 | | | 2.E-06 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Tetrachloroethene | 1.E-09 | 5.E-10 | 3.E-10 | | | 2.E-09 | 1.E-06 | 6.E-07 | 8.E-06 | | | 1.E-05 |
| | | | Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Trichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Xylenes | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chemical Total | 7.E-07 | 3.E-07 | 6.E-08 | 0.E+00 | 0.E+00 | 1.E-06 | 8.E-01 | 6.E-01 | 2.E-03 | 0.E+00 | 0.E+00 | 1.E+00 |
| | | | Exposure Point Total | | | | | | 1.E-06 | | | | | | 1.E+00 |
| | | | Exposure Medium Total | | | | | | 1.E-06 | | | | | | 1.E+00 |
| | | | Soil Total | | | | | | 1.E-06 | | | | | | 1.E+00 |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1,2-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 2-Chlorophenol | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 4-Methyl-2-pentanone | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Ethylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Isopropylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Methylcyclohexane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| Methylene chloride | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Naphthalene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Tetrachloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Trichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Xylenes (Total) | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | |
| | | | Exposure Point Total | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Exposure Medium Total | | | | | | 0.E+00 | | | | | | 0.E+00 |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1,2-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2,4-Trichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 2-Chlorophenol | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 4-Methyl-2-pentanone | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bromodichloromethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Ethylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Isopropylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Trespasser/Recreational |
| Receptor: | Teen/Adolescent |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | |
|-------------------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air |
| | | | Methyl tert butyl ether | | | | | | | | | | | |
| | | | Methylcyclohexane | | | | | | | | | | | |
| | | | Methylene chloride | | | | | | | | | | | |
| | | | Naphthalene | | | | | | | | | | | |
| | | | Tetrachloroethene | | | | | | | | | | | |
| | | | Toluene | | | | | | | | | | | |
| | | | Trichloroethene | | | | | | | | | | | |
| | | | Vinyl chloride | | | | | | | | | | | |
| | | | Xylenes (Total) | | | | | | | | | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 |
| | | | Exposure Point Total | | | | | | | | | | | |
| | | | Exposure Medium Total | | | | | | | | | | | |
| Groundwater Total | | | | | | | | | | | | | | |

Total Risk Across All Media = 1.E-06

Total Hazard Across All Media = 1

**Future Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Surface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|--------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 2.7 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 2.5E-06 | 3.0E-04 | 8.5E-03 | 1% |
| Iron | 39124 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 3.7E-02 | 7.0E-01 | 5.3E-02 | 6% |
| Manganese | 767 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 7.2E-04 | 2.0E-02 | 3.6E-02 | 4% |
| Thallium | 43 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 4.0E-05 | 7.0E-05 | 5.8E-01 | 71% |
| Vanadium | 148 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 1.4E-04 | 1.0E-03 | 1.4E-01 | 17% |
| 1,2-Dichloroethane | 0.32 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 3.0E-07 | NA | NA | 0% |
| Tetrachloroethene | 0.011 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 1.0E-08 | 1.0E-02 | 1.0E-06 | 0% |

Hazard Index = 8.1E-01

Notes:

(1): Soil EPCs (see Appedix H-3)

**Future Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Noncancer Hazard from Dermal Contact
Surface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | $RfD_{dermal-adj}$ Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|--------------------|-----------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 2.7 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 1.2E-06 | 9.5E-01 | 2.9E-04 | 4.1E-03 | 1% |
| Iron | 39124 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 5.6E-03 | 2.0E-01 | 1.4E-01 | 4.0E-02 | 6% |
| Manganese | 767 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 1.1E-04 | 2.0E-01 | 4.0E-03 | 2.7E-02 | 4% |
| Thallium | 43 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 6.1E-06 | 2.0E-01 | 1.4E-05 | 4.4E-01 | 71% |
| Vanadium | 148 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 2.1E-05 | 2.0E-01 | 2.0E-04 | 1.1E-01 | 17% |
| 1,2-Dichloroethane | 0.32 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 1.4E-07 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 0.011 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 4.7E-09 | 8.0E-01 | 8.0E-03 | 5.9E-07 | 0% |

Notes:

- (1): Soil EPCs (see Appedix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 6.2E-01

**Future Teen/Adolescent Trespasser-Recreational Scenario
 Estimation of Noncancer Hazard from Inhalation Exposure
 Surface Soil, Excluding Hot Spots**

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|--------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 2.7 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 7.8E-11 | NA | NA | 0% |
| Iron | 39124 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 1.1E-06 | NA | NA | 0% |
| Manganese | 767 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 2.2E-08 | 1.43E-05 | 1.5E-03 | 99% |
| Thallium | 43 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 1.2E-09 | NA | NA | 0% |
| Vanadium | 148 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 4.3E-09 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.32 | NA | 3.91E+03 | 0.52 | 144 | 12 | 4 | 42 | 4380 | 1.6E-06 | 7.00E-01 | 2.3E-06 | 0% |
| Tetrachloroethene | 0.011 | NA | 2.55E+03 | 0.52 | 144 | 12 | 4 | 42 | 4380 | 8.4E-08 | 1.00E-02 | 8.4E-06 | 1% |

Notes:

- (1): Soil EPCs (see Appedix H-3)
- (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
- (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

| |
|-------------------------------|
| Hazard Index = 1.6E-03 |
|-------------------------------|

**Future Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Cancer Risk from Incidental Ingestion
Surface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) | |
|--------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|----|
| Arsenic | 2.7 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 4.3E-07 | 1.5E+00 | 6.5E-07 | 98% | |
| Iron | 39124 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 6.3E-03 | NA | NA | 0% | |
| Manganese | 767 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 1.2E-04 | NA | NA | 0% | |
| Thallium | 43 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 6.9E-06 | NA | NA | 0% | |
| Vanadium | 148 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 2.4E-05 | NA | NA | 0% | |
| 1,2-Dichloroethane | 0.32 | | | chemical is considered mutagenic, see Table xx for risk calculation | | | | | | | | 1.1E-08 | 2% |
| Tetrachloroethene | 0.011 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 1.8E-09 | 5.4E-01 | 9.6E-10 | 0% | |

Excess Lifetime Cancer Risk = 6.6E-07

Notes:

(1): Soil EPCs (see Appedix H-3)

"NA" = Not applicable

**Future Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Cancer Risk from Dermal Contact
Surface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

- where:
- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
 - SA = skin surface area in contact with soil on days exposed (cm²)
 - AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
 - AE_d = absorption efficiency (unitless)
 - EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
 - ED = exposure duration: the typical duration of each exposure event (years)
 - EV = event frequency (events/day)
 - BW = body weight (kg)
 - AT_c = averaging time (days)
 - C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|--------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 2.7 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 2.0E-07 | 9.5E-01 | 1.6E+00 | 3.1E-07 | 90% |
| Iron | 39124 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 9.6E-04 | 2.0E-01 | NA | NA | 0% |
| Manganese | 767 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 1.9E-05 | 2.0E-01 | NA | NA | 0% |
| Thallium | 43 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 1.1E-06 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 148 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 3.6E-06 | 2.0E-01 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.32 | | | | chemical is considered mutagenic, see Table xx for risk calculation | | | | | | | | | 3.3E-08 | 9% |
| Tetrachloroethene | 0.011 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 8.1E-10 | 8.0E-01 | 6.8E-01 | 5.5E-10 | 0% |

Notes:

- (1): Soil EPCs (see Appedix H-3)
 - (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
 - (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online
- "NA" = Not applicable

Excess Lifetime Cancer Risk = 3.5E-07

**Future Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Cancer Risk from Inhalation Exposure
Surface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | CSF_{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|--------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 2.7 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 1.3E-11 | 1.51E+01 | 2.0E-10 | 0% |
| Iron | 39124 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 1.9E-07 | NA | NA | 0% |
| Manganese | 767 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 3.8E-09 | NA | NA | 0% |
| Thallium | 43 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 2.1E-10 | NA | NA | 0% |
| Vanadium | 148 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 7.3E-10 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.32 | | | | | | | | | | | 6.1E-08 | 99% |
| Tetrachloroethene | 0.011 | NA | 2.55E+03 | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 1.4E-08 | 2.10E-02 | 3.0E-10 | 0% |

Excess Lifetime Cancer Risk = 6.1E-08

Notes:

- (1): Soil EPCs (see Appedix H-3)
- (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
- (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

| Parameter | CS (mg/kg) | 0-2 Years Child Mult. (1/day) | 2-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | CSF (mg/kg*day) ⁻¹ | CSF adjustment factor | | | | ED | | | | EP | Risk | | | | Total Risk | | | | | | | | |
|--------------------|---------------|-------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------|-----------------------|-----|------|-------|-----|-----|------|-------|----|------|-----|----------|-------|------------|-----------------|-----|----|--|-----|------|------|-----|
| | | | | | | | 0-2 | 2-6 | 6-15 | 15-30 | 0-2 | 2-6 | 6-15 | 15-30 | | 0-2 | 2-6 | 6-15 | 15-30 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,2-Dichloroethane | 0.32 | | | 2.90E-06 | | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | NA | NA | 3.27E-08 | NA | 3.27E-08 | Dermal Risk | | | | | | | |
| 1,2-Dichloroethane | 0.32 | | | 1.01E-06 | | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | NA | NA | 1.14E-08 | NA | 1.14E-08 | Ingestion risk | | | | | | | |
| 1,2-Dichloroethane | 0.32 | | | 5.40E-06 | | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | NA | NA | 6.08E-08 | NA | 6.08E-08 | inhalation risk | 4 | 8 | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | 4 | 8 | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | 4.5 | 9 | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | 4.5 | 9 | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | 5.5 | 11 | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | 5.5 | 11 | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | 7 | 13 | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | 7 | 13 | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | 8 | 16 | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | 8 | 16 | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | 8.6 | 0.52 | 6-15 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | 0.15 | 0-2 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.26 | 2-6 |

Appendix H-5.5
Surface Soil
Excluding Hot Spots
Future Resident

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | |
|-----------------------|---------------------|---------------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | |
| Soil | Surface Soil | Excluding Hot Spots | Arsenic | 6.E-06 | 6.E-07 | 6.E-09 | | 7.E-06 | 1.E-01 | 1.E-02 | NA | | | | 1.E-01 | |
| | | | Iron | NA | NA | NA | | 0.E+00 | 7.E-01 | 1.E-01 | NA | | | | 8.E-01 | |
| | | | Manganese | NA | NA | NA | | 0.E+00 | 5.E-01 | 7.E-02 | 2.E-02 | | | | 6.E-01 | |
| | | | Thallium | NA | NA | NA | | 0.E+00 | 8.E+00 | 1.E+00 | NA | | | | 9.E+00 | |
| | | | Vanadium | NA | NA | NA | | 0.E+00 | 2.E+00 | 3.E-01 | NA | | | | 2.E+00 | |
| | | | 1,2-Dichloroethane | 2.E-07 | 5.E-07 | 2.E-06 | | 2.E-06 | NA | NA | 3.E-05 | | | | 3.E-05 | |
| | | | 1,4-Dichlorobenzene | | | | | 0.E+00 | | | | | | | 0.E+00 | |
| | | | Benzene | | | | | 0.E+00 | | | | | | | 0.E+00 | |
| | | | Chloroform | | | | | 0.E+00 | | | | | | | 0.E+00 | |
| | | | cis-1,2-Dichloroethene | | | | | 0.E+00 | | | | | | | 0.E+00 | |
| | | | Tetrachloroethene | 9.E-09 | 1.E-09 | 9.E-09 | | 2.E-08 | 1.E-05 | 1.E-05 | 1.E-04 | | | | 1.E-04 | |
| | | | Toluene | | | | | 0.E+00 | | | | | | | 0.E+00 | |
| | | | Trichloroethene | | | | | 0.E+00 | | | | | | | 0.E+00 | |
| | | | Vinyl chloride | | | | | 0.E+00 | | | | | | | 0.E+00 | |
| | | | Xylenes | | | | | 0.E+00 | | | | | | | 0.E+00 | |
| | | | Chemical Total | 7.E-06 | 1.E-06 | 2.E-06 | 0.E+00 | 0.E+00 | 9.E-06 | 1.E+01 | 2.E+00 | 2.E-02 | 0.E+00 | 0.E+00 | 1.E+01 | |
| | | | Exposure Point Total | | | | | | 9.E-06 | | | | | | 1.E+01 | |
| | | | Exposure Medium Total | | | | | | 9.E-06 | | | | | | 1.E+01 | |
| Soil Total | | | | | | | | | 9.E-06 | | | | | | 1.E+01 | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 6.E-03 | 6.E-03 | |
| | | | 1,1,2-Trichloroethane | | | | | 4.E-08 | 4.E-08 | | | | | 4.E-04 | 4.E-04 | |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | | 3.E-03 | 3.E-03 |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | | 5.E-02 | 5.E-02 |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | | 5.E-04 | 5.E-04 |
| | | | 1,2-Dichloroethane | | | | | 3.E-05 | 3.E-05 | | | | | | 1.E-03 | 1.E-03 |
| | | | 1,4-Dichlorobenzene | | | | | 1.E-07 | 1.E-07 | | | | | | 6.E-05 | 6.E-05 |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | | 3.E-04 | 3.E-04 |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | | 2.E-05 | 2.E-05 |
| | | | Benzene | | | | | 1.E-06 | 1.E-06 | | | | | | 1.E-02 | 1.E-02 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | NA | 0.E+00 | | | | | | 0.E+00 | 0.E+00 |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | | 6.E-03 | 6.E-03 |
| | | | Chloroethane | | | | | 5.E-07 | 5.E-07 | | | | | | 1.E-03 | 1.E-03 |
| | | | Chloroform | | | | | 9.E-07 | 9.E-07 | | | | | | 2.E-03 | 2.E-03 |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | | 2.E-02 | 2.E-02 |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | | 8.E-03 | 8.E-03 |
| | | | Iron | | | | | NA | 0.E+00 | | | | | | 0.E+00 | 0.E+00 |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | | | 2.E-02 | 2.E-02 |
| | | | Manganese | | | | | NA | 0.E+00 | | | | | | 0.E+00 | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | | | 6.E-06 | 6.E-06 |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | | 1.E-02 | 1.E-02 |
| | | | Methylene chloride | | | | | 1.E-07 | 1.E-07 | | | | | | 5.E-04 | 5.E-04 |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | | 7.E-04 | 7.E-04 |
| | | | Tetrachloroethene | | | | | 2.E-05 | 2.E-05 | | | | | | 2.E-01 | 2.E-01 |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | | 3.E-03 | 3.E-03 |
| | | | Trichloroethene | | | | | 2.E-04 | 2.E-04 | | | | | | 1.E-01 | 1.E-01 |
| | | | Vinyl chloride | | | | | 5.E-06 | 5.E-06 | | | | | | 2.E-02 | 2.E-02 |
| | | | Xylenes (Total) | | | | | NA | 0.E+00 | | | | | | 3.E-01 | 3.E-01 |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-04 | 3.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 8.E-01 | 8.E-01 | |
| | | | Exposure Point Total | | | | | | 3.E-04 | | | | | | 8.E-01 | |
| | | | Exposure Medium Total | | | | | | 3.E-04 | | | | | | 8.E-01 | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | NA | 0.E+00 | 4.E-01 | 4.E-01 | | | | 8.E-01 | |
| | | | 1,1,2-Trichloroethane | 4.E-06 | 4.E-06 | | | NA | 7.E-06 | 1.E-01 | 1.E-01 | | | | 2.E-01 | |
| | | | 1,1-Dichloroethane | NA | NA | | | NA | 0.E+00 | 7.E-02 | 7.E-02 | | | | 1.E-01 | |
| | | | 1,1-Dichloroethene | NA | NA | | | NA | 0.E+00 | 4.E-01 | 4.E-01 | | | | 7.E-01 | |
| | | | 1,2,4-Trichlorobenzene | | | 0.E+00 | | NA | 0.E+00 | 0.E+00 | | | | | 0.E+00 | |
| | | | 1,2-Dichlorobenzene | NA | NA | | | NA | 0.E+00 | 6.E-02 | 6.E-02 | | | | 1.E-01 | |
| | | | 1,2-Dichloroethane | 1.E-02 | 1.E-02 | | | NA | 2.E-02 | NA | NA | | | | 0.E+00 | |
| | | | 1,4-Dichlorobenzene | 6.E-06 | 6.E-06 | | | NA | 1.E-05 | 9.E-02 | 9.E-02 | | | | 2.E-01 | |
| | | | 2-Chlorophenol | NA | NA | | | NA | 0.E+00 | 2.E-01 | 2.E-01 | | | | 3.E-01 | |
| | | | 4-Methyl-2-pentanone | NA | NA | | | NA | 0.E+00 | 3.E-01 | 3.E-01 | | | | 6.E-01 | |
| | | | Benzene | 3.E-05 | 3.E-05 | | | NA | 5.E-05 | 1.E+00 | 1.E+00 | | | | 3.E+00 | |
| | | | Bis(2-ethylhexyl)phthalate | 5.E-07 | 5.E-07 | | | NA | 1.E-06 | 1.E-02 | 1.E-02 | | | | 2.E-02 | |
| | | | Bromodichloromethane | | 0.E+00 | | | NA | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 | |
| | | | Chlorobenzene | NA | NA | | | NA | 0.E+00 | 5.E-01 | 5.E-01 | | | | 1.E+00 | |
| | | | Chloroethane | 3.E-04 | 3.E-04 | | | NA | 7.E-04 | 3.E-02 | 3.E-02 | | | | 6.E-02 | |
| | | | Chloroform | 2.E-06 | 2.E-06 | | | NA | 4.E-06 | 2.E-01 | 2.E-01 | | | | 5.E-01 | |
| | | | cis-1,2-Dichloroethene | NA | NA | | | NA | 0.E+00 | 9.E+00 | 9.E+00 | | | | 2.E+01 | |
| | | | Ethylbenzene | NA | NA | | | NA | 0.E+00 | 1.E+00 | 1.E+00 | | | | 2.E+00 | |
| | | | Iron | NA | NA | | | NA | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 | |
| | | | Isopropylbenzene | NA | NA | | | NA | 0.E+00 | 9.E-01 | 9.E-01 | | | | 2.E+00 | |
| | | | Manganese | NA | NA | | | NA | 0.E+00 | 1.E+00 | 1.E+00 | | | | 2.E+00 | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|-------------------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Methyl tert butyl ether | 1.E-06 | 1.E-06 | | | | 2.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 9.E-05 | 9.E-05 | | | | 2.E-04 | 4.E-01 | 4.E-01 | | | | 9.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 1.E-02 | 1.E-02 | | | | 3.E-02 |
| | | | Tetrachloroethene | 3.E-03 | 3.E-03 | | | | 6.E-03 | 6.E+00 | 6.E+00 | | | | 1.E+01 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 4.E+00 | 4.E+00 | | | | 8.E+00 |
| | | | Trichloroethene | 2.E-03 | 2.E-03 | | | | 3.E-03 | 2.E+02 | 2.E+02 | | | | 3.E+02 |
| | | | Vinyl chloride | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+00 | 3.E+00 | | | | 5.E+00 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 2.E+00 | 2.E+00 | | | | 4.E+00 |
| | | | Chemical Total | 2.E-02 | 2.E-02 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-02 | 2.E+02 | 2.E+02 | 0.E+00 | 0.E+00 | 0.E+00 | 4.E+02 |
| | | | Exposure Point Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| | | | Exposure Medium Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| Groundwater Total | | | | | | | | | 3.E-02 | | | | | | 4.E+02 |

Total Risk Across All Media = 3.E-02

Total Hazard Across All Media = 408

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Surface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|--------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 2.7 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 3.5E-05 | 3.0E-04 | 1.2E-01 | 1% |
| Iron | 39124 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 5.0E-01 | 7.0E-01 | 7.1E-01 | 6% |
| Manganese | 767 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 9.8E-03 | 2.0E-02 | 4.9E-01 | 4% |
| Thallium | 43 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 5.5E-04 | 7.0E-05 | 7.9E+00 | 71% |
| Vanadium | 148 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 1.9E-03 | 1.0E-03 | 1.9E+00 | 17% |
| 1,2-Dichloroethane | 0.32 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 4.1E-06 | NA | NA | 0% |
| Tetrachloroethene | 0.011 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 1.4E-07 | 1.0E-02 | 1.4E-05 | 0% |

Hazard Index = 1.1E+01

Notes:
 (1): Soil EPCs (see Appendix H-3)

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Dermal Contact
Surface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (years) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | $RfD_{dermal-adj}$ Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|--------------------|-----------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------|-----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 2.7 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 2.9E-06 | 9.5E-01 | 2.9E-04 | 1.0E-02 | 1% |
| Iron | 39124 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.4E-02 | 2.0E-01 | 1.4E-01 | 1.0E-01 | 6% |
| Manganese | 767 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 2.7E-04 | 2.0E-01 | 4.0E-03 | 6.9E-02 | 4% |
| Thallium | 43 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.5E-05 | 2.0E-01 | 1.4E-05 | 1.1E+00 | 71% |
| Vanadium | 148 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 5.3E-05 | 2.0E-01 | 2.0E-04 | 2.6E-01 | 17% |
| 1,2-Dichloroethane | 0.32 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 3.4E-07 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 0.011 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.2E-08 | 8.0E-01 | 8.0E-03 | 1.5E-06 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

| |
|-------------------------------|
| Hazard Index = 1.5E+00 |
|-------------------------------|

**Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Surface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = [(C_s / \text{PEF}) + (C_s / \text{VF})] * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_n$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|--------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 2.7 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 1.1E-09 | NA | NA | 0% |
| Iron | 39124 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 1.5E-05 | NA | NA | 0% |
| Manganese | 767 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 3.0E-07 | 1.43E-05 | 2.1E-02 | 99% |
| Thallium | 43 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 1.7E-08 | NA | NA | 0% |
| Vanadium | 148 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 5.8E-08 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.32 | NA | 3.91E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.2E-05 | 7.00E-01 | 3.1E-05 | 0% |
| Tetrachloroethene | 0.011 | NA | 2.55E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 1.1E-06 | 1.00E-02 | 1.1E-04 | 1% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Hazard Index = 2.1E-02

Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Incidental Ingestion
Surface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Age Adgusted Soil Ingestion Factor (mg-year/kg-day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | C_1 Conv. Factor (mass) (kg/mg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) | |
|------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------|-----------------------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|----|
| Arsenic | 2.7 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 4.2E-06 | 1.5E+00 | 6.3E-06 | 96% | |
| Iron | 39124 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 6.1E-02 | NA | NA | 0% | |
| Manganese | 767 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 1.2E-03 | NA | NA | 0% | |
| Thallium | 43 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 6.7E-05 | NA | NA | 0% | |
| Vanadium | 148 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 2.3E-04 | NA | NA | 0% | |
| 1,2-Dichloroethane | 0.32 | | chemical is considered mutagenic, see Table xx for risk calculation | | | | | | | 2.30E-07 | 4% |
| cis-1,2-Dichloroethene | 0.00 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 0.0E+00 | NA | NA | 0% | |
| Tetrachloroethene | 0.011 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 1.7E-08 | 5.4E-01 | 9.3E-09 | 0% | |

Excess Lifetime Cancer Risk = 6.6E-06

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Dermal Contact
Surface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SFS Age-Adjusted Dermal Factor (mg-year/kg-event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) | |
|--------------------|--------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|-----|
| Arsenic | 2.7 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 4.0E-07 | 9.5E-01 | 1.6E+00 | 6.3E-07 | 55% | |
| Iron | 39124 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 1.9E-03 | 2.0E-01 | NA | NA | 0% | |
| Manganese | 767 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 3.8E-05 | 2.0E-01 | NA | NA | 0% | |
| Thallium | 43 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 2.1E-06 | 2.0E-01 | NA | NA | 0% | |
| Vanadium | 148 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 7.3E-06 | 8.0E-01 | NA | NA | 0% | |
| 1,2-Dichloroethane | 0.32 | | | chemical is considered mutagenic, see Table xx for risk calculation | | | | | | | | 5.1E-07 | 45% |
| Tetrachloroethene | 0.011 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 1.6E-09 | 8.0E-01 | 6.8E-01 | 1.1E-09 | 0% | |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004

(3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or

| |
|----------------------------------------------|
| Excess Lifetime Cancer Risk = 1.1E-06 |
|----------------------------------------------|

Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Inhalation Exposure
Surface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = [(C_s / \text{PEF}) + (C_s / \text{VF})] * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_c$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) | |
|--------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|------------|
| Arsenic | 2.7 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 3.7E-10 | 1.51E+01 | 5.6E-09 | 0% | |
| Iron | 39124 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 5.4E-06 | NA | NA | 0% | |
| Manganese | 767 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.1E-07 | NA | NA | 0% | |
| Thallium | 43 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 5.9E-09 | NA | NA | 0% | |
| Vanadium | 148 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 2.0E-08 | NA | NA | 0% | |
| 1,2-Dichloroethane | 0.32 | | | chemical is considered mutagenic, see Table xx for risk calculation | | | | | | | | | 1.7E-06 | 99% |
| Tetrachloroethene | 0.011 | NA | 2.55E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 4.1E-07 | 2.10E-02 | 8.5E-09 | 1% | |

Excess Lifetime Cancer Risk = 1.7E-06

- Notes:
- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
 - (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

| Parameter | CS (mg/kg) | 0-2 Years Child Mult. (1/day) | 2-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | CSF (mg/kg*day) ⁻¹ | CSF adjustment factor | | | | ED | | | | EP | Risk | | | | Total Risk | |
|--------------------|---------------|-------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------|-----------------------|-----|------|-------|-----|-----|------|-------|----|----------|----------|----------|----------|------------|------------------------|
| | | | | | | | 0-2 | 2-6 | 6-15 | 15-30 | 0-2 | 2-6 | 6-15 | 15-30 | | 0-2 | 2-6 | 6-15 | 15-30 | | |
| 1,2-Dichloroethane | 0.32 | 3.31E-05 | 2.30E-05 | 7.06E-06 | 5.92E-06 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 2.76E-07 | 1.15E-07 | 7.95E-08 | 3.71E-08 | 5.08E-07 | Dermal Risk |
| 1,2-Dichloroethane | 0.32 | 1.74E-05 | 9.59E-06 | 2.46E-06 | 1.41E-06 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 1.46E-07 | 4.80E-08 | 2.77E-08 | 8.83E-09 | 2.30E-07 | Ingestion risk |
| 1,2-Dichloroethane | 0.32 | 5.36E-05 | 5.11E-05 | 5.25E-05 | 5.79E-05 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 4.48E-07 | 2.56E-07 | 5.91E-07 | 3.62E-07 | 1.66E-06 | Inhalation risk |

Appendix H-5.6
Surface Soil
Hot Spot 1
Current O&M Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|------------|
| Scenario Timeframe: | Current |
| Receptor Population: | O&M Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | | | |
|-----------------------|---------------------|----------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|--------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | | | |
| Soil | Surface Soil | Hot Spot #1 | Arsenic | 3.E-07 | 1.E-07 | 4.E-10 | | | 4.E-07 | 2.E-03 | 8.E-04 | NA | | | 3.E-03 | | | |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 2.E-02 | 2.E-02 | NA | | | 4.E-02 | | | |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 2.E-02 | 2.E-02 | 8.E-03 | | | 5.E-02 | | | |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 2.E-01 | 1.E-01 | NA | | | 3.E-01 | | | |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 3.E-02 | 2.E-02 | NA | | | 5.E-02 | | | |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Tetrachloroethene | 2.E-07 | 8.E-08 | 7.E-13 | | | 2.E-07 | 8.E-05 | 4.E-05 | 5.E-03 | | | 5.E-03 | | | |
| | | | Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Trichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Xylenes | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | | | | Chemical Total | 5.E-07 | 2.E-07 | 4.E-10 | 0.E+00 | 0.E+00 | 7.E-07 | 3.E-01 | 2.E-01 | 1.E-02 | 0.E+00 | 0.E+00 | 5.E-01 |
| | | | | | | Exposure Point Total | | | | | | 7.E-07 | | | | | | 5.E-01 |
| | | | Exposure Medium Total | | | | | | 7.E-07 | | | | | | 5.E-01 | | | |
| Soil Total | | | | | | | | | 7.E-07 | | | | | | 5.E-01 | | | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 3.E-03 | 3.E-03 | | | |
| | | | 1,1,2-Trichloroethane | | | | | 1.E-08 | 1.E-08 | | | | | 2.E-04 | 2.E-04 | | | |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | 1.E-03 | 1.E-03 | | | |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | 2.E-02 | 2.E-02 | | | |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | 2.E-04 | 2.E-04 | | | |
| | | | 1,2-Dichloroethane | | | | | 1.E-05 | 1.E-05 | | | | | 4.E-04 | 4.E-04 | | | |
| | | | 1,4-Dichlorobenzene | | | | | 5.E-08 | 5.E-08 | | | | | 3.E-05 | 3.E-05 | | | |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | 1.E-04 | 1.E-04 | | | |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | 9.E-06 | 9.E-06 | | | |
| | | | Benzene | | | | | 3.E-07 | 3.E-07 | | | | | 4.E-03 | 4.E-03 | | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | NA | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 | | | |
| | | | Chloroethane | | | | | 2.E-07 | 2.E-07 | | | | | 6.E-04 | 6.E-04 | | | |
| | | | Chloroform | | | | | 3.E-07 | 3.E-07 | | | | | 8.E-04 | 8.E-04 | | | |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | 7.E-03 | 7.E-03 | | | |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | 3.E-03 | 3.E-03 | | | |
| | | | Iron | | | | | NA | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | | 9.E-03 | 9.E-03 | | | |
| | | | Manganese | | | | | NA | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | | 3.E-06 | 3.E-06 | | | |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | 6.E-03 | 6.E-03 | | | |
| | | | Methylene chloride | | | | | 4.E-08 | 4.E-08 | | | | | 2.E-04 | 2.E-04 | | | |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | 3.E-04 | 3.E-04 | | | |
| | | | Tetrachloroethene | | | | | 8.E-06 | 8.E-06 | | | | | 1.E-01 | 1.E-01 | | | |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | 1.E-03 | 1.E-03 | | | |
| | | | Trichloroethene | | | | | 7.E-05 | 7.E-05 | | | | | 5.E-02 | 5.E-02 | | | |
| | | | Vinyl chloride | | | | | 2.E-06 | 2.E-06 | | | | | 1.E-02 | 1.E-02 | | | |
| Xylenes (Total) | | | | | NA | 0.E+00 | | | | | 1.E-01 | 1.E-01 | | | | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 9.E-05 | 9.E-05 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-01 | 3.E-01 | | | |
| | | | Exposure Point Total | | | | | | 9.E-05 | | | | | | 3.E-01 | | | |
| | | | Exposure Medium Total | | | | | | 9.E-05 | | | | | | 3.E-01 | | | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,1,2-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,1-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,1-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,2,4-Trichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,2-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 2-Chlorophenol | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 4-Methyl-2-pentanone | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Bromodichloromethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Ethylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Isopropylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |

Surface Soil Calcs - Current O&M Worker.xls

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|------------|
| Scenario Timeframe: | Current |
| Receptor Population: | O&M Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|-------------------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Methyl tert butyl ether | | | | | | | | | | | | 0.E+00 |
| | | | Methylcyclohexane | | | | | | | | | | | | 0.E+00 |
| | | | Methylene chloride | | | | | | | | | | | | 0.E+00 |
| | | | Naphthalene | | | | | | | | | | | | 0.E+00 |
| | | | Tetrachloroethene | | | | | | | | | | | | 0.E+00 |
| | | | Toluene | | | | | | | | | | | | 0.E+00 |
| | | | Trichloroethene | | | | | | | | | | | | 0.E+00 |
| | | | Vinyl chloride | | | | | | | | | | | | 0.E+00 |
| | | | Xylenes (Total) | | | | | | | | | | | | 0.E+00 |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 |
| | | | Exposure Point Total | | | | | | | | | | | | 0.E+00 |
| | | | Exposure Medium Total | | | | | | | | | | | | 0.E+00 |
| Groundwater Total | | | | | | | | | | | | | | | 9.E-05 |

Total Risk Across All Media = 9.E-05

Total Hazard Across All Media = 0.8

Current O&M Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Surface Soil - Hot Spot 1

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.9 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 9125 | 5.6E-07 | 3.0E-04 | 1.9E-03 | 1% |
| Iron | 54500 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 9125 | 1.6E-02 | 7.0E-01 | 2.3E-02 | 8% |
| Manganese | 1700 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 9125 | 5.0E-04 | 2.0E-02 | 2.5E-02 | 9% |
| Thallium | 50 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 9125 | 1.5E-05 | 7.0E-05 | 2.1E-01 | 73% |
| Vanadium | 97 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 9125 | 2.8E-05 | 1.0E-03 | 2.8E-02 | 10% |
| Tetrachloroethene | 2.7 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 9125 | 7.9E-07 | 1.0E-02 | 7.9E-05 | 0% |

Hazard Index = 2.9E-01

Notes:

(1): Soil EPCs (see Appendix H-3)

Current O&M Worker Scenario
Estimation of Noncancer Hazard from Dermal Contact
Surface Soil - Hot Spot 1

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} Absorption Efficiency ⁽³⁾ (unitless) | RfD _{dermal-adj} Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk |
|-------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------|------------------------------------|
| Arsenic | 1.9 | 3,300 | 0.2 | 0.03 | 150 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.2E-07 | 9.5E-01 | 2.9E-04 | 7.7E-04 | 0% |
| Iron | 54500 | 3,300 | 0.2 | 0.01 | 150 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.1E-03 | 2.0E-01 | 1.4E-01 | 1.5E-02 | 8% |
| Manganese | 1700 | 3,300 | 0.2 | 0.01 | 150 | 25 | 1 | 1.0E-06 | 70 | 9125 | 6.6E-05 | 2.0E-01 | 4.0E-03 | 1.6E-02 | 9% |
| Thallium | 50 | 3,300 | 0.2 | 0.01 | 150 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.9E-06 | 2.0E-01 | 1.4E-05 | 1.4E-01 | 73% |
| Vanadium | 97 | 3,300 | 0.2 | 0.01 | 150 | 25 | 1 | 1.0E-06 | 70 | 9125 | 3.7E-06 | 2.0E-01 | 2.0E-04 | 1.9E-02 | 10% |
| Tetrachloroethene | 2.7 | 3,300 | 0.2 | 0.03 | 150 | 25 | 1 | 1.0E-06 | 70 | 9125 | 3.1E-07 | 8.0E-01 | 8.0E-03 | 3.9E-05 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 1.9E-01

Current O&M Worker Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Surface Soil - Hot Spot 1

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient (mg/kg-day) | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|-----------------------------------|-------------------------------------------|
| Arsenic | 1.9 | 6.80E+08 | NA | 1 | 150 | 25 | 8 | 70 | 9125 | 1.3E-10 | NA | NA | 0% |
| Iron | 54500 | 6.80E+08 | NA | 1 | 150 | 25 | 8 | 70 | 9125 | 3.8E-06 | NA | NA | 0% |
| Manganese | 1700 | 6.80E+08 | NA | 1 | 150 | 25 | 8 | 70 | 9125 | 1.2E-07 | 1.43E-05 | 8.2E-03 | 62% |
| Thallium | 50 | 6.80E+08 | NA | 1 | 150 | 25 | 8 | 70 | 9125 | 3.5E-09 | NA | NA | 0% |
| Vanadium | 97 | 6.80E+08 | NA | 1 | 150 | 25 | 8 | 70 | 9125 | 6.7E-09 | NA | NA | 0% |
| Tetrachloroethene | 2.7 | NA | 2.55E+03 | 1 | 150 | 25 | 8 | 70 | 9125 | 5.0E-05 | 1.00E-02 | 5.0E-03 | 38% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

| |
|-------------------------------|
| Hazard Index = 1.3E-02 |
|-------------------------------|

Current O&M Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Surface Soil - Hot Spot 1

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.9 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 25,550 | 2.0E-07 | 1.5E+00 | 3.0E-07 | 66% |
| Iron | 54500 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 25,550 | 5.7E-03 | NA | NA | 0% |
| Manganese | 1700 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 25,550 | 1.8E-04 | NA | NA | 0% |
| Thallium | 50 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 25,550 | 5.2E-06 | NA | NA | 0% |
| Vanadium | 97 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 25,550 | 1.0E-05 | NA | NA | 0% |
| Tetrachloroethene | 2.7 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 25,550 | 2.8E-07 | 5.4E-01 | 1.5E-07 | 34% |

Excess Lifetime Cancer Risk = 4.5E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

Current O&M Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Surface Soil - Hot Spot 1

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | $SF_{dermal-adj}$ Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.9 | 3,300 | 0.2 | 0.03 | 150 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 7.9E-08 | 9.5E-01 | 1.6E+00 | 1.2E-07 | 62% |
| Iron | 54500 | 3,300 | 0.2 | 0.01 | 150 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 7.5E-04 | 2.0E-01 | NA | NA | 0% |
| Manganese | 1700 | 3,300 | 0.2 | 0.01 | 150 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.4E-05 | 2.0E-01 | NA | NA | 0% |
| Thallium | 50 | 3,300 | 0.2 | 0.01 | 150 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 6.9E-07 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 97 | 3,300 | 0.2 | 0.01 | 150 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.3E-06 | 2.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 2.7 | 3,300 | 0.2 | 0.03 | 150 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.1E-07 | 8.0E-01 | 6.8E-01 | 7.6E-08 | 38% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004

(3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or
 U.S. EPA Region 4 RAGS Supplement, online

"NA" = Not applicable

Excess Lifetime Cancer Risk = 2.0E-07

Current O&M Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Surface Soil - Hot Spot 1

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.9 | 1.32E+09 | NA | 1 | 150 | 25 | 8 | 70 | 25,550 | 2.4E-11 | 1.51E+01 | 3.7E-10 | 100% |
| Iron | 54500 | 1.32E+09 | NA | 1 | 150 | 25 | 8 | 70 | 25,550 | 6.9E-07 | NA | NA | 0% |
| Manganese | 1700 | 1.32E+09 | NA | 1 | 150 | 25 | 8 | 70 | 25,550 | 2.2E-08 | NA | NA | 0% |
| Thallium | 50 | 1.32E+09 | NA | 1 | 150 | 25 | 8 | 70 | 25,550 | 6.4E-10 | NA | NA | 0% |
| Vanadium | 97 | 1.32E+09 | NA | 1 | 150 | 25 | 8 | 70 | 25,550 | 1.2E-09 | NA | NA | 0% |
| Tetrachloroethene | 2.7 | 1.32E+09 | 2.55E+03 | 1 | 150 | 25 | 8 | 70 | 25,550 | 3.4E-11 | 2.10E-02 | 7.2E-13 | 0% |

Excess Lifetime Cancer Risk = 3.7E-10

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Appendix H-5.7
Surface Soil
Hot Spot 1
Current/Future
Trespasser/Recreational

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------------|
| Scenario Timeframe: | Current/Future |
| Receptor Population: | Trespasser/Recreational |
| Receptor: | Teen/Adolescent |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|------------------------|---------------------|----------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| Soil | Surface Soil | Hot Spot #1 | Arsenic | 5.E-07 | 2.E-07 | 1.E-10 | | | 7.E-07 | 6.E-03 | 3.E-03 | NA | | | 9.E-03 |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 7.E-02 | 6.E-02 | NA | | | 1.E-01 |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 8.E-02 | 6.E-02 | 3.E-03 | | | 1.E-01 |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 7.E-01 | 5.E-01 | NA | | | 1.E+00 |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 9.E-02 | 7.E-02 | NA | | | 2.E-01 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Tetrachloroethene | 2.E-07 | 1.E-07 | 7.E-08 | | | 4.E-07 | 3.E-04 | 1.E-04 | 2.E-03 | | | 2.E-03 |
| | | | Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Trichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Xylenes | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chemical Total | 7.E-07 | 4.E-07 | 7.E-08 | 0.E+00 | 0.E+00 | 1.E-06 | 9.E-01 | 7.E-01 | 5.E-03 | 0.E+00 | 0.E+00 | 2.E+00 |
| | | | Exposure Point Total | | | | | | 1.E-06 | | | | | | 2.E+00 |
| | | | Exposure Medium Total | | | | | | 1.E-06 | | | | | | 2.E+00 |
| Soil Total | | | | | | | | | 1.E-06 | | | | | | 2.E+00 |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1,2-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 2-Chlorophenol | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 4-Methyl-2-pentanone | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Ethylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Isopropylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Methylcyclohexane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| Methylene chloride | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Naphthalene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Tetrachloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Trichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Xylenes (Total) | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 |
| | | | Exposure Point Total | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Exposure Medium Total | | | | | | 0.E+00 | | | | | | 0.E+00 |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1,2-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2,4-Trichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 2-Chlorophenol | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 4-Methyl-2-pentanone | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bromodichloromethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Ethylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------------|
| Scenario Timeframe: | Current/Future |
| Receptor Population: | Trespasser/Recreational |
| Receptor: | Teen/Adolescent |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | |
|--------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | |
| | | | Iron | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Isopropylbenzene | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Manganese | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Methylcyclohexane | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Methylene chloride | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Naphthalene | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Tetrachloroethene | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Toluene | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Trichloroethene | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Vinyl chloride | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Xylenes (Total) | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 |
| | | | Exposure Point Total | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Exposure Medium Total | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Groundwater Total | | | | | | | | | | | | 0.E+00 | 0.E+00 |

Total Risk Across All Media = 1.E-06

Total Hazard Across All Media = 2

**Current/Future Teen/Adolescent Trespasser-Recreational Scenario
 Estimation of Noncancer Hazard from Incidental Ingestion
 Surface Soil - Hot Spot 1**

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.9 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 1.8E-06 | 3.0E-04 | 5.9E-03 | 1% |
| Iron | 54500 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 5.1E-02 | 7.0E-01 | 7.3E-02 | 8% |
| Manganese | 1700 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 1.6E-03 | 2.0E-02 | 8.0E-02 | 9% |
| Thallium | 50 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 4.7E-05 | 7.0E-05 | 6.7E-01 | 73% |
| Vanadium | 97 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 9.1E-05 | 1.0E-03 | 9.1E-02 | 10% |
| Tetrachloroethene | 2.7 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 2.5E-06 | 1.0E-02 | 2.5E-04 | 0% |

Hazard Index = 9.2E-01

Notes:

(1): Soil EPCs (see Appendix H-3)

**Current/Future Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Noncancer Hazard from Dermal Contact
Surface Soil - Hot Spot 1**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | RfD _{dermal-adj} Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk |
|-------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------|------------------------------------|
| Arsenic | 1.9 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 8.1E-07 | 9.5E-01 | 2.9E-04 | 2.9E-03 | 0% |
| Iron | 54500 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 7.8E-03 | 2.0E-01 | 1.4E-01 | 5.6E-02 | 8% |
| Manganese | 1700 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 2.4E-04 | 2.0E-01 | 4.0E-03 | 6.1E-02 | 9% |
| Thallium | 50 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 7.1E-06 | 2.0E-01 | 1.4E-05 | 5.1E-01 | 73% |
| Vanadium | 97 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 1.4E-05 | 2.0E-01 | 2.0E-04 | 6.9E-02 | 10% |
| Tetrachloroethene | 2.7 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 1.2E-06 | 8.0E-01 | 8.0E-03 | 1.4E-04 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 7.0E-01

**Current/Future Teen/Adolescent Trespasser-Recreational Scenario
 Estimation of Noncancer Hazard from Inhalation Exposure
 Surface Soil - Hot Spot 1**

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m^3/kg)
- VF = volatilization factor (m^3/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m^3/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m^3/kg) | VF Volatilization Factor ⁽³⁾ (m^3/kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m^3/hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.9 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 5.5E-11 | NA | NA | 0% |
| Iron | 54500 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 1.6E-06 | NA | NA | 0% |
| Manganese | 1700 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 4.9E-08 | 1.43E-05 | 3.4E-03 | 62% |
| Thallium | 50 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 1.4E-09 | NA | NA | 0% |
| Vanadium | 97 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 2.8E-09 | NA | NA | 0% |
| Tetrachloroethene | 2.7 | NA | 2.55E+03 | 0.52 | 144 | 12 | 4 | 42 | 4380 | 2.1E-05 | 1.00E-02 | 2.1E-03 | 38% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
- (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

| |
|-------------------------------|
| Hazard Index = 5.5E-03 |
|-------------------------------|

**Current/Future Teen/Adolescent Trespasser-Recreational Scenario
 Estimation of Cancer Risk from Incidental Ingestion
 Surface Soil - Hot Spot 1**

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.9 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 3.1E-07 | 1.5E+00 | 4.6E-07 | 66% |
| Iron | 54500 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 8.8E-03 | NA | NA | 0% |
| Manganese | 1700 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 2.7E-04 | NA | NA | 0% |
| Thallium | 50 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 8.1E-06 | NA | NA | 0% |
| Vanadium | 97 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 1.6E-05 | NA | NA | 0% |
| Tetrachloroethene | 2.7 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 4.3E-07 | 5.4E-01 | 2.3E-07 | 34% |

Excess Lifetime Cancer Risk = 6.9E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

Current/Future Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Cancer Risk from Dermal Contact
Surface Soil - Hot Spot 1

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.9 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 1.4E-07 | 9.5E-01 | 1.6E+00 | 2.2E-07 | 62% |
| Iron | 54500 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 1.3E-03 | 2.0E-01 | NA | NA | 0% |
| Manganese | 1700 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 4.2E-05 | 2.0E-01 | NA | NA | 0% |
| Thallium | 50 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 1.2E-06 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 97 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 2.4E-06 | 2.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 2.7 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 2.0E-07 | 8.0E-01 | 6.8E-01 | 1.3E-07 | 38% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004

(3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or
 U.S. EPA Region 4 RAGS Supplement, online

"NA" = Not applicable

Excess Lifetime Cancer Risk = 3.5E-07

Current/Future Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Cancer Risk from Inhalation Exposure
Surface Soil - Hot Spot 1

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m^3/kg)

VF = volatilization factor (m^3/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m^3/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m^3/kg) | VF Volatilization Factor ⁽³⁾ (m^3/kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m^3/hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | CSF_{inh} Cancer Slope Factor ($\text{mg}/(\text{kg}/\text{day}))^{-1}$) | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.9 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 9.4E-12 | 1.51E+01 | 1.4E-10 | 0% |
| Iron | 54500 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 2.7E-07 | NA | NA | 0% |
| Manganese | 1700 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 8.4E-09 | NA | NA | 0% |
| Thallium | 50 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 2.5E-10 | NA | NA | 0% |
| Vanadium | 97 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 4.8E-10 | NA | NA | 0% |
| Tetrachloroethene | 2.7 | NA | 2.55E+03 | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 3.5E-06 | 2.10E-02 | 7.4E-08 | 100% |

Excess Lifetime Cancer Risk = 7.5E-08

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

| Parameter | CS (mg/kg) | 0-2 Years Child Mult. (1/day) | 2-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | CSF (mg/kg*day) ⁻¹ | CSF adjustment factor | | | | ED | | | | EP | Risk | | | | Total Risk | |
|--------------------|---------------|-------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------|-----------------------|-----|------|-------|-----|-----|------|-------|----|------|-----|----------|-------|------------|------------------------|
| | | | | | | | 0-2 | 2-6 | 6-15 | 15-30 | 0-2 | 2-6 | 6-15 | 15-30 | | 0-2 | 2-6 | 6-15 | 15-30 | | |
| 1,2-Dichloroethane | 0.00 | | | 2.90E-06 | | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | NA | NA | 0.00E+00 | NA | 0.00E+00 | Dermal Risk |
| 1,2-Dichloroethane | 0.00 | | | 1.01E-06 | | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | NA | NA | 0.00E+00 | NA | 0.00E+00 | Ingestion risk |
| 1,2-Dichloroethane | 0.00 | | | 5.40E-06 | | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | NA | NA | 0.00E+00 | NA | 0.00E+00 | inhalation risk |

Appendix H-5.8
Surface Soil
Hot Spot 1
Future Industrial Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|-----------------------|---------------------|----------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| Soil | Surface Soil | Hot Spot #1 | Arsenic | 5.E-07 | 2.E-07 | 6.E-10 | | | 7.E-07 | 3.E-03 | 1.E-03 | NA | | | 4.E-03 |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 4.E-02 | 3.E-02 | NA | | | 6.E-02 |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 4.E-02 | 3.E-02 | 1.E-02 | | | 8.E-02 |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 3.E-01 | 2.E-01 | NA | | | 6.E-01 |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 5.E-02 | 3.E-02 | NA | | | 8.E-02 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Tetrachloroethene | 3.E-07 | 1.E-07 | 6.E-07 | | | 1.E-06 | 1.E-04 | 7.E-05 | 8.E-03 | | | 8.E-03 |
| | | | Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Trichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Xylenes | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chemical Total | 8.E-07 | 3.E-07 | 6.E-07 | 0.E+00 | 0.E+00 | 2.E-06 | 5.E-01 | 3.E-01 | 2.E-02 | 0.E+00 | 0.E+00 | 8.E-01 |
| | | | Exposure Point Total | | | | | | 2.E-06 | | | | | | 8.E-01 |
| | | | Exposure Medium Total | | | | | | 2.E-06 | | | | | | 8.E-01 |
| Soil Total | | | | | | | | | 2.E-06 | | | | | | 8.E-01 |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 |
| | | | 1,1,2-Trichloroethane | | | | | 2.E-08 | 2.E-08 | | | | | 3.E-04 | 3.E-04 |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | 3.E-02 | 3.E-02 |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | 4.E-04 | 4.E-04 |
| | | | 1,2-Dichloroethane | | | | | 2.E-05 | 2.E-05 | | | | | 7.E-04 | 7.E-04 |
| | | | 1,4-Dichlorobenzene | | | | | 8.E-08 | 8.E-08 | | | | | 4.E-05 | 4.E-05 |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | 2.E-04 | 2.E-04 |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | 1.E-05 | 1.E-05 |
| | | | Benzene | | | | | 6.E-07 | 6.E-07 | | | | | 7.E-03 | 7.E-03 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | NA | 0.E+00 | | | | | 0.E+00 | 0.E+00 |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | 4.E-03 | 4.E-03 |
| | | | Chloroethane | | | | | 3.E-07 | 3.E-07 | | | | | 1.E-03 | 1.E-03 |
| | | | Chloroform | | | | | 5.E-07 | 5.E-07 | | | | | 1.E-03 | 1.E-03 |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 |
| | | | Iron | | | | | NA | 0.E+00 | | | | | 0.E+00 | 0.E+00 |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 |
| | | | Manganese | | | | | NA | 0.E+00 | | | | | 0.E+00 | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | | 4.E-06 | 4.E-06 |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 |
| | | | Methylene chloride | | | | | 7.E-08 | 7.E-08 | | | | | 4.E-04 | 4.E-04 |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | 5.E-04 | 5.E-04 |
| | | | Tetrachloroethene | | | | | 1.E-05 | 1.E-05 | | | | | 2.E-01 | 2.E-01 |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 |
| | | | Trichloroethene | | | | | 1.E-04 | 1.E-04 | | | | | 9.E-02 | 9.E-02 |
| | | | Vinyl chloride | | | | | 3.E-06 | 3.E-06 | | | | | 2.E-02 | 2.E-02 |
| Xylenes (Total) | | | | | NA | 0.E+00 | | | | | 2.E-01 | 2.E-01 | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 2.E-04 | 2.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E-01 | 6.E-01 |
| | | | Exposure Point Total | | | | | | 2.E-04 | | | | | | 6.E-01 |
| | | | Exposure Medium Total | | | | | | 2.E-04 | | | | | | 6.E-01 |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 |
| | | | 1,1,2-Trichloroethane | 2.E-06 | 2.E-06 | | | | 5.E-06 | 3.E-02 | 3.E-02 | | | | 6.E-02 |
| | | | 1,1-Dichloroethane | NA | NA | | | | 0.E+00 | 2.E-02 | 2.E-02 | | | | 4.E-02 |
| | | | 1,1-Dichloroethene | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 |
| | | | 1,2,4-Trichlorobenzene | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 |
| | | | 1,2-Dichlorobenzene | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | 1.E-03 | 1.E-03 | | | | 3.E-03 | NA | NA | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | 4.E-06 | 4.E-06 | | | | 7.E-06 | 1.E-02 | 1.E-02 | | | | 3.E-02 |
| | | | 2-Chlorophenol | NA | NA | | | | 0.E+00 | 5.E-02 | 5.E-02 | | | | 1.E-01 |
| | | | 4-Methyl-2-pentanone | NA | NA | | | | 0.E+00 | 9.E-02 | 9.E-02 | | | | 2.E-01 |
| | | | Benzene | 2.E-05 | 2.E-05 | | | | 3.E-05 | 2.E-01 | 2.E-01 | | | | 4.E-01 |
| | | | Bis(2-ethylhexyl)phthalate | 3.E-07 | 3.E-07 | | | | 6.E-07 | 3.E-03 | 3.E-03 | | | | 6.E-03 |
| | | | Bromodichloromethane | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 |
| | | | Chlorobenzene | NA | NA | | | | 0.E+00 | 7.E-02 | 7.E-02 | | | | 1.E-01 |
| | | | Chloroethane | 2.E-06 | 2.E-06 | | | | 4.E-06 | 5.E-03 | 5.E-03 | | | | 9.E-03 |
| | | | Chloroform | 1.E-06 | 1.E-06 | | | | 3.E-06 | 4.E-02 | 4.E-02 | | | | 7.E-02 |
| | | | cis-1,2-Dichloroethene | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 3.E+00 |
| | | | Ethylbenzene | NA | NA | | | | 0.E+00 | 2.E-01 | 2.E-01 | | | | 4.E-01 |
| | | | Iron | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 |
| | | | Isopropylbenzene | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 3.E-01 |
| | | | Manganese | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 6.E-01 |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|-------------------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Methyl tert butyl ether | 6.E-07 | 6.E-07 | | | | 1.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 1.E-05 | 1.E-05 | | | | 2.E-05 | 7.E-02 | 7.E-02 | | | | 1.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 4.E-03 | 4.E-03 | | | | 9.E-03 |
| | | | Tetrachloroethene | 2.E-03 | 2.E-03 | | | | 4.E-03 | 9.E-01 | 9.E-01 | | | | 2.E+00 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 6.E-01 | 6.E-01 | | | | 1.E+00 |
| | | | Trichloroethene | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+01 | 3.E+01 | | | | 5.E+01 |
| | | | Vinyl chloride | 3.E-04 | 3.E-04 | | | | 6.E-04 | 4.E-01 | 4.E-01 | | | | 8.E-01 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 |
| | | | Chemical Total | 5.E-03 | 5.E-03 | 0.E+00 | 0.E+00 | 0.E+00 | 9.E-03 | 3.E+01 | 3.E+01 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E+01 |
| | | | Exposure Point Total | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Exposure Medium Total | | | | | | 9.E-03 | | | | | | 6.E+01 |
| Groundwater Total | | | | | | | | | 9.E-03 | | | | | | 6.E+01 |

Total Risk Across All Media = 9.E-03

Total Hazard Across All Media = 63

Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Surface Soil - Hot Spot 1

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.9 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 9.3E-07 | 3.0E-04 | 3.1E-03 | 1% |
| Iron | 54500 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.7E-02 | 7.0E-01 | 3.8E-02 | 8% |
| Manganese | 1700 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 8.3E-04 | 2.0E-02 | 4.2E-02 | 9% |
| Thallium | 50 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.4E-05 | 7.0E-05 | 3.5E-01 | 73% |
| Vanadium | 97 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 4.7E-05 | 1.0E-03 | 4.7E-02 | 10% |
| Tetrachloroethene | 2.7 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.3E-06 | 1.0E-02 | 1.3E-04 | 0% |

Hazard Index = 4.8E-01

Notes:

(1): Soil EPCs (see Appendix H-3)

**Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Dermal Contact
Surface Soil - Hot Spot 1**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | RfD _{dermal-adj} Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient (%) | Percent Distribution of Risk |
|-------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------|------------------------------------|
| Arsenic | 1.9 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 3.7E-07 | 9.5E-01 | 2.9E-04 | 1.3E-03 | 0% |
| Iron | 54500 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 3.5E-03 | 2.0E-01 | 1.4E-01 | 2.5E-02 | 8% |
| Manganese | 1700 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.1E-04 | 2.0E-01 | 4.0E-03 | 2.7E-02 | 9% |
| Thallium | 50 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 3.2E-06 | 2.0E-01 | 1.4E-05 | 2.3E-01 | 73% |
| Vanadium | 97 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 6.2E-06 | 2.0E-01 | 2.0E-04 | 3.1E-02 | 10% |
| Tetrachloroethene | 2.7 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 5.2E-07 | 8.0E-01 | 8.0E-03 | 6.5E-05 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 3.2E-01

Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Surface Soil - Hot Spot 1

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.9 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 2.2E-10 | NA | NA | 0% |
| Iron | 54500 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 6.3E-06 | NA | NA | 0% |
| Manganese | 1700 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 2.0E-07 | 1.43E-05 | 1.4E-02 | 62% |
| Thallium | 50 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 5.8E-09 | NA | NA | 0% |
| Vanadium | 97 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 1.1E-08 | NA | NA | 0% |
| Tetrachloroethene | 2.7 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 8.3E-05 | 1.00E-02 | 8.3E-03 | 38% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

| | |
|-----------------------|----------------|
| Hazard Index = | 2.2E-02 |
|-----------------------|----------------|

Future Industrial Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Surface Soil - Hot Spot 1

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.9 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 3.3E-07 | 1.5E+00 | 5.0E-07 | 66% |
| Iron | 54500 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 9.5E-03 | NA | NA | 0% |
| Manganese | 1700 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 3.0E-04 | NA | NA | 0% |
| Thallium | 50 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 8.7E-06 | NA | NA | 0% |
| Vanadium | 97 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.7E-05 | NA | NA | 0% |
| Tetrachloroethene | 2.7 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 4.7E-07 | 5.4E-01 | 2.5E-07 | 34% |

Excess Lifetime Cancer Risk = 7.5E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

Future Industrial Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Surface Soil - Hot Spot 1

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | $SF_{dermal-adj}$ Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.9 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.3E-07 | 9.5E-01 | 1.6E+00 | 2.1E-07 | 62% |
| Iron | 54500 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.3E-03 | 2.0E-01 | NA | NA | 0% |
| Manganese | 1700 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 3.9E-05 | 2.0E-01 | NA | NA | 0% |
| Thallium | 50 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.2E-06 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 97 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.2E-06 | 2.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 2.7 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.9E-07 | 8.0E-01 | 6.8E-01 | 1.3E-07 | 38% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004

(3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or
 U.S. EPA Region 4 RAGS Supplement, online

"NA" = Not applicable

Excess Lifetime Cancer Risk = 3.3E-07

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Surface Soil - Hot Spot 1**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.9 | 1.32E+09 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 4.0E-11 | 1.51E+01 | 6.1E-10 | 0% |
| Iron | 54500 | 1.32E+09 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 1.2E-06 | NA | NA | 0% |
| Manganese | 1700 | 1.32E+09 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.6E-08 | NA | NA | 0% |
| Thallium | 50 | 1.32E+09 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 1.1E-09 | NA | NA | 0% |
| Vanadium | 97 | 1.32E+09 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.0E-09 | NA | NA | 0% |
| Tetrachloroethene | 2.7 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.0E-05 | 2.10E-02 | 6.2E-07 | 100% |

Excess Lifetime Cancer Risk = 6.2E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Appendix H-5.9
Surface Soil
Hot Spot 1
Future Resident

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | |
|-----------------------|---------------------|----------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | |
| Soil | Surface Soil | Hot Spot #1 | Arsenic | 4.E-06 | 4.E-07 | 4.E-09 | | 5.E-06 | 8.E-02 | 7.E-03 | NA | | | | 9.E-02 | |
| | | | Iron | NA | NA | NA | | 0.E+00 | 1.E+00 | 1.E-01 | NA | | | | 1.E+00 | |
| | | | Manganese | NA | NA | NA | | 0.E+00 | 1.E+00 | 2.E-01 | 5.E-02 | | | | 1.E+00 | |
| | | | Thallium | NA | NA | NA | | 0.E+00 | 9.E+00 | 1.E+00 | NA | | | | | 1.E+01 |
| | | | Vanadium | NA | NA | NA | | 0.E+00 | 1.E+00 | 2.E-01 | NA | | | | | 1.E+00 |
| | | | 1,2-Dichloroethane | | | | | 0.E+00 | | | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | 0.E+00 | | | | | | | | 0.E+00 |
| | | | Benzene | | | | | 0.E+00 | | | | | | | | 0.E+00 |
| | | | Chloroform | | | | | 0.E+00 | | | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | 0.E+00 | | | | | | | | 0.E+00 |
| | | | Tetrachloroethene | 2.E-06 | 3.E-07 | 2.E-06 | | 5.E-06 | 3.E-03 | 4.E-04 | 3.E-02 | | | | | 3.E-02 |
| | | | Toluene | | | | | 0.E+00 | | | | | | | | 0.E+00 |
| | | | Trichloroethene | | | | | 0.E+00 | | | | | | | | 0.E+00 |
| | | | Vinyl chloride | | | | | 0.E+00 | | | | | | | | 0.E+00 |
| | | | Xylenes | | | | | 0.E+00 | | | | | | | | 0.E+00 |
| | | | Chemical Total | 7.E-06 | 7.E-07 | 2.E-06 | 0.E+00 | 0.E+00 | 1.E-05 | 1.E+01 | 2.E+00 | 7.E-02 | 0.E+00 | 0.E+00 | 1.E+01 | |
| | | | Exposure Point Total | | | | | | 1.E-05 | | | | | | 1.E+01 | |
| | | | Exposure Medium Total | | | | | | 1.E-05 | | | | | | 1.E+01 | |
| Soil Total | | | | | | | | | 1.E-05 | | | | | | 1.E+01 | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 6.E-03 | 6.E-03 | |
| | | | 1,1,2-Trichloroethane | | | | | 4.E-08 | 4.E-08 | | | | | 4.E-04 | 4.E-04 | |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | | 3.E-03 | 3.E-03 |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | | 5.E-02 | 5.E-02 |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | | 5.E-04 | 5.E-04 |
| | | | 1,2-Dichloroethane | | | | | 3.E-05 | 3.E-05 | | | | | | 1.E-03 | 1.E-03 |
| | | | 1,4-Dichlorobenzene | | | | | 1.E-07 | 1.E-07 | | | | | | 6.E-05 | 6.E-05 |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | | 3.E-04 | 3.E-04 |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | | 2.E-05 | 2.E-05 |
| | | | Benzene | | | | | 1.E-06 | 1.E-06 | | | | | | 1.E-02 | 1.E-02 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | NA | 0.E+00 | | | | | | | 0.E+00 |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | | 6.E-03 | 6.E-03 |
| | | | Chloroethane | | | | | 5.E-07 | 5.E-07 | | | | | | 1.E-03 | 1.E-03 |
| | | | Chloroform | | | | | 9.E-07 | 9.E-07 | | | | | | 2.E-03 | 2.E-03 |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | | 2.E-02 | 2.E-02 |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | | 8.E-03 | 8.E-03 |
| | | | Iron | | | | | NA | 0.E+00 | | | | | | | 0.E+00 |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | | | 2.E-02 | 2.E-02 |
| | | | Manganese | | | | | NA | 0.E+00 | | | | | | | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | | | 6.E-06 | 6.E-06 |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | | 1.E-02 | 1.E-02 |
| | | | Methylene chloride | | | | | 1.E-07 | 1.E-07 | | | | | | 5.E-04 | 5.E-04 |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | | 7.E-04 | 7.E-04 |
| | | | Tetrachloroethene | | | | | 2.E-05 | 2.E-05 | | | | | | 2.E-01 | 2.E-01 |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | | 3.E-03 | 3.E-03 |
| | | | Trichloroethene | | | | | 2.E-04 | 2.E-04 | | | | | | 1.E-01 | 1.E-01 |
| | | | Vinyl chloride | | | | | 5.E-06 | 5.E-06 | | | | | | 2.E-02 | 2.E-02 |
| Xylenes (Total) | | | | | NA | 0.E+00 | | | | | | 3.E-01 | 3.E-01 | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-04 | 3.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 8.E-01 | 8.E-01 | |
| | | | Exposure Point Total | | | | | 3.E-04 | | | | | | | 8.E-01 | |
| | | | Exposure Medium Total | | | | | 3.E-04 | | | | | | | 8.E-01 | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | NA | 0.E+00 | 4.E-01 | 4.E-01 | | | | 8.E-01 | |
| | | | 1,1,2-Trichloroethane | 4.E-06 | 4.E-06 | | | NA | 7.E-06 | 1.E-01 | 1.E-01 | | | | 2.E-01 | |
| | | | 1,1-Dichloroethane | NA | NA | | | NA | 0.E+00 | 7.E-02 | 7.E-02 | | | | 1.E-01 | |
| | | | 1,1-Dichloroethene | NA | NA | | | NA | 0.E+00 | 4.E-01 | 4.E-01 | | | | 7.E-01 | |
| | | | 1,2,4-Trichlorobenzene | 0.E+00 | 0.E+00 | | | NA | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 | |
| | | | 1,2-Dichlorobenzene | NA | NA | | | NA | 0.E+00 | 6.E-02 | 6.E-02 | | | | 1.E-01 | |
| | | | 1,2-Dichloroethane | 1.E-02 | 1.E-02 | | | NA | 2.E-02 | NA | NA | | | | 0.E+00 | |
| | | | 1,4-Dichlorobenzene | 6.E-06 | 6.E-06 | | | NA | 1.E-05 | 9.E-02 | 9.E-02 | | | | 2.E-01 | |
| | | | 2-Chlorophenol | NA | NA | | | NA | 0.E+00 | 2.E-01 | 2.E-01 | | | | 3.E-01 | |
| | | | 4-Methyl-2-pentanone | NA | NA | | | NA | 0.E+00 | 3.E-01 | 3.E-01 | | | | 6.E-01 | |
| | | | Benzene | 3.E-05 | 3.E-05 | | | NA | 5.E-05 | 1.E+00 | 1.E+00 | | | | 3.E+00 | |
| | | | Bis(2-ethylhexyl)phthalate | 5.E-07 | 5.E-07 | | | NA | 1.E-06 | 1.E-02 | 1.E-02 | | | | 2.E-02 | |
| | | | Bromodichloromethane | 0.E+00 | 0.E+00 | | | NA | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 | |
| | | | Chlorobenzene | NA | NA | | | NA | 0.E+00 | 5.E-01 | 5.E-01 | | | | 1.E+00 | |
| | | | Chloroethane | 3.E-04 | 3.E-04 | | | NA | 7.E-04 | 3.E-02 | 3.E-02 | | | | 6.E-02 | |
| | | | Chloroform | 2.E-06 | 2.E-06 | | | NA | 4.E-06 | 2.E-01 | 2.E-01 | | | | 5.E-01 | |
| | | | cis-1,2-Dichloroethene | NA | NA | | | NA | 0.E+00 | 9.E+00 | 9.E+00 | | | | 2.E+01 | |
| | | | Ethylbenzene | NA | NA | | | NA | 0.E+00 | 1.E+00 | 1.E+00 | | | | 2.E+00 | |
| | | | Iron | NA | NA | | | NA | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 | |
| | | | Isopropylbenzene | NA | NA | | | NA | 0.E+00 | 9.E-01 | 9.E-01 | | | | 2.E+00 | |
| | | | Manganese | NA | NA | | | NA | 0.E+00 | 1.E+00 | 1.E+00 | | | | 2.E+00 | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|-------------------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Methyl tert butyl ether | 1.E-06 | 1.E-06 | | | | 2.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 9.E-05 | 9.E-05 | | | | 2.E-04 | 4.E-01 | 4.E-01 | | | | 9.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 1.E-02 | 1.E-02 | | | | 3.E-02 |
| | | | Tetrachloroethene | 3.E-03 | 3.E-03 | | | | 6.E-03 | 6.E+00 | 6.E+00 | | | | 1.E+01 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 4.E+00 | 4.E+00 | | | | 8.E+00 |
| | | | Trichloroethene | 2.E-03 | 2.E-03 | | | | 3.E-03 | 2.E+02 | 2.E+02 | | | | 3.E+02 |
| | | | Vinyl chloride | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+00 | 3.E+00 | | | | 5.E+00 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 2.E+00 | 2.E+00 | | | | 4.E+00 |
| | | | Chemical Total | 2.E-02 | 2.E-02 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-02 | 2.E+02 | 2.E+02 | 0.E+00 | 0.E+00 | 0.E+00 | 4.E+02 |
| | | | Exposure Point Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| | | | Exposure Medium Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| Groundwater Total | | | | | | | | | 3.E-02 | | | | | | 4.E+02 |

Total Risk Across All Media = 3.E-02

Total Hazard Across All Media = 409

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Surface Soil - Hot Spot 1

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.9 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 2.4E-05 | 3.0E-04 | 8.1E-02 | 1% |
| Iron | 54500 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 7.0E-01 | 7.0E-01 | 1.0E+00 | 8% |
| Manganese | 1700 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 2.2E-02 | 2.0E-02 | 1.1E+00 | 9% |
| Thallium | 50 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 6.4E-04 | 7.0E-05 | 9.1E+00 | 73% |
| Vanadium | 97 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 1.2E-03 | 1.0E-03 | 1.2E+00 | 10% |
| Tetrachloroethene | 2.7 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 3.5E-05 | 1.0E-02 | 3.5E-03 | 0% |

Hazard Index = 1.3E+01

Notes:

(1): Soil EPCs (see Appendix H-3)

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Dermal Contact
Surface Soil - Hot Spot 1

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (years) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | $RfD_{dermal-adj}$ Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------|-----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.9 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 2.0E-06 | 9.5E-01 | 2.9E-04 | 7.2E-03 | 0% |
| Iron | 54500 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 2.0E-02 | 2.0E-01 | 1.4E-01 | 1.4E-01 | 8% |
| Manganese | 1700 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 6.1E-04 | 2.0E-01 | 4.0E-03 | 1.5E-01 | 9% |
| Thallium | 50 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.8E-05 | 2.0E-01 | 1.4E-05 | 1.3E+00 | 73% |
| Vanadium | 97 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 3.5E-05 | 2.0E-01 | 2.0E-04 | 1.7E-01 | 10% |
| Tetrachloroethene | 2.7 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 2.9E-06 | 8.0E-01 | 8.0E-03 | 3.6E-04 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 1.8E+00

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Surface Soil - Hot Spot 1

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = [(C_s / \text{PEF}) + (C_s / \text{VF})] * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_n$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient (mg/kg-day) | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|-----------------------------------|-------------------------------------------|
| Arsenic | 1.9 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 7.4E-10 | NA | NA | 0% |
| Iron | 54500 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.1E-05 | NA | NA | 0% |
| Manganese | 1700 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 6.6E-07 | 1.43E-05 | 4.6E-02 | 62% |
| Thallium | 50 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.0E-08 | NA | NA | 0% |
| Vanadium | 97 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 3.8E-08 | NA | NA | 0% |
| Tetrachloroethene | 2.7 | NA | 2.55E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.8E-04 | 1.00E-02 | 2.8E-02 | 38% |

Hazard Index = 7.5E-02

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Incidental Ingestion
Surface Soil - Hot Spot 1

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Age Adgusted Soil Ingestion Factor (mg-year/kg-day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | C_1 Conv. Factor (mass) (kg/mg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------|-----------------------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.9 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 3.0E-06 | 1.5E+00 | 4.5E-06 | 66% |
| Iron | 54500 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 8.5E-02 | NA | NA | 0% |
| Manganese | 9089 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 1.4E-02 | NA | NA | 0% |
| Thallium | 44 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 6.8E-05 | NA | NA | 0% |
| Vanadium | 152 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 2.4E-04 | NA | NA | 0% |
| Tetrachloroethene | 2.7 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 4.2E-06 | 5.4E-01 | 2.3E-06 | 34% |

Excess Lifetime Cancer Risk = 6.7E-06

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Dermal Contact
Surface Soil - Hot Spot 1

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SFS Age-Adjusted Dermal Factor (mg-year/kg-event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|--------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.9 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 2.8E-07 | 9.5E-01 | 1.6E+00 | 4.4E-07 | 62% |
| Iron | 54500 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 2.7E-03 | 2.0E-01 | NA | NA | 0% |
| Manganese | 1700 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 8.4E-05 | 2.0E-01 | NA | NA | 0% |
| Thallium | 50 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 2.5E-06 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 97 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 4.8E-06 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 2.7 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 4.0E-07 | 8.0E-01 | 6.8E-01 | 2.7E-07 | 38% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or

| | |
|--------------------------------------|----------------|
| Excess Lifetime Cancer Risk = | 7.1E-07 |
|--------------------------------------|----------------|

Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Inhalation Exposure
Surface Soil - Hot Spot 1

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = [(C_s / \text{PEF}) + (C_s / \text{VF})] * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_c$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | CSF_{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.9 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 2.6E-10 | 1.51E+01 | 4.0E-09 | 0% |
| Iron | 54500 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 7.5E-06 | NA | NA | 0% |
| Manganese | 1700 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 2.3E-07 | NA | NA | 0% |
| Thallium | 50 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 6.9E-09 | NA | NA | 0% |
| Vanadium | 97 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.3E-08 | NA | NA | 0% |
| Tetrachloroethene | 2.7 | NA | 2.55E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 9.9E-05 | 2.10E-02 | 2.1E-06 | 100% |

Excess Lifetime Cancer Risk = 2.1E-06

- Notes:
- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
 - (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

Appendix H-5.10
Surface Soil
Hot Spot 2
Current O&M Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|------------|
| Scenario Timeframe: | Current |
| Receptor Population: | O&M Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|-----------------------|---------------------|----------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| Soil | Surface Soil | Hot Spot #2 | Arsenic | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Thallium | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Vanadium | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Tetrachloroethene | 5.E-08 | 2.E-08 | 2.E-13 | | | 7.E-08 | 2.E-05 | 1.E-05 | 1.E-03 | | | 2.E-03 |
| | | | Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Trichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Xylenes | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chemical Total | 5.E-08 | 2.E-08 | 2.E-13 | 0.E+00 | 0.E+00 | 7.E-08 | 2.E-05 | 1.E-05 | 1.E-03 | 0.E+00 | 0.E+00 | 2.E-03 |
| | | | Exposure Point Total | | | | | | 7.E-08 | | | | | | 2.E-03 |
| | | | Exposure Medium Total | | | | | | 7.E-08 | | | | | | 2.E-03 |
| | | | Soil Total | | | | | | 7.E-08 | | | | | | 2.E-03 |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 3.E-03 | 3.E-03 |
| | | | 1,1,2-Trichloroethane | | | | | 1.E-08 | 1.E-08 | | | | | 2.E-04 | 2.E-04 |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | 1.E-03 | 1.E-03 |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | 2.E-02 | 2.E-02 |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | 2.E-04 | 2.E-04 |
| | | | 1,2-Dichloroethane | | | | | 1.E-05 | 1.E-05 | | | | | 4.E-04 | 4.E-04 |
| | | | 1,4-Dichlorobenzene | | | | | 5.E-08 | 5.E-08 | | | | | 3.E-05 | 3.E-05 |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | 1.E-04 | 1.E-04 |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | 9.E-06 | 9.E-06 |
| | | | Benzene | | | | | 3.E-07 | 3.E-07 | | | | | 4.E-03 | 4.E-03 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | NA | 0.E+00 | | | | | | 0.E+00 |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 |
| | | | Chloroethane | | | | | 2.E-07 | 2.E-07 | | | | | 6.E-04 | 6.E-04 |
| | | | Chloroform | | | | | 3.E-07 | 3.E-07 | | | | | 8.E-04 | 8.E-04 |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | 7.E-03 | 7.E-03 |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | 3.E-03 | 3.E-03 |
| | | | Iron | | | | | NA | 0.E+00 | | | | | | 0.E+00 |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | | 9.E-03 | 9.E-03 |
| | | | Manganese | | | | | NA | 0.E+00 | | | | | | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | | 3.E-06 | 3.E-06 |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | 6.E-03 | 6.E-03 |
| | | | Methylene chloride | | | | | 4.E-08 | 4.E-08 | | | | | 2.E-04 | 2.E-04 |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | 3.E-04 | 3.E-04 |
| | | | Tetrachloroethene | | | | | 8.E-06 | 8.E-06 | | | | | 1.E-01 | 1.E-01 |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | 1.E-03 | 1.E-03 |
| | | | Trichloroethene | | | | | 7.E-05 | 7.E-05 | | | | | 5.E-02 | 5.E-02 |
| | | | Vinyl chloride | | | | | 2.E-06 | 2.E-06 | | | | | 1.E-02 | 1.E-02 |
| Xylenes (Total) | | | | | NA | 0.E+00 | | | | | 1.E-01 | 1.E-01 | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 9.E-05 | 9.E-05 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-01 | 3.E-01 |
| | | | Exposure Point Total | | | | | | 9.E-05 | | | | | 3.E-01 | |
| | | | Exposure Medium Total | | | | | | 9.E-05 | | | | | 3.E-01 | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1,2-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2,4-Trichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 2-Chlorophenol | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 4-Methyl-2-pentanone | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bromodichloromethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|------------|
| Scenario Timeframe: | Current |
| Receptor Population: | O&M Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | cis-1,2-Dichloroethene | | | | | | | | | | | | |
| | | | Ethylbenzene | | | | | | | | | | | | |
| | | | Iron | | | | | | | | | | | | |
| | | | Isopropylbenzene | | | | | | | | | | | | |
| | | | Manganese | | | | | | | | | | | | |
| | | | Methyl tert butyl ether | | | | | | | | | | | | |
| | | | Methylcyclohexane | | | | | | | | | | | | |
| | | | Methylene chloride | | | | | | | | | | | | |
| | | | Naphthalene | | | | | | | | | | | | |
| | | | Tetrachloroethene | | | | | | | | | | | | |
| | | | Toluene | | | | | | | | | | | | |
| | | | Trichloroethene | | | | | | | | | | | | |
| | | | Vinyl chloride | | | | | | | | | | | | |
| | | | Xylenes (Total) | | | | | | | | | | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 |
| | | | Exposure Point Total | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Exposure Medium Total | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Groundwater Total | | | | | | 9.E-05 | | | | | | 3.E-01 |

Total Risk Across All Media = **9.E-05**

Total Hazard Across All Media = **0.3**

Current O&M Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Surface Soil - Hot Spot 2

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient (mg/kg-day) | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------|------------------------------------------|---------------------------------------------------------|
| Tetrachloroethene | 0.80 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 9125 | 2.3E-07 | 1.0E-02 | 2.3E-05 | 100% |

Hazard Index = 2.3E-05

Notes:

(1): Soil EPCs (see Appendix H-3)

Current O&M Worker Scenario
Estimation of Noncancer Hazard from Dermal Contact
Surface Soil - Hot Spot 2

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | RfD _{dermal-adj} Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|-------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------|-------------------------------------------|
| Tetrachloroethene | 0.80 | 3,300 | 0.2 | 0.03 | 150 | 25 | 1 | 1.0E-06 | 70 | 9125 | 9.3E-08 | 8.0E-01 | 8.0E-03 | 1.2E-05 | 100% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 1.2E-05

Current O&M Worker Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Surface Soil - Hot Spot 2

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient (1.5E-03) | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|---------------------------------|-------------------------------------------|
| Tetrachloroethene | 0.80 | NA | 2.55E+03 | 1 | 150 | 25 | 8 | 70 | 9125 | 1.5E-05 | 1.00E-02 | 1.5E-03 | 100% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Hazard Index = 1.5E-03

**Current O&M Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Surface Soil - Hot Spot 2**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Tetrachloroethene | 0.80 | 50 | 1 | 150 | 25 | 1.0E-06 | 70 | 25,550 | 8.4E-08 | 5.4E-01 | 4.5E-08 | 100% |

Excess Lifetime Cancer Risk = 4.5E-08

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

Current O&M Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Surface Soil - Hot Spot 2

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Tetrachloroethene | 0.80 | 3,300 | 0.2 | 0.03 | 150 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 3.3E-08 | 8.0E-01 | 6.8E-01 | 2.2E-08 | 100% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
 - (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or
 U.S. EPA Region 4 RAGS Supplement, online
- "NA" = Not applicable

Excess Lifetime Cancer Risk = 2.2E-08

Current O&M Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Surface Soil - Hot Spot 2

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * \text{IR}_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * \text{IR}_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$\text{IR}_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $\text{IR}_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | $\text{ADD}_{\text{inhal}}$ Average Daily Dose (mg/kg-day) | CSF_{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|----------------------------------------------------------|------------------------------|--------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Tetrachloroethene | 0.80 | 1.32E+09 | 2.55E+03 | 1 | 150 | 25 | 8 | 70 | 25,550 | 1.0E-11 | 2.10E-02 | 2.1E-13 | 100% |

Excess Lifetime Cancer Risk = 2.1E-13

- Notes:
 (1): Soil EPCs (see Appendix H-3)
 (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
 (3): U.S. EPA Region 9 PRG Tables (online)
 "NA" = Not applicable

Appendix H-5.11

Surface Soil

Hot Spot 2

Current/Future

Trespasser/Recreational

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------------|
| Scenario Timeframe: | Current/Future |
| Receptor Population: | Trespasser/Recreational |
| Receptor: | Teen/Adolescent |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|-----------------------|---------------------|----------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| Soil | Surface Soil | Hot Spot #2 | Arsenic | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Thallium | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Vanadium | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Tetrachloroethene | 7.E-08 | 6.E-08 | 2.E-08 | | | 2.E-07 | 8.E-05 | 4.E-05 | 6.E-04 | | | 7.E-04 |
| | | | Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Trichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 |
| Xylenes | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chemical Total | 7.E-08 | 6.E-08 | 2.E-08 | 0.E+00 | 0.E+00 | 2.E-07 | 8.E-05 | 4.E-05 | 6.E-04 | 0.E+00 | 0.E+00 | 7.E-04 |
| | | | Exposure Point Total | | | | | | 2.E-07 | | | | | | 7.E-04 |
| | | | Exposure Medium Total | | | | | | 2.E-07 | | | | | | 7.E-04 |
| Soil Total | | | | | | | | | 2.E-07 | | | | | | 7.E-04 |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1,2-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 2-Chlorophenol | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 4-Methyl-2-pentanone | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Ethylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Isopropylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Methylcyclohexane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Methylene chloride | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Naphthalene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| Tetrachloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Trichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Xylenes (Total) | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | |
| | | | Exposure Point Total | | | | | | 0.E+00 | | | | | 0.E+00 | |
| | | | Exposure Medium Total | | | | | | 0.E+00 | | | | | 0.E+00 | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1,2-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2,4-Trichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 2-Chlorophenol | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 4-Methyl-2-pentanone | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bromodichloromethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------------|
| Scenario Timeframe: | Current/Future |
| Receptor Population: | Trespasser/Recreational |
| Receptor: | Teen/Adolescent |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | |
|--------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | |
| | | | Ethylbenzene | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Iron | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Isopropylbenzene | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Manganese | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Methylcyclohexane | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Methylene chloride | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Naphthalene | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Tetrachloroethene | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Toluene | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Trichloroethene | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Vinyl chloride | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Xylenes (Total) | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | |
| | | | Exposure Point Total | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Exposure Medium Total | | | | | | | | | | | | 0.E+00 | 0.E+00 |
| | | | Groundwater Total | | | | | | | | | | | | 0.E+00 | 0.E+00 |

Total Risk Across All Media = 2.E-07

Total Hazard Across All Media = 0.000731

**Current/Future Teen/Adolescent Trespasser-Recreational Scenario
 Estimation of Noncancer Hazard from Incidental Ingestion
 Surface Soil - Hot Spot 2**

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient (7.5E-05) | Percent Distribution of Risk (%) (100%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|---------------------------------|-----------------------------------------------------|
| Tetrachloroethene | 0.80 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 7.5E-07 | 1.0E-02 | 7.5E-05 | 100% |

Hazard Index = 7.5E-05

Notes:
 (1): Soil EPCs (see Appendix H-3)

**Current/Future Teen/Adolescent Trespasser-Recreational Scenario
 Estimation of Noncancer Hazard from Dermal Contact
 Surface Soil - Hot Spot 2**

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | RfD _{dermal-adj} Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient (4.3E-05) | Percent Distribution of Risk (%) |
|-------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------|-------------------------------------------|
| Tetrachloroethene | 0.80 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 3.4E-07 | 8.0E-01 | 8.0E-03 | 4.3E-05 | 100% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 4.3E-05

**Current/Future Teen/Adolescent Trespasser-Recreational Scenario
 Estimation of Noncancer Hazard from Inhalation Exposure
 Surface Soil - Hot Spot 2**

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient (6.1E-04) | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|---------------------------------|-------------------------------------------|
| Tetrachloroethene | 0.80 | NA | 2.55E+03 | 0.52 | 144 | 12 | 4 | 42 | 4380 | 6.1E-06 | 1.00E-02 | 6.1E-04 | 100% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Hazard Index = 6.1E-04

**Current/Future Teen/Adolescent Trespasser-Recreational Scenario
 Estimation of Cancer Risk from Incidental Ingestion
 Surface Soil - Hot Spot 2**

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Tetrachloroethene | 0.80 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 1.3E-07 | 5.4E-01 | 7.0E-08 | 100% |

Excess Lifetime Cancer Risk = 7.0E-08

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Current/Future Teen/Adolescent Trespasser-Recreational Scenario
 Estimation of Cancer Risk from Dermal Contact
 Surface Soil - Hot Spot 2**

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Tetrachloroethene | 0.80 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 5.9E-08 | 8.0E-01 | 6.8E-01 | 4.0E-08 | 100% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
 - (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or
 U.S. EPA Region 4 RAGS Supplement, online
- "NA" = Not applicable

Excess Lifetime Cancer Risk = 4.0E-08

Current/Future Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Cancer Risk from Inhalation Exposure
Surface Soil - Hot Spot 2

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * \text{IR}_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * \text{IR}_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$\text{IR}_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $\text{IR}_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | $\text{ADD}_{\text{inhal}}$ Average Daily Dose (mg/kg-day) | CSF_{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|----------------------------------------------------------|------------------------------|--------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Tetrachloroethene | 0.80 | NA | 2.55E+03 | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 1.1E-06 | 2.10E-02 | 2.2E-08 | 100% |

Excess Lifetime Cancer Risk = 2.2E-08

Notes:
 (1): Soil EPCs (see Appendix H-3)
 (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
 (3): U.S. EPA Region 9 PRG Tables (online)
 "NA" = Not applicable

| Parameter | CS (mg/kg) | 0-2 Years Child Mult. (1/day) | 2-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | CSF (mg/kg*day) ⁻¹ | CSF adjustment factor | | | | ED | | | | EP | Risk | | | | Total Risk | |
|--------------------|---------------|-------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------|-----------------------|-----|------|-------|-----|-----|------|-------|----|------|-----|----------|-------|---------------|------------------------|
| | | | | | | | 0-2 | 2-6 | 6-15 | 15-30 | 0-2 | 2-6 | 6-15 | 15-30 | | 0-2 | 2-6 | 6-15 | 15-30 | | |
| 1,2-Dichloroethane | 0.00 | | | 2.90E-06 | | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | NA | NA | 0.00E+00 | NA | 0.00E+00 | Dermal Risk |
| 1,2-Dichloroethane | 0.00 | | | 1.01E-06 | | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | NA | NA | 0.00E+00 | NA | 0.00E+00 | Ingestion risk |
| 1,2-Dichloroethane | 0.00 | | | 5.40E-06 | | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | NA | NA | 0.00E+00 | NA | 0.00E+00 | inhalation risk |

4 8
4 8
4,5 9
4,5 9
5,5 11
5,5 11
7 13
7 13
8 16
8 16

8.6 0.52 6-15
0.15 0-2
0.26 2-6

Appendix H-5.12
Surface Soil
Hot Spot 2
Future Industrial Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|-----------------------|---------------------|----------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| Soil | Surface Soil | Hot Spot #2 | Arsenic | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Thallium | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Vanadium | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Tetrachloroethene | 8.E-08 | 4.E-08 | 2.E-07 | | | 3.E-07 | 4.E-05 | 2.E-05 | 2.E-03 | | | 3.E-03 |
| | | | Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Trichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Xylenes | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chemical Total | 8.E-08 | 4.E-08 | 2.E-07 | 0.E+00 | 0.E+00 | 3.E-07 | 4.E-05 | 2.E-05 | 2.E-03 | 0.E+00 | 0.E+00 | 3.E-03 |
| | | | Exposure Point Total | | | | | | 3.E-07 | | | | | | 3.E-03 |
| | | | Exposure Medium Total | | | | | | 3.E-07 | | | | | | 3.E-03 |
| | | | Soil Total | | | | | | 3.E-07 | | | | | | 3.E-03 |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 |
| | | | 1,1,2-Trichloroethane | | | | | 2.E-08 | 2.E-08 | | | | | 3.E-04 | 3.E-04 |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | 3.E-02 | 3.E-02 |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | 4.E-04 | 4.E-04 |
| | | | 1,2-Dichloroethane | | | | | 2.E-05 | 2.E-05 | | | | | 7.E-04 | 7.E-04 |
| | | | 1,4-Dichlorobenzene | | | | | 8.E-08 | 8.E-08 | | | | | 4.E-05 | 4.E-05 |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | 2.E-04 | 2.E-04 |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | 1.E-05 | 1.E-05 |
| | | | Benzene | | | | | 6.E-07 | 6.E-07 | | | | | 7.E-03 | 7.E-03 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | 4.E-03 | 4.E-03 |
| | | | Chloroethane | | | | | 3.E-07 | 3.E-07 | | | | | 1.E-03 | 1.E-03 |
| | | | Chloroform | | | | | 5.E-07 | 5.E-07 | | | | | 1.E-03 | 1.E-03 |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | | 4.E-06 | 4.E-06 |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 |
| | | | Methylene chloride | | | | | 7.E-08 | 7.E-08 | | | | | 4.E-04 | 4.E-04 |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | 5.E-04 | 5.E-04 |
| | | | Tetrachloroethene | | | | | 1.E-05 | 1.E-05 | | | | | 2.E-01 | 2.E-01 |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 |
| | | | Trichloroethene | | | | | 1.E-04 | 1.E-04 | | | | | 9.E-02 | 9.E-02 |
| | | | Vinyl chloride | | | | | 3.E-06 | 3.E-06 | | | | | 2.E-02 | 2.E-02 |
| Xylenes (Total) | | | | | NA | 0.E+00 | | | | | 2.E-01 | 2.E-01 | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 2.E-04 | 2.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E-01 | 6.E-01 |
| | | | Exposure Point Total | | | | | | 2.E-04 | | | | | 6.E-01 | |
| | | | Exposure Medium Total | | | | | | 2.E-04 | | | | | 6.E-01 | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | 2.E-01 | |
| | | | 1,1,2-Trichloroethane | 2.E-06 | 2.E-06 | | | | 5.E-06 | 3.E-02 | 3.E-02 | | | 6.E-02 | |
| | | | 1,1-Dichloroethane | NA | NA | | | | 0.E+00 | 2.E-02 | 2.E-02 | | | 4.E-02 | |
| | | | 1,1-Dichloroethene | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | 2.E-01 | |
| | | | 1,2,4-Trichlorobenzene | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | 0.E+00 | |
| | | | 1,2-Dichlorobenzene | NA | NA | | | | 0.E+00 | NA | NA | | | 0.E+00 | |
| | | | 1,2-Dichloroethane | 1.E-03 | 1.E-03 | | | | 3.E-03 | NA | NA | | | 0.E+00 | |
| | | | 1,4-Dichlorobenzene | 4.E-06 | 4.E-06 | | | | 7.E-06 | 1.E-02 | 1.E-02 | | | 3.E-02 | |
| | | | 2-Chlorophenol | NA | NA | | | | 0.E+00 | 5.E-02 | 5.E-02 | | | 1.E-01 | |
| | | | 4-Methyl-2-pentanone | NA | NA | | | | 0.E+00 | 9.E-02 | 9.E-02 | | | 2.E-01 | |
| | | | Benzene | 2.E-05 | 2.E-05 | | | | 3.E-05 | 2.E-01 | 2.E-01 | | | 4.E-01 | |
| | | | Bis(2-ethylhexyl)phthalate | 3.E-07 | 3.E-07 | | | | 6.E-07 | 3.E-03 | 3.E-03 | | | 6.E-03 | |
| | | | Bromodichloromethane | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | 0.E+00 | |
| | | | Chlorobenzene | NA | NA | | | | 0.E+00 | 7.E-02 | 7.E-02 | | | 1.E-01 | |
| | | | Chloroethane | 2.E-06 | 2.E-06 | | | | 4.E-06 | 5.E-03 | 5.E-03 | | | 9.E-03 | |
| | | | Chloroform | 1.E-06 | 1.E-06 | | | | 3.E-06 | 4.E-02 | 4.E-02 | | | 7.E-02 | |
| | | | cis-1,2-Dichloroethene | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | 3.E+00 | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|------------------------------|---------------|---------------|-------------------------------|------------------------|-----------------------|----------------------------------|---------------|---------------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Ethylbenzene | NA | NA | | | | 0.E+00 | 2.E-01 | 2.E-01 | | | | 4.E-01 |
| | | | Iron | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 |
| | | | Isopropylbenzene | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 3.E-01 |
| | | | Manganese | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 6.E-01 |
| | | | Methyl tert butyl ether | 6.E-07 | 6.E-07 | | | | 1.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 1.E-05 | 1.E-05 | | | | 2.E-05 | 7.E-02 | 7.E-02 | | | | 1.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 4.E-03 | 4.E-03 | | | | 9.E-03 |
| | | | Tetrachloroethene | 2.E-03 | 2.E-03 | | | | 4.E-03 | 9.E-01 | 9.E-01 | | | | 2.E+00 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 6.E-01 | 6.E-01 | | | | 1.E+00 |
| | | | Trichloroethene | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+01 | 3.E+01 | | | | 5.E+01 |
| | | | Vinyl chloride | 3.E-04 | 3.E-04 | | | | 6.E-04 | 4.E-01 | 4.E-01 | | | | 8.E-01 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 |
| | | | Chemical Total | 5.E-03 | 5.E-03 | 0.E+00 | 0.E+00 | 0.E+00 | 9.E-03 | 3.E+01 | 3.E+01 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E+01 |
| | | | Exposure Point Total | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Exposure Medium Total | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Groundwater Total | | | | | | 9.E-03 | | | | | | 6.E+01 |

Total Risk Across All Media = 9.E-03

Total Hazard Across All Media = 62

Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Surface Soil - Hot Spot 2

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient (mg/kg-day) | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------|------------------------------------------|---------------------------------------------------------|
| Tetrachloroethene | 0.800 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 3.9E-07 | 1.0E-02 | 3.9E-05 | 100% |

Hazard Index = 3.9E-05

Notes:

(1): Soil EPCs (see Appendix H-3)

**Future Industrial Worker Scenario
 Estimation of Noncancer Hazard from Dermal Contact
 Surface Soil - Hot Spot 2**

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | $RfD_{dermal-adj}$ Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient 1.9E-05 | Percent Distribution of Risk 100% |
|-------------------|-----------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------|-------------------------------|--------------------------------------------|
| Tetrachloroethene | 0.800 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.5E-07 | 8.0E-01 | 8.0E-03 | 1.9E-05 | 100% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 1.9E-05

Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Surface Soil - Hot Spot 2

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient (2.5E-03) | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|---------------------------------|-------------------------------------------|
| Tetrachloroethene | 0.800 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 2.5E-05 | 1.00E-02 | 2.5E-03 | 100% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Hazard Index = 2.5E-03

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Surface Soil - Hot Spot 2**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------|----------------------------------------------------|
| Tetrachloroethene | 0.800 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.4E-07 | 5.4E-01 | 7.5E-08 | 100% |

Excess Lifetime Cancer Risk = 7.5E-08

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Surface Soil - Hot Spot 2**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Tetrachloroethene | 0.800 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 5.5E-08 | 8.0E-01 | 6.8E-01 | 3.7E-08 | 100% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
 - (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or
U.S. EPA Region 4 RAGS Supplement, online
- "NA" = Not applicable

Excess Lifetime Cancer Risk = 3.7E-08

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Surface Soil - Hot Spot 2**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * \text{IR}_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * \text{IR}_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $\text{IR}_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $\text{IR}_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | $\text{ADD}_{\text{inhal}}$ Average Daily Dose (mg/kg-day) | CSF_{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|----------------------------------------------------------|------------------------------|--------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Tetrachloroethene | 0.800 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 8.8E-06 | 2.10E-02 | 1.8E-07 | 100% |

Excess Lifetime Cancer Risk = 1.8E-07

- Notes:
- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
 - (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

Appendix H-5.13
Surface Soil
Hot Spot 2
Future Resident

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|-----------------------|---------------------|----------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| Soil | Surface Soil | Hot Spot #2 | Arsenic | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Thallium | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Vanadium | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Tetrachloroethene | 7.E-07 | 8.E-08 | 6.E-07 | | | 1.E-06 | 1.E-03 | 1.E-04 | 8.E-03 | | | 9.E-03 |
| | | | Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Trichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 |
| Xylenes | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chemical Total | 7.E-07 | 8.E-08 | 6.E-07 | 0.E+00 | 0.E+00 | 1.E-06 | 1.E-03 | 1.E-04 | 8.E-03 | 0.E+00 | 0.E+00 | 9.E-03 |
| | | | Exposure Point Total | | | | | | 1.E-06 | | | | | | 9.E-03 |
| | | | Exposure Medium Total | | | | | | 1.E-06 | | | | | | 9.E-03 |
| Soil Total | | | | | | | | | 1.E-06 | | | | | | 9.E-03 |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 6.E-03 | 6.E-03 |
| | | | 1,1,2-Trichloroethane | | | | | 4.E-08 | 4.E-08 | | | | | 4.E-04 | 4.E-04 |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | 3.E-03 | 3.E-03 |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | 5.E-02 | 5.E-02 |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | 5.E-04 | 5.E-04 |
| | | | 1,2-Dichloroethane | | | | | 3.E-05 | 3.E-05 | | | | | 1.E-03 | 1.E-03 |
| | | | 1,4-Dichlorobenzene | | | | | 1.E-07 | 1.E-07 | | | | | 6.E-05 | 6.E-05 |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | 3.E-04 | 3.E-04 |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | 2.E-05 | 2.E-05 |
| | | | Benzene | | | | | 1.E-06 | 1.E-06 | | | | | 1.E-02 | 1.E-02 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | 6.E-03 | 6.E-03 |
| | | | Chloroethane | | | | | 5.E-07 | 5.E-07 | | | | | 1.E-03 | 1.E-03 |
| | | | Chloroform | | | | | 9.E-07 | 9.E-07 | | | | | 2.E-03 | 2.E-03 |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | 2.E-02 | 2.E-02 |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | 8.E-03 | 8.E-03 |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | | 2.E-02 | 2.E-02 |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | | 6.E-06 | 6.E-06 |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 |
| | | | Methylene chloride | | | | | 1.E-07 | 1.E-07 | | | | | 5.E-04 | 5.E-04 |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | 7.E-04 | 7.E-04 |
| | | | Tetrachloroethene | | | | | 2.E-05 | 2.E-05 | | | | | 2.E-01 | 2.E-01 |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | 3.E-03 | 3.E-03 |
| | | | Trichloroethene | | | | | 2.E-04 | 2.E-04 | | | | | 1.E-01 | 1.E-01 |
| | | | Vinyl chloride | | | | | 5.E-06 | 5.E-06 | | | | | 2.E-02 | 2.E-02 |
| | | | Xylenes (Total) | | | | | NA | 0.E+00 | | | | | 3.E-01 | 3.E-01 |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-04 | 3.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 8.E-01 | 8.E-01 |
| | | | Exposure Point Total | | | | | | 3.E-04 | | | | | | 8.E-01 |
| | | | Exposure Medium Total | | | | | | 3.E-04 | | | | | | 8.E-01 |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | | 0.E+00 | 4.E-01 | 4.E-01 | | | | 8.E-01 |
| | | | 1,1,2-Trichloroethane | 4.E-06 | 4.E-06 | | | | 7.E-06 | 1.E-01 | 1.E-01 | | | | 2.E-01 |
| | | | 1,1-Dichloroethane | NA | NA | | | | 0.E+00 | 7.E-02 | 7.E-02 | | | | 1.E-01 |
| | | | 1,1-Dichloroethene | NA | NA | | | | 0.E+00 | 4.E-01 | 4.E-01 | | | | 7.E-01 |
| | | | 1,2,4-Trichlorobenzene | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 |
| | | | 1,2-Dichlorobenzene | NA | NA | | | | 0.E+00 | 6.E-02 | 6.E-02 | | | | 1.E-01 |
| | | | 1,2-Dichloroethane | 1.E-02 | 1.E-02 | | | | 2.E-02 | NA | NA | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | 6.E-06 | 6.E-06 | | | | 1.E-05 | 9.E-02 | 9.E-02 | | | | 2.E-01 |
| | | | 2-Chlorophenol | NA | NA | | | | 0.E+00 | 2.E-01 | 2.E-01 | | | | 3.E-01 |
| | | | 4-Methyl-2-pentanone | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 6.E-01 |
| | | | Benzene | 3.E-05 | 3.E-05 | | | | 5.E-05 | 1.E+00 | 1.E+00 | | | | 3.E+00 |
| | | | Bis(2-ethylhexyl)phthalate | 5.E-07 | 5.E-07 | | | | 1.E-06 | 1.E-02 | 1.E-02 | | | | 2.E-02 |
| | | | Bromodichloromethane | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 |
| | | | Chlorobenzene | NA | NA | | | | 0.E+00 | 5.E-01 | 5.E-01 | | | | 1.E+00 |
| | | | Chloroethane | 3.E-04 | 3.E-04 | | | | 7.E-04 | 3.E-02 | 3.E-02 | | | | 6.E-02 |
| | | | Chloroform | 2.E-06 | 2.E-06 | | | | 4.E-06 | 2.E-01 | 2.E-01 | | | | 5.E-01 |
| | | | cis-1,2-Dichloroethene | NA | NA | | | | 0.E+00 | 9.E+00 | 9.E+00 | | | | 2.E+01 |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|------------------------------|---------------|---------------|-------------------------------|------------------------|-----------------------|----------------------------------|---------------|---------------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Ethylbenzene | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 2.E+00 |
| | | | Iron | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 |
| | | | Isopropylbenzene | NA | NA | | | | 0.E+00 | 9.E-01 | 9.E-01 | | | | 2.E+00 |
| | | | Manganese | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 2.E+00 |
| | | | Methyl tert butyl ether | 1.E-06 | 1.E-06 | | | | 2.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 9.E-05 | 9.E-05 | | | | 2.E-04 | 4.E-01 | 4.E-01 | | | | 9.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 1.E-02 | 1.E-02 | | | | 3.E-02 |
| | | | Tetrachloroethene | 3.E-03 | 3.E-03 | | | | 6.E-03 | 6.E+00 | 6.E+00 | | | | 1.E+01 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 4.E+00 | 4.E+00 | | | | 8.E+00 |
| | | | Trichloroethene | 2.E-03 | 2.E-03 | | | | 3.E-03 | 2.E+02 | 2.E+02 | | | | 3.E+02 |
| | | | Vinyl chloride | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+00 | 3.E+00 | | | | 5.E+00 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 2.E+00 | 2.E+00 | | | | 4.E+00 |
| | | | Chemical Total | 2.E-02 | 2.E-02 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-02 | 2.E+02 | 2.E+02 | 0.E+00 | 0.E+00 | 0.E+00 | 4.E+02 |
| | | | Exposure Point Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| | | | Exposure Medium Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| | | | Groundwater Total | | | | | | 3.E-02 | | | | | | 4.E+02 |

Total Risk Across All Media = 3.E-02

Total Hazard Across All Media = 395

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Surface Soil - Hot Spot 2

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient (1.0E-03) | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------|----------------------------------------|---------------------------------------------------------|
| Tetrachloroethene | 0.80 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 1.0E-05 | 1.0E-02 | 1.0E-03 | 100% |

Hazard Index = 1.0E-03

Notes:

(1): Soil EPCs (see Appendix H-3)

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Dermal Contact
Surface Soil - Hot Spot 2

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (years) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} Absorption Efficiency ⁽³⁾ (unitless) | $RfD_{dermal-adj}$ Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|-----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------|--------------------|-------------------------------------------|
| Tetrachloroethene | 0.80 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 8.6E-07 | 8.0E-01 | 8.0E-03 | 1.1E-04 | 100% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or
 U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 1.1E-04

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Surface Soil - Hot Spot 2

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = [(C_s / \text{PEF}) + (C_s / \text{VF})] * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_n$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient (8.3E-03) | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|---------------------------------|-------------------------------------------|
| Tetrachloroethene | 0.80 | NA | 2.55E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 8.3E-05 | 1.00E-02 | 8.3E-03 | 100% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Hazard Index = 8.3E-03

Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Incidental Ingestion
Surface Soil - Hot Spot 2

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Age Adgusted Soil Ingestion Factor (mg-year/kg-day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | C_1 Conv. Factor (mass) (kg/mg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------|-----------------------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Tetrachloroethene | 0.80 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 1.2E-06 | 5.4E-01 | 6.7E-07 | 100% |

Excess Lifetime Cancer Risk = 6.7E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Dermal Contact
Surface Soil - Hot Spot 2

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SFS Age-Adjusted Dermal Factor (mg-year/kg-event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|--------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Tetrachloroethene | 0.80 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 1.2E-07 | 8.0E-01 | 6.8E-01 | 8.0E-08 | 100% |

Excess Lifetime Cancer Risk = 8.0E-08

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or

**Future Adult (1-31) Resident Scenario
 Estimation of Cancer Risk from Inhalation Exposure
 Surface Soil - Hot Spot 2**

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = [(C_s / \text{PEF}) + (C_s / \text{VF})] * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_c$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | CSF_{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Tetrachloroethene | 0.80 | NA | 2.55E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 2.9E-05 | 2.10E-02 | 6.2E-07 | 100% |

Excess Lifetime Cancer Risk = 6.2E-07

- Notes:
- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
 - (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

| Parameter | CS (mg/kg) | 0-2 Years Child Mult. (1/day) | 2-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | CSF (mg/kg*day) ⁻¹ | CSF adjustment factor | | | | ED | | | | EP | Risk | | | | Total Risk | | |
|--------------------|---------------|-------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------|-----------------------|-----|------|-------|-----|-----|------|-------|----|----------|----------|----------|----------|---------------|----------|----------------|
| | | | | | | | 0-2 | 2-6 | 6-15 | 15-30 | 0-2 | 2-6 | 6-15 | 15-30 | | 0-2 | 2-6 | 6-15 | 15-30 | | | |
| 1,2-Dichloroethane | 0.00 | 3.31E-05 | 2.30E-05 | 7.06E-06 | 5.92E-06 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | Dermal Risk |
| 1,2-Dichloroethane | 0.00 | 1.74E-05 | 9.59E-06 | 2.46E-06 | 1.41E-06 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | Ingestion risk |

| Parameter | CS (mg/kg) | 0-2 Years Child Mult. (1/day) | 2-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | CSF (mg/kg*day) ⁻¹ | CSF adjustment factor | | | | ED | | | | EP | Risk | | | | Total Risk | | |
|--------------------|---------------|-------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------|-----------------------|-----|------|-------|-----|-----|------|-------|----|----------|----------|----------|----------|---------------|----------|--|
| | | | | | | | 0-2 | 2-6 | 6-15 | 15-30 | 0-2 | 2-6 | 6-15 | 15-30 | | 0-2 | 2-6 | 6-15 | 15-30 | | | |
| 1,2-Dichloroethane | 0.00 | 5.36E-05 | 5.11E-05 | 5.25E-05 | 5.79E-05 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |

4 8
4 8
4.5 9
4.5 9
5.5 11
5.5 11
7 13
7 13
8 16
8 16

8.6 0.52 6-15
0.15 0-2
0.26 2-6

Appendix H-5.14

Surface Soil

Hot Spot 3

Current/Future

Trespasser/Recreational

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Trespasser/Recreational |
| Receptor: | Teen/Adolescent |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|-----------------------|---------------------|----------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| Soil | Surface Soil | Hot Spot #3 | Arsenic | 4.E-07 | 2.E-07 | 1.E-10 | | | 6.E-07 | 6.E-03 | 3.E-03 | NA | | | 8.E-03 |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 1.E-01 | 1.E-01 | NA | | | 2.E-01 |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 1.E-01 | 8.E-02 | 4.E-03 | | | 2.E-01 |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 1.E+00 | 1.E+00 | NA | | | 2.E+00 |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 5.E-01 | 4.E-01 | NA | | | 8.E-01 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Tetrachloroethene | 2.E-07 | 1.E-07 | 8.E-08 | | | 5.E-07 | 3.E-04 | 2.E-04 | 2.E-03 | | | 3.E-03 |
| | | | Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Trichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Xylenes | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chemical Total | 7.E-07 | 3.E-07 | 8.E-08 | 0.E+00 | 0.E+00 | 1.E-06 | 2.E+00 | 2.E+00 | 7.E-03 | 0.E+00 | 0.E+00 | 4.E+00 |
| | | | Exposure Point Total | | | | | | 1.E-06 | | | | | | 4.E+00 |
| | | | Exposure Medium Total | | | | | | 1.E-06 | | | | | | 4.E+00 |
| Soil Total | | | | | | | | | 1.E-06 | | | | | | 4.E+00 |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1,2-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 2-Chlorophenol | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 4-Methyl-2-pentanone | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Ethylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Isopropylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Methylcyclohexane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| Methylene chloride | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Naphthalene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Tetrachloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Trichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Xylenes (Total) | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | |
| | | | Exposure Point Total | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Exposure Medium Total | | | | | | 0.E+00 | | | | | | 0.E+00 |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1,2-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2,4-Trichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 2-Chlorophenol | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 4-Methyl-2-pentanone | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bromodichloromethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Trespasser/Recreational |
| Receptor: | Teen/Adolescent |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | cis-1,2-Dichloroethene | | | | | | | | | | | | |
| | | | Ethylbenzene | | | | | | | | | | | | |
| | | | Iron | | | | | | | | | | | | |
| | | | Isopropylbenzene | | | | | | | | | | | | |
| | | | Manganese | | | | | | | | | | | | |
| | | | Methyl tert butyl ether | | | | | | | | | | | | |
| | | | Methylcyclohexane | | | | | | | | | | | | |
| | | | Methylene chloride | | | | | | | | | | | | |
| | | | Naphthalene | | | | | | | | | | | | |
| | | | Tetrachloroethene | | | | | | | | | | | | |
| | | | Toluene | | | | | | | | | | | | |
| | | | Trichloroethene | | | | | | | | | | | | |
| | | | Vinyl chloride | | | | | | | | | | | | |
| | | | Xylenes (Total) | | | | | | | | | | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 |
| | | | Exposure Point Total | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Exposure Medium Total | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Groundwater Total | | | | | | 0.E+00 | | | | | | 0.E+00 |

Total Risk Across All Media = 1.E-06

Total Hazard Across All Media = 4

**Future Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Surface Soil - Hot Spot 3**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.8 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 1.7E-06 | 3.0E-04 | 5.6E-03 | 0% |
| Iron | 99000 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 9.3E-02 | 7.0E-01 | 1.3E-01 | 6% |
| Manganese | 2200 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 2.1E-03 | 2.0E-02 | 1.0E-01 | 5% |
| Thallium | 99 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 9.3E-05 | 7.0E-05 | 1.3E+00 | 65% |
| Vanadium | 510 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 4.8E-04 | 1.0E-03 | 4.8E-01 | 23% |
| Tetrachloroethene | 2.8 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 4380 | 2.6E-06 | 1.0E-02 | 2.6E-04 | 0% |

Hazard Index = 2.0E+00

Notes:

(1): Soil EPCs (see Appendix H-3)

**Future Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Noncancer Hazard from Dermal Contact
Surface Soil - Hot Spot 3**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | RfD _{dermal-adj} Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk |
|-------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------|------------------------------------|
| Arsenic | 1.8 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 7.7E-07 | 9.5E-01 | 2.9E-04 | 2.7E-03 | 0% |
| Iron | 99000 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 1.4E-02 | 2.0E-01 | 1.4E-01 | 1.0E-01 | 6% |
| Manganese | 2200 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 3.1E-04 | 2.0E-01 | 4.0E-03 | 7.9E-02 | 5% |
| Thallium | 99 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 1.4E-05 | 2.0E-01 | 1.4E-05 | 1.0E+00 | 65% |
| Vanadium | 510 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 7.3E-05 | 2.0E-01 | 2.0E-04 | 3.6E-01 | 23% |
| Tetrachloroethene | 2.8 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 4380 | 1.2E-06 | 8.0E-01 | 8.0E-03 | 1.5E-04 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 1.6E+00

**Future Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Surface Soil - Hot Spot 3**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.8 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 5.2E-11 | NA | NA | 0% |
| Iron | 99000 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 2.8E-06 | NA | NA | 0% |
| Manganese | 2200 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 6.3E-08 | 1.43E-05 | 4.4E-03 | 67% |
| Thallium | 99 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 2.8E-09 | NA | NA | 0% |
| Vanadium | 510 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 4380 | 1.5E-08 | NA | NA | 0% |
| Tetrachloroethene | 2.8 | NA | 2.55E+03 | 0.52 | 144 | 12 | 4 | 42 | 4380 | 2.1E-05 | 1.00E-02 | 2.1E-03 | 33% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

| |
|-------------------------------|
| Hazard Index = 6.6E-03 |
|-------------------------------|

**Future Teen/Adolescent Trespasser-Recreational Scenario
 Estimation of Cancer Risk from Incidental Ingestion
 Surface Soil - Hot Spot 3**

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.8 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 2.9E-07 | 1.5E+00 | 4.3E-07 | 64% |
| Iron | 99000 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 1.6E-02 | NA | NA | 0% |
| Manganese | 2200 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 3.5E-04 | NA | NA | 0% |
| Thallium | 99 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 1.6E-05 | NA | NA | 0% |
| Vanadium | 510 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 8.2E-05 | NA | NA | 0% |
| Tetrachloroethene | 2.8 | 100 | 1 | 144 | 12 | 1.0E-06 | 42 | 25,550 | 4.5E-07 | 5.4E-01 | 2.4E-07 | 36% |

Excess Lifetime Cancer Risk = 6.8E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Future Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Cancer Risk from Dermal Contact
Surface Soil - Hot Spot 3**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.8 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 1.3E-07 | 9.5E-01 | 1.6E+00 | 2.1E-07 | 60% |
| Iron | 99000 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 2.4E-03 | 2.0E-01 | NA | NA | 0% |
| Manganese | 2200 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 5.4E-05 | 2.0E-01 | NA | NA | 0% |
| Thallium | 99 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 2.4E-06 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 510 | 7,605 | 0.2 | 0.01 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 1.2E-05 | 2.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 2.8 | 7,605 | 0.2 | 0.03 | 144 | 12 | 1 | 1.0E-06 | 42 | 25,550 | 2.1E-07 | 8.0E-01 | 6.8E-01 | 1.4E-07 | 40% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004

(3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or
U.S. EPA Region 4 RAGS Supplement, online

"NA" = Not applicable

Excess Lifetime Cancer Risk = 3.5E-07

**Future Teen/Adolescent Trespasser-Recreational Scenario
Estimation of Cancer Risk from Inhalation Exposure
Surface Soil - Hot Spot 3**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | CSF_{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.8 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 8.9E-12 | 1.51E+01 | 1.3E-10 | 0% |
| Iron | 99000 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 4.9E-07 | NA | NA | 0% |
| Manganese | 2200 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 1.1E-08 | NA | NA | 0% |
| Thallium | 99 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 4.9E-10 | NA | NA | 0% |
| Vanadium | 510 | 6.80E+08 | NA | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 2.5E-09 | NA | NA | 0% |
| Tetrachloroethene | 2.8 | NA | 2.55E+03 | 0.52 | 144 | 12 | 4 | 42 | 25,550 | 3.7E-06 | 2.10E-02 | 7.7E-08 | 100% |

Excess Lifetime Cancer Risk = 7.7E-08

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

| Parameter | CS (mg/kg) | 0-2 Years Child Mult. (1/day) | 2-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | CSF (mg/kg*day) ⁻¹ | CSF adjustment factor | | | | ED | | | | EP | Risk | | | | Total Risk | |
|--------------------|---------------|-------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------|-----------------------|-----|------|-------|-----|-----|------|-------|----|------|-----|----------|-------|---------------|------------------------|
| | | | | | | | 0-2 | 2-6 | 6-15 | 15-30 | 0-2 | 2-6 | 6-15 | 15-30 | | 0-2 | 2-6 | 6-15 | 15-30 | | |
| 1,2-Dichloroethane | 0.00 | | | 2.90E-06 | | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | NA | NA | 0.00E+00 | NA | 0.00E+00 | Dermal Risk |
| 1,2-Dichloroethane | 0.00 | | | 1.01E-06 | | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | NA | NA | 0.00E+00 | NA | 0.00E+00 | Ingestion risk |
| 1,2-Dichloroethane | 0.00 | | | 5.40E-06 | | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | NA | NA | 0.00E+00 | NA | 0.00E+00 | inhalation risk |

4 8
4 8
4,5 9
4,5 9
5,5 11
5,5 11
7 13
7 13
8 16
8 16

8.6 0.52 6-15
0.15 0-2
0.26 2-6

Appendix H-5.15

Surface Soil

Hot Spot 3

Future Industrial Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | | | |
|-----------------------|---------------------|----------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|--------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | | | |
| Soil | Surface Soil | Hot Spot #3 | Arsenic | 5.E-07 | 2.E-07 | 6.E-10 | | | 7.E-07 | 3.E-03 | 1.E-03 | NA | | | 4.E-03 | | | |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 7.E-02 | 5.E-02 | NA | | | 1.E-01 | | | |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 5.E-02 | 4.E-02 | 2.E-02 | | | 1.E-01 | | | |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 7.E-01 | 5.E-01 | NA | | | 1.E+00 | | | |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 2.E-01 | 2.E-01 | NA | | | 4.E-01 | | | |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Tetrachloroethene | 3.E-07 | 1.E-07 | 6.E-07 | | | 1.E-06 | 1.E-04 | 7.E-05 | 9.E-03 | | | 9.E-03 | | | |
| | | | Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Trichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Xylenes | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | | | | Chemical Total | 7.E-07 | 3.E-07 | 6.E-07 | 0.E+00 | 0.E+00 | 2.E-06 | 1.E+00 | 7.E-01 | 3.E-02 | 0.E+00 | 0.E+00 | 2.E+00 |
| | | | | | | Exposure Point Total | | | | | | 2.E-06 | | | | | | 2.E+00 |
| | | | Exposure Medium Total | | | | | | 2.E-06 | | | | | | 2.E+00 | | | |
| Soil Total | | | | | | | | | 2.E-06 | | | | | | 2.E+00 | | | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 | | | |
| | | | 1,1,2-Trichloroethane | | | | | 2.E-08 | 2.E-08 | | | | | 3.E-04 | 3.E-04 | | | |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 | | | |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | 3.E-02 | 3.E-02 | | | |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | 4.E-04 | 4.E-04 | | | |
| | | | 1,2-Dichloroethane | | | | | 2.E-05 | 2.E-05 | | | | | 7.E-04 | 7.E-04 | | | |
| | | | 1,4-Dichlorobenzene | | | | | 8.E-08 | 8.E-08 | | | | | 4.E-05 | 4.E-05 | | | |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | 2.E-04 | 2.E-04 | | | |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | 1.E-05 | 1.E-05 | | | |
| | | | Benzene | | | | | 6.E-07 | 6.E-07 | | | | | 7.E-03 | 7.E-03 | | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chlorobenzene | | | | | | NA | 0.E+00 | | | | 4.E-03 | 4.E-03 | | | |
| | | | Chloroethane | | | | | 3.E-07 | 3.E-07 | | | | | 1.E-03 | 1.E-03 | | | |
| | | | Chloroform | | | | | 5.E-07 | 5.E-07 | | | | | 1.E-03 | 1.E-03 | | | |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 | | | |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 | | | |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Isopropylbenzene | | | | | | NA | 0.E+00 | | | | 1.E-02 | 1.E-02 | | | |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Methyl tert butyl ether | | | | | | NA | 0.E+00 | | | | 4.E-06 | 4.E-06 | | | |
| | | | Methylcyclohexane | | | | | | NA | 0.E+00 | | | | 1.E-02 | 1.E-02 | | | |
| | | | Methylene chloride | | | | | | 7.E-08 | 7.E-08 | | | | 4.E-04 | 4.E-04 | | | |
| | | | Naphthalene | | | | | | NA | 0.E+00 | | | | 5.E-04 | 5.E-04 | | | |
| | | | Tetrachloroethene | | | | | | 1.E-05 | 1.E-05 | | | | 2.E-01 | 2.E-01 | | | |
| | | | Toluene | | | | | | NA | 0.E+00 | | | | 2.E-03 | 2.E-03 | | | |
| | | | Trichloroethene | | | | | | 1.E-04 | 1.E-04 | | | | 9.E-02 | 9.E-02 | | | |
| | | | Vinyl chloride | | | | | | 3.E-06 | 3.E-06 | | | | 2.E-02 | 2.E-02 | | | |
| Xylenes (Total) | | | | | | NA | 0.E+00 | | | | 2.E-01 | 2.E-01 | | | | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 2.E-04 | 2.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E-01 | 6.E-01 | | | |
| | | | Exposure Point Total | | | | | | 2.E-04 | | | | | | 6.E-01 | | | |
| | | | Exposure Medium Total | | | | | | 2.E-04 | | | | | | 6.E-01 | | | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 | | | |
| | | | 1,1,2-Trichloroethane | 2.E-06 | 2.E-06 | | | | 5.E-06 | 3.E-02 | 3.E-02 | | | 6.E-02 | | | | |
| | | | 1,1-Dichloroethane | NA | NA | | | | 0.E+00 | 2.E-02 | 2.E-02 | | | 4.E-02 | | | | |
| | | | 1,1-Dichloroethene | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | 2.E-01 | | | | |
| | | | 1,2,4-Trichlorobenzene | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | 0.E+00 | | | | |
| | | | 1,2-Dichlorobenzene | NA | NA | | | | 0.E+00 | NA | NA | | | 0.E+00 | | | | |
| | | | 1,2-Dichloroethane | 1.E-03 | 1.E-03 | | | | 3.E-03 | NA | NA | | | 0.E+00 | | | | |
| | | | 1,4-Dichlorobenzene | 4.E-06 | 4.E-06 | | | | 7.E-06 | 1.E-02 | 1.E-02 | | | 3.E-02 | | | | |
| | | | 2-Chlorophenol | NA | NA | | | | 0.E+00 | 5.E-02 | 5.E-02 | | | 1.E-01 | | | | |
| | | | 4-Methyl-2-pentanone | NA | NA | | | | 0.E+00 | 9.E-02 | 9.E-02 | | | 2.E-01 | | | | |
| | | | Benzene | 2.E-05 | 2.E-05 | | | | 3.E-05 | 2.E-01 | 2.E-01 | | | 4.E-01 | | | | |
| | | | Bis(2-ethylhexyl)phthalate | 3.E-07 | 3.E-07 | | | | 6.E-07 | 3.E-03 | 3.E-03 | | | 6.E-03 | | | | |
| | | | Bromodichloromethane | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | 0.E+00 | | | | |
| | | | Chlorobenzene | NA | NA | | | | 0.E+00 | 7.E-02 | 7.E-02 | | | 1.E-01 | | | | |
| | | | Chloroethane | 2.E-06 | 2.E-06 | | | | 4.E-06 | 5.E-03 | 5.E-03 | | | 9.E-03 | | | | |
| | | | Chloroform | 1.E-06 | 1.E-06 | | | | 3.E-06 | 4.E-02 | 4.E-02 | | | 7.E-02 | | | | |
| | | | cis-1,2-Dichloroethene | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | 3.E+00 | | | | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|------------------------------|---------------|---------------|-------------------------------|------------------------|-----------------------|----------------------------------|---------------|---------------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Ethylbenzene | NA | NA | | | | 0.E+00 | 2.E-01 | 2.E-01 | | | | 4.E-01 |
| | | | Iron | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 |
| | | | Isopropylbenzene | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 3.E-01 |
| | | | Manganese | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 6.E-01 |
| | | | Methyl tert butyl ether | 6.E-07 | 6.E-07 | | | | 1.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 1.E-05 | 1.E-05 | | | | 2.E-05 | 7.E-02 | 7.E-02 | | | | 1.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 4.E-03 | 4.E-03 | | | | 9.E-03 |
| | | | Tetrachloroethene | 2.E-03 | 2.E-03 | | | | 4.E-03 | 9.E-01 | 9.E-01 | | | | 2.E+00 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 6.E-01 | 6.E-01 | | | | 1.E+00 |
| | | | Trichloroethene | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+01 | 3.E+01 | | | | 5.E+01 |
| | | | Vinyl chloride | 3.E-04 | 3.E-04 | | | | 6.E-04 | 4.E-01 | 4.E-01 | | | | 8.E-01 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 |
| | | | Chemical Total | 5.E-03 | 5.E-03 | 0.E+00 | 0.E+00 | 0.E+00 | 9.E-03 | 3.E+01 | 3.E+01 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E+01 |
| | | | Exposure Point Total | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Exposure Medium Total | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Groundwater Total | | | | | | 9.E-03 | | | | | | 6.E+01 |

Total Risk Across All Media = **9.E-03**

Total Hazard Across All Media = **63**

Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Surface Soil - Hot Spot 3

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.8 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 8.8E-07 | 3.0E-04 | 2.9E-03 | 0% |
| Iron | 99000 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 4.8E-02 | 7.0E-01 | 6.9E-02 | 6% |
| Manganese | 2200 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.1E-03 | 2.0E-02 | 5.4E-02 | 5% |
| Thallium | 99 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 4.8E-05 | 7.0E-05 | 6.9E-01 | 65% |
| Vanadium | 510 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.5E-04 | 1.0E-03 | 2.5E-01 | 23% |
| Tetrachloroethene | 2.8 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.4E-06 | 1.0E-02 | 1.4E-04 | 0% |

Hazard Index = 1.1E+00

Notes:

(1): Soil EPCs (see Appendix H-3)

Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Dermal Contact
Surface Soil - Hot Spot 3

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} Absorption Efficiency ⁽³⁾ (unitless) | RfD _{dermal-adj} Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk |
|-------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------|------------------------------------|
| Arsenic | 1.8 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 3.5E-07 | 9.5E-01 | 2.9E-04 | 1.2E-03 | 0% |
| Iron | 99000 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 6.4E-03 | 2.0E-01 | 1.4E-01 | 4.6E-02 | 6% |
| Manganese | 2200 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.4E-04 | 2.0E-01 | 4.0E-03 | 3.6E-02 | 5% |
| Thallium | 99 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 6.4E-06 | 2.0E-01 | 1.4E-05 | 4.6E-01 | 65% |
| Vanadium | 510 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 3.3E-05 | 2.0E-01 | 2.0E-04 | 1.6E-01 | 23% |
| Tetrachloroethene | 2.8 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 5.4E-07 | 8.0E-01 | 8.0E-03 | 6.8E-05 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 7.0E-01

Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Surface Soil - Hot Spot 3

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient (mg/kg-day) | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|-----------------------------------|-------------------------------------------|
| Arsenic | 1.8 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 2.1E-10 | NA | NA | 0% |
| Iron | 99000 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 1.1E-05 | NA | NA | 0% |
| Manganese | 2200 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 2.5E-07 | 1.43E-05 | 1.8E-02 | 67% |
| Thallium | 99 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 1.1E-08 | NA | NA | 0% |
| Vanadium | 510 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 5.9E-08 | NA | NA | 0% |
| Tetrachloroethene | 2.8 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 8.6E-05 | 1.00E-02 | 8.6E-03 | 33% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

| | |
|-----------------------|----------------|
| Hazard Index = | 2.6E-02 |
|-----------------------|----------------|

Future Industrial Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Surface Soil - Hot Spot 3

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.8 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 3.1E-07 | 1.5E+00 | 4.7E-07 | 64% |
| Iron | 99000 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.7E-02 | NA | NA | 0% |
| Manganese | 2200 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 3.8E-04 | NA | NA | 0% |
| Thallium | 99 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.7E-05 | NA | NA | 0% |
| Vanadium | 510 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 8.9E-05 | NA | NA | 0% |
| Tetrachloroethene | 2.8 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 4.9E-07 | 5.4E-01 | 2.6E-07 | 36% |

Excess Lifetime Cancer Risk = 7.4E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

Future Industrial Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Surface Soil - Hot Spot 3

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | $SF_{dermal-adj}$ Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.8 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.2E-07 | 9.5E-01 | 1.6E+00 | 2.0E-07 | 60% |
| Iron | 99000 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.3E-03 | 2.0E-01 | NA | NA | 0% |
| Manganese | 2200 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 5.1E-05 | 2.0E-01 | NA | NA | 0% |
| Thallium | 99 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.3E-06 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 510 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.2E-05 | 2.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 2.8 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.9E-07 | 8.0E-01 | 6.8E-01 | 1.3E-07 | 40% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004

(3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or

U.S. EPA Region 4 RAGS Supplement, online

"NA" = Not applicable

Excess Lifetime Cancer Risk = 3.3E-07

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Surface Soil - Hot Spot 3**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.8 | 1.32E+09 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.8E-11 | 1.51E+01 | 5.8E-10 | 0% |
| Iron | 99000 | 1.32E+09 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.1E-06 | NA | NA | 0% |
| Manganese | 2200 | 1.32E+09 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 4.7E-08 | NA | NA | 0% |
| Thallium | 99 | 1.32E+09 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.1E-09 | NA | NA | 0% |
| Vanadium | 510 | 1.32E+09 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 1.1E-08 | NA | NA | 0% |
| Tetrachloroethene | 2.8 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.1E-05 | 2.10E-02 | 6.4E-07 | 100% |

Excess Lifetime Cancer Risk = 6.5E-07

Notes:
 (1): Soil EPCs (see Appendix H-3)
 (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
 (3): U.S. EPA Region 9 PRG Tables (online)
 "NA" = Not applicable

Appendix H-5.16
Surface Soil
Hot Spot 3
Future Resident

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | | | |
|-----------------------|---------------------|----------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|--------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | | | |
| Soil | Surface Soil | Hot Spot #3 | Arsenic | 4.E-06 | 4.E-07 | 4.E-09 | | | 5.E-06 | 8.E-02 | 7.E-03 | NA | | | | 8.E-02 | | |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 2.E+00 | 3.E-01 | NA | | | | | 2.E+00 | |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 1.E+00 | 2.E-01 | 6.E-02 | | | | | 2.E+00 | |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 2.E+01 | 3.E+00 | NA | | | | | 2.E+01 | |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | | | | | | | | 0.E+00 | |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | | | 0.E+00 | |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | | | 0.E+00 | |
| | | | Benzene | | | | | | 0.E+00 | | | | | | | | 0.E+00 | |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | | | 0.E+00 | |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | | | 0.E+00 | |
| | | | Tetrachloroethene | 2.E-06 | 3.E-07 | 2.E-06 | | | 5.E-06 | 4.E-03 | 4.E-04 | 3.E-02 | | | | | 3.E-02 | |
| | | | Toluene | | | | | | 0.E+00 | | | | | | | | 0.E+00 | |
| | | | Trichloroethene | | | | | | 0.E+00 | | | | | | | | 0.E+00 | |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | | | 0.E+00 | |
| | | | Xylenes | | | | | | 0.E+00 | | | | | | | | 0.E+00 | |
| | | | | | | Chemical Total | 7.E-06 | 7.E-07 | 2.E-06 | 0.E+00 | 0.E+00 | 9.E-06 | 2.E+01 | 3.E+00 | 9.E-02 | 0.E+00 | 0.E+00 | 2.E+01 |
| | | | | | | Exposure Point Total | | | | | | 9.E-06 | | | | | | 2.E+01 |
| | | | Exposure Medium Total | | | | | | 9.E-06 | | | | | | 2.E+01 | | | |
| | | | Soil Total | | | | | | 9.E-06 | | | | | | 2.E+01 | | | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 6.E-03 | 6.E-03 | | | |
| | | | 1,1,2-Trichloroethane | | | | | 4.E-08 | 4.E-08 | | | | | 4.E-04 | 4.E-04 | | | |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | | 3.E-03 | 3.E-03 | | |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | | 5.E-02 | 5.E-02 | | |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | | 5.E-04 | 5.E-04 | | |
| | | | 1,2-Dichloroethane | | | | | 3.E-05 | 3.E-05 | | | | | | 1.E-03 | 1.E-03 | | |
| | | | 1,4-Dichlorobenzene | | | | | 1.E-07 | 1.E-07 | | | | | | 6.E-05 | 6.E-05 | | |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | | 3.E-04 | 3.E-04 | | |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | | 2.E-05 | 2.E-05 | | |
| | | | Benzene | | | | | 1.E-06 | 1.E-06 | | | | | | 1.E-02 | 1.E-02 | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | NA | 0.E+00 | | | | | | 0.E+00 | 0.E+00 | | |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | | 6.E-03 | 6.E-03 | | |
| | | | Chloroethane | | | | | 5.E-07 | 5.E-07 | | | | | | 1.E-03 | 1.E-03 | | |
| | | | Chloroform | | | | | 9.E-07 | 9.E-07 | | | | | | 2.E-03 | 2.E-03 | | |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | | 2.E-02 | 2.E-02 | | |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | | 8.E-03 | 8.E-03 | | |
| | | | Iron | | | | | NA | 0.E+00 | | | | | | 0.E+00 | 0.E+00 | | |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | | | 2.E-02 | 2.E-02 | | |
| | | | Manganese | | | | | NA | 0.E+00 | | | | | | 0.E+00 | 0.E+00 | | |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | | | 6.E-06 | 6.E-06 | | |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | | 1.E-02 | 1.E-02 | | |
| | | | Methylene chloride | | | | | 1.E-07 | 1.E-07 | | | | | | 5.E-04 | 5.E-04 | | |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | | 7.E-04 | 7.E-04 | | |
| | | | Tetrachloroethene | | | | | 2.E-05 | 2.E-05 | | | | | | 2.E-01 | 2.E-01 | | |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | | 3.E-03 | 3.E-03 | | |
| | | | Trichloroethene | | | | | 2.E-04 | 2.E-04 | | | | | | 1.E-01 | 1.E-01 | | |
| | | | Vinyl chloride | | | | | 5.E-06 | 5.E-06 | | | | | | 2.E-02 | 2.E-02 | | |
| Xylenes (Total) | | | | | NA | 0.E+00 | | | | | | 3.E-01 | 3.E-01 | | | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-04 | 3.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 8.E-01 | 8.E-01 | | | |
| | | | Exposure Point Total | | | | | | 3.E-04 | | | | | | 8.E-01 | | | |
| | | | Exposure Medium Total | | | | | | 3.E-04 | | | | | | 8.E-01 | | | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | | 0.E+00 | 4.E-01 | 4.E-01 | | | | 8.E-01 | | | |
| | | | 1,1,2-Trichloroethane | 4.E-06 | 4.E-06 | | | | 7.E-06 | 1.E-01 | 1.E-01 | | | | 2.E-01 | | | |
| | | | 1,1-Dichloroethane | NA | NA | | | | 0.E+00 | 7.E-02 | 7.E-02 | | | | 1.E-01 | | | |
| | | | 1,1-Dichloroethene | NA | NA | | | | 0.E+00 | 4.E-01 | 4.E-01 | | | | 7.E-01 | | | |
| | | | 1,2,4-Trichlorobenzene | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 | | | |
| | | | 1,2-Dichlorobenzene | NA | NA | | | | 0.E+00 | 6.E-02 | 6.E-02 | | | | 1.E-01 | | | |
| | | | 1,2-Dichloroethane | 1.E-02 | 1.E-02 | | | | 2.E-02 | NA | NA | | | | 0.E+00 | | | |
| | | | 1,4-Dichlorobenzene | 6.E-06 | 6.E-06 | | | | 1.E-05 | 9.E-02 | 9.E-02 | | | | 2.E-01 | | | |
| | | | 2-Chlorophenol | NA | NA | | | | 0.E+00 | 2.E-01 | 2.E-01 | | | | 3.E-01 | | | |
| | | | 4-Methyl-2-pentanone | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 6.E-01 | | | |
| | | | Benzene | 3.E-05 | 3.E-05 | | | | 5.E-05 | 1.E+00 | 1.E+00 | | | | 3.E+00 | | | |
| | | | Bis(2-ethylhexyl)phthalate | 5.E-07 | 5.E-07 | | | | 1.E-06 | 1.E-02 | 1.E-02 | | | | 2.E-02 | | | |
| | | | Bromodichloromethane | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 | | | |
| | | | Chlorobenzene | NA | NA | | | | 0.E+00 | 5.E-01 | 5.E-01 | | | | 1.E+00 | | | |
| | | | Chloroethane | 3.E-04 | 3.E-04 | | | | 7.E-04 | 3.E-02 | 3.E-02 | | | | 6.E-02 | | | |
| | | | Chloroform | 2.E-06 | 2.E-06 | | | | 4.E-06 | 2.E-01 | 2.E-01 | | | | 5.E-01 | | | |
| | | | cis-1,2-Dichloroethene | NA | NA | | | | 0.E+00 | 9.E+00 | 9.E+00 | | | | 2.E+01 | | | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|------------------------------|---------------|---------------|-------------------------------|------------------------|-----------------------|----------------------------------|---------------|---------------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Ethylbenzene | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 2.E+00 |
| | | | Iron | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 |
| | | | Isopropylbenzene | NA | NA | | | | 0.E+00 | 9.E-01 | 9.E-01 | | | | 2.E+00 |
| | | | Manganese | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 2.E+00 |
| | | | Methyl tert butyl ether | 1.E-06 | 1.E-06 | | | | 2.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 9.E-05 | 9.E-05 | | | | 2.E-04 | 4.E-01 | 4.E-01 | | | | 9.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 1.E-02 | 1.E-02 | | | | 3.E-02 |
| | | | Tetrachloroethene | 3.E-03 | 3.E-03 | | | | 6.E-03 | 6.E+00 | 6.E+00 | | | | 1.E+01 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 4.E+00 | 4.E+00 | | | | 8.E+00 |
| | | | Trichloroethene | 2.E-03 | 2.E-03 | | | | 3.E-03 | 2.E+02 | 2.E+02 | | | | 3.E+02 |
| | | | Vinyl chloride | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+00 | 3.E+00 | | | | 5.E+00 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 2.E+00 | 2.E+00 | | | | 4.E+00 |
| | | | Chemical Total | 2.E-02 | 2.E-02 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-02 | 2.E+02 | 2.E+02 | 0.E+00 | 0.E+00 | 0.E+00 | 4.E+02 |
| | | | Exposure Point Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| | | | Exposure Medium Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| | | | Groundwater Total | | | | | | 3.E-02 | | | | | | 4.E+02 |

Total Risk Across All Media = 3.E-02

Total Hazard Across All Media = 419

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Surface Soil - Hot Spot 3

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.8 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 2.3E-05 | 3.0E-04 | 7.7E-02 | 0% |
| Iron | 99000 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 1.3E+00 | 7.0E-01 | 1.8E+00 | 6% |
| Manganese | 2200 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 2.8E-02 | 2.0E-02 | 1.4E+00 | 5% |
| Thallium | 99 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 1.3E-03 | 7.0E-05 | 1.8E+01 | 65% |
| Vanadium | 510 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 6.5E-03 | 1.0E-03 | 6.5E+00 | 23% |
| Tetrachloroethene | 2.8 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 3.6E-05 | 1.0E-02 | 3.6E-03 | 0% |

Hazard Index = 2.8E+01

Notes:

(1): Soil EPCs (see Appendix H-3)

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Dermal Contact
Surface Soil - Hot Spot 3

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (years) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} Absorption Efficiency ⁽³⁾ (unitless) | $RfD_{dermal-adj}$ Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------|-----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.8 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.9E-06 | 9.5E-01 | 2.9E-04 | 6.8E-03 | 0% |
| Iron | 99000 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 3.5E-02 | 2.0E-01 | 1.4E-01 | 2.5E-01 | 6% |
| Manganese | 2200 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 7.9E-04 | 2.0E-01 | 4.0E-03 | 2.0E-01 | 5% |
| Thallium | 99 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 3.5E-05 | 2.0E-01 | 1.4E-05 | 2.5E+00 | 65% |
| Vanadium | 510 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.8E-04 | 2.0E-01 | 2.0E-04 | 9.1E-01 | 23% |
| Tetrachloroethene | 2.8 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 3.0E-06 | 8.0E-01 | 8.0E-03 | 3.8E-04 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 3.9E+00

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Surface Soil - Hot Spot 3

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = [(C_s / \text{PEF}) + (C_s / \text{VF})] * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_n$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient (mg/kg-day) | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|-----------------------------------|-------------------------------------------|
| Arsenic | 1.8 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 7.0E-10 | NA | NA | 0% |
| Iron | 99000 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 3.9E-05 | NA | NA | 0% |
| Manganese | 2200 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 8.6E-07 | 1.43E-05 | 6.0E-02 | 67% |
| Thallium | 99 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 3.9E-08 | NA | NA | 0% |
| Vanadium | 510 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.0E-07 | NA | NA | 0% |
| Tetrachloroethene | 2.8 | NA | 2.55E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.9E-04 | 1.00E-02 | 2.9E-02 | 33% |

Hazard Index = 8.9E-02

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Incidental Ingestion
Surface Soil - Hot Spot 3

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Age Adgusted Soil Ingestion Factor (mg-year/kg-day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | C_1 Conv. Factor (mass) (kg/mg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------|-----------------------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.8 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 2.8E-06 | 1.5E+00 | 4.2E-06 | 64% |
| Iron | 99000 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 1.5E-01 | NA | NA | 0% |
| Manganese | 2200 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 3.4E-03 | NA | NA | 0% |
| Thallium | 99 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 1.5E-04 | NA | NA | 0% |
| Vanadium | 510 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 8.0E-04 | NA | NA | 0% |
| Tetrachloroethene | 2.8 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 4.4E-06 | 5.4E-01 | 2.4E-06 | 36% |

Excess Lifetime Cancer Risk = 6.6E-06

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Dermal Contact
Surface Soil - Hot Spot 3

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SFS Age-Adjusted Dermal Factor (mg-year/kg-event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|--------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.8 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 2.7E-07 | 9.5E-01 | 1.6E+00 | 4.2E-07 | 60% |
| Iron | 99000 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 4.9E-03 | 2.0E-01 | NA | NA | 0% |
| Manganese | 2200 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 1.1E-04 | 2.0E-01 | NA | NA | 0% |
| Thallium | 99 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 4.9E-06 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 510 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 2.5E-05 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 2.8 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 4.1E-07 | 8.0E-01 | 6.8E-01 | 2.8E-07 | 40% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or

| | |
|--------------------------------------|----------------|
| Excess Lifetime Cancer Risk = | 7.0E-07 |
|--------------------------------------|----------------|

Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Inhalation Exposure
Surface Soil - Hot Spot 3

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = [(C_s / \text{PEF}) + (C_s / \text{VF})] * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_c$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|-------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.8 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 2.5E-10 | 1.51E+01 | 3.8E-09 | 0% |
| Iron | 99000 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.4E-05 | NA | NA | 0% |
| Manganese | 2200 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 3.0E-07 | NA | NA | 0% |
| Thallium | 99 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.4E-08 | NA | NA | 0% |
| Vanadium | 510 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 7.0E-08 | NA | NA | 0% |
| Tetrachloroethene | 2.8 | NA | 2.55E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.0E-04 | 2.10E-02 | 2.2E-06 | 100% |

Excess Lifetime Cancer Risk = 2.2E-06

- Notes:
- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
 - (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

| Parameter | CS (mg/kg) | 0-2 Years Child Mult. (1/day) | 2-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | CSF (mg/kg*day) ⁻¹ | CSF adjustment factor | | | | ED | | | | EP | Risk | | | | Total Risk | | | | | | |
|--------------------|---------------|-------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------|-----------------------|-----|------|-------|-----|-----|------|-------|----|----------|----------|----------|----------|---------------|----------|----------|----------|----------|-------------|----------------|
| | | | | | | | 0-2 | 2-6 | 6-15 | 15-30 | 0-2 | 2-6 | 6-15 | 15-30 | | 0-2 | 2-6 | 6-15 | 15-30 | | | | | | | |
| 1,2-Dichloroethane | 0.00 | 3.31E-05 | 2.30E-05 | 7.06E-06 | 5.92E-06 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | Dermal Risk | |
| 1,2-Dichloroethane | 0.00 | 1.74E-05 | 9.59E-06 | 2.46E-06 | 1.41E-06 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | Ingestion risk |

| Parameter | CS (mg/kg) | 0-2 Years Child Mult. (1/day) | 2-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | CSF (mg/kg*day) ⁻¹ | CSF adjustment factor | | | | ED | | | | EP | Risk | | | | Total Risk | | | | | | |
|--------------------|---------------|-------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------|-----------------------|-----|------|-------|-----|-----|------|-------|----|----------|----------|----------|----------|---------------|----------|----------|----------|----------|----------|----------|
| | | | | | | | 0-2 | 2-6 | 6-15 | 15-30 | 0-2 | 2-6 | 6-15 | 15-30 | | 0-2 | 2-6 | 6-15 | 15-30 | | | | | | | |
| 1,2-Dichloroethane | 0.00 | 5.36E-05 | 5.11E-05 | 5.25E-05 | 5.79E-05 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

4 8
4 8
4.5 9
4.5 9
5.5 11
5.5 11
7 13
7 13
8 16
8 16

8.6 0.52 6-15
0.15 0-2
0.26 2-6

Appendix H-5.17
Subsurface Soil
Excluding Hot Spots
Future Excavation Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Excavation Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | | | |
|-----------------------|---------------------|---------------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|--------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | | | |
| Soil | Subsurface Soil | Excluding Hot Spots | Arsenic | 1.E-07 | 7.E-09 | 4.E-11 | | | 1.E-07 | 2.E-02 | 1.E-03 | NA | | | | 2.E-02 | | |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 2.E-01 | 2.E-02 | NA | | | | | 2.E-01 | |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 2.E-02 | 2.E-03 | 6.E-03 | | | | | 2.E-02 | |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 2.E+00 | 2.E-01 | NA | | | | | 2.E+00 | |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 3.E+00 | 3.E-01 | NA | | | | | 3.E+00 | |
| | | | 1,2-Dichloroethane | 1.E-09 | NA | 9.E-09 | | | 1.E-08 | NA | NA | 1.E-05 | | | | | 1.E-05 | |
| | | | 1,4-Dichlorobenzene | 2.E-10 | 1.E-11 | 3.E-10 | | | 5.E-10 | 6.E-07 | 5.E-08 | 1.E-06 | | | | | 2.E-06 | |
| | | | Benzene | 1.E-10 | 1.E-13 | 5.E-10 | | | 6.E-10 | 3.E-05 | 4.E-08 | 1.E-04 | | | | | 2.E-04 | |
| | | | Chloroform | 1.E-12 | 1.E-15 | 7.E-11 | | | 8.E-11 | 7.E-07 | 9.E-10 | 5.E-06 | | | | | 5.E-06 | |
| | | | cis-1,2-Dichloroethene | NA | NA | NA | | | 0.E+00 | 9.E-06 | 1.E-08 | 1.E-04 | | | | | 1.E-04 | |
| | | | Tetrachloroethene | 7.E-09 | 5.E-10 | 3.E-09 | | | 1.E-08 | 9.E-06 | 7.E-07 | 8.E-04 | | | | | 9.E-04 | |
| | | | Toluene | NA | NA | NA | | | 0.E+00 | 2.E-05 | 1.E-06 | 2.E-04 | | | | | 2.E-04 | |
| | | | Trichloroethene | 2.E-09 | 2.E-10 | 2.E-08 | | | 2.E-08 | 1.E-03 | 1.E-04 | 3.E-04 | | | | | 2.E-03 | |
| | | | Vinyl chloride | 9.E-11 | 1.E-13 | 4.E-11 | | | 1.E-10 | 3.E-06 | 3.E-09 | 7.E-06 | | | | | 1.E-05 | |
| | | | Xylenes | NA | NA | NA | | | 0.E+00 | 2.E-04 | 2.E-05 | 7.E-03 | | | | | 7.E-03 | |
| | | | | | | Chemical Total | 1.E-07 | 8.E-09 | 3.E-08 | 0.E+00 | 0.E+00 | 2.E-07 | 5.E+00 | 5.E-01 | 1.E-02 | 0.E+00 | 0.E+00 | 5.E+00 |
| | | | | | | Exposure Point Total | | | | | | 2.E-07 | | | | | | 5.E+00 |
| | | | Exposure Medium Total | | | | | | 2.E-07 | | | | | | 5.E+00 | | | |
| | | | Soil Total | | | | | | 2.E-07 | | | | | | 5.E+00 | | | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | NA | | 0.E+00 | | | | 9.E-05 | | 9.E-05 | | | |
| | | | 1,1,2-Trichloroethane | | | | 2.E-11 | | 2.E-11 | | | | 6.E-06 | | 6.E-06 | | | |
| | | | 1,1-Dichloroethane | | | | NA | | 0.E+00 | | 0.E+00 | | 1.E-06 | | 1.E-06 | | | |
| | | | 1,1-Dichloroethene | | | | NA | | 0.E+00 | | 0.E+00 | | 7.E-04 | | 7.E-04 | | | |
| | | | 1,2-Dichlorobenzene | | | | NA | | 0.E+00 | | 0.E+00 | | 8.E-06 | | 8.E-06 | | | |
| | | | 1,2-Dichloroethane | | | | NA | | 0.E+00 | | 0.E+00 | | 2.E-05 | | 2.E-05 | | | |
| | | | 1,4-Dichlorobenzene | | | | 7.E-11 | | 7.E-11 | | 7.E-11 | | 3.E-07 | | 3.E-07 | | | |
| | | | 2-Chlorophenol | | | | NA | | 0.E+00 | | 0.E+00 | | NA | | 0.E+00 | | | |
| | | | 4-Methyl-2-pentanone | | | | NA | | 0.E+00 | | 0.E+00 | | 3.E-07 | | 3.E-07 | | | |
| | | | Benzene | | | | 5.E-10 | | 5.E-10 | | 5.E-10 | | 2.E-04 | | 2.E-04 | | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | NA | | 0.E+00 | | 0.E+00 | | NA | | 0.E+00 | | | |
| | | | Chlorobenzene | | | | NA | | 0.E+00 | | 0.E+00 | | 9.E-05 | | 9.E-05 | | | |
| | | | Chloroethane | | | | NA | | 0.E+00 | | 0.E+00 | | 5.E-06 | | 5.E-06 | | | |
| | | | Chloroform | | | | 5.E-10 | | 5.E-10 | | 5.E-10 | | 3.E-05 | | 3.E-05 | | | |
| | | | cis-1,2-Dichloroethene | | | | NA | | 0.E+00 | | 0.E+00 | | 2.E-04 | | 2.E-04 | | | |
| | | | Ethylbenzene | | | | NA | | 0.E+00 | | 0.E+00 | | 1.E-04 | | 1.E-04 | | | |
| | | | Iron | | | | NA | | 0.E+00 | | 0.E+00 | | NA | | 0.E+00 | | | |
| | | | Isopropylbenzene | | | | NA | | 0.E+00 | | 0.E+00 | | 3.E-02 | | 3.E-02 | | | |
| | | | Manganese | | | | NA | | 0.E+00 | | 0.E+00 | | NA | | 0.E+00 | | | |
| | | | Methyl tert butyl ether | | | | NA | | 0.E+00 | | 0.E+00 | | NA | | 0.E+00 | | | |
| | | | Methylcyclohexane | | | | NA | | 0.E+00 | | 0.E+00 | | NA | | 0.E+00 | | | |
| | | | Methylene chloride | | | | NA | | 0.E+00 | | 0.E+00 | | 3.E-06 | | 3.E-06 | | | |
| | | | Naphthalene | | | | NA | | 0.E+00 | | 0.E+00 | | 8.E-06 | | 8.E-06 | | | |
| | | | Tetrachloroethene | | | | 1.E-08 | | 1.E-08 | | 1.E-08 | | 4.E-03 | | 4.E-03 | | | |
| | | | Toluene | | | | NA | | 0.E+00 | | 0.E+00 | | 6.E-05 | | 6.E-05 | | | |
| | | | Trichloroethene | | | | 1.E-07 | | 1.E-07 | | 1.E-07 | | 2.E-03 | | 2.E-03 | | | |
| | | | Vinyl chloride | | | | NA | | 0.E+00 | | 0.E+00 | | 4.E-04 | | 4.E-04 | | | |
| Xylenes (Total) | | | | NA | | 0.E+00 | | 0.E+00 | | 4.E-03 | | 4.E-03 | | | | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 1.E-07 | 0.E+00 | 1.E-07 | 0.E+00 | 0.E+00 | 0.E+00 | 4.E-02 | 0.E+00 | 4.E-02 | | | |
| | | | Exposure Point Total | | | | | | 1.E-07 | | | | | | 4.E-02 | | | |
| | | | Exposure Medium Total | | | | | | 1.E-07 | | | | | | 4.E-02 | | | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,1,2-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,1-Dichloroethane | | | | | | 0.E+00 | | 0.E+00 | | | | 0.E+00 | | | |
| | | | 1,1-Dichloroethene | | | | | | 0.E+00 | | 0.E+00 | | | | 0.E+00 | | | |
| | | | 1,2,4-Trichlorobenzene | | | | | | 0.E+00 | | 0.E+00 | | | | 0.E+00 | | | |
| | | | 1,2-Dichlorobenzene | | | | | | 0.E+00 | | 0.E+00 | | | | 0.E+00 | | | |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | 0.E+00 | | | | 0.E+00 | | | |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | 0.E+00 | | | | 0.E+00 | | | |
| | | | 2-Chlorophenol | | | | | | 0.E+00 | | 0.E+00 | | | | 0.E+00 | | | |
| | | | 4-Methyl-2-pentanone | | | | | | 0.E+00 | | 0.E+00 | | | | 0.E+00 | | | |
| | | | Benzene | | | | | | 0.E+00 | | 0.E+00 | | | | 0.E+00 | | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | 0.E+00 | | | | 0.E+00 | | | |
| | | | Bromodichloromethane | | | | | | 0.E+00 | | 0.E+00 | | | | 0.E+00 | | | |
| | | | Chlorobenzene | | | | | | 0.E+00 | | 0.E+00 | | | | 0.E+00 | | | |
| | | | Chloroethane | | | | | | 0.E+00 | | 0.E+00 | | | | 0.E+00 | | | |
| | | | Chloroform | | | | | | 0.E+00 | | 0.E+00 | | | | 0.E+00 | | | |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | 0.E+00 | | | | 0.E+00 | | | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Excavation Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Ethylbenzene | | | | | | | | | | | | 0.E+00 |
| | | | Iron | | | | | | | | | | | | 0.E+00 |
| | | | Isopropylbenzene | | | | | | | | | | | | 0.E+00 |
| | | | Manganese | | | | | | | | | | | | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | | | | | | | | 0.E+00 |
| | | | Methylcyclohexane | | | | | | | | | | | | 0.E+00 |
| | | | Methylene chloride | | | | | | | | | | | | 0.E+00 |
| | | | Naphthalene | | | | | | | | | | | | 0.E+00 |
| | | | Tetrachloroethene | | | | | | | | | | | | 0.E+00 |
| | | | Toluene | | | | | | | | | | | | 0.E+00 |
| | | | Trichloroethene | | | | | | | | | | | | 0.E+00 |
| | | | Vinyl chloride | | | | | | | | | | | | 0.E+00 |
| | | | Xylenes (Total) | | | | | | | | | | | | 0.E+00 |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 |
| | | | Exposure Point Total | | | | | | | | | | | | 0.E+00 |
| | | | Exposure Medium Total | | | | | | | | | | | | 0.E+00 |
| | | | Groundwater Total | | | | | | | | | | | | 1.E-07 |

Total Risk Across All Media = 3.E-07

Total Hazard Across All Media = 5

Future Excavation Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Subsurface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Subchronic Oral RfD ⁽²⁾ (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.6 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 5.2E-06 | 3.0E-04 | 1.7E-02 | 0% |
| Iron | 36293 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.2E-01 | 7.0E-01 | 1.7E-01 | 4% |
| Manganese | 696 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 2.2E-03 | 1.4E-01 | 1.6E-02 | 0% |
| Thallium | 40 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.3E-04 | 7.0E-05 | 1.8E+00 | 40% |
| Vanadium | 5563 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.8E-02 | 7.0E-03 | 2.6E+00 | 56% |
| 1,2-Dichloroethane | 0.35 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.1E-06 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.17 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 5.5E-07 | 9.0E-01 | 6.1E-07 | 0% |
| Benzene | 0.043 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.4E-07 | 4.0E-03 | 3.5E-05 | 0% |
| Chloroform | 0.0022 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 7.1E-09 | 1.0E-02 | 7.1E-07 | 0% |
| cis-1,2-Dichloroethene | 0.27 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 8.7E-07 | 1.0E-01 | 8.7E-06 | 0% |
| Tetrachloroethene | 0.28 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 8.9E-07 | 1.0E-01 | 8.9E-06 | 0% |
| Toluene | 12 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 3.8E-05 | 2.0E+00 | 1.9E-05 | 0% |
| Trichloroethene | 0.13 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 4.1E-07 | 3.0E-04 | 1.4E-03 | 0% |
| Vinyl Chloride | 0.0026 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 8.4E-09 | 3.0E-03 | 2.8E-06 | 0% |
| Xylenes (total) | 15 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 4.8E-05 | 2.0E-01 | 2.4E-04 | 0% |

Hazard Index = 4.6E+00

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): Subchronic RfDs were not available for iron, thallium, benzene, trichloroethene, vinyl chloride or xylenes, therefore, chronic values were implemented.

CDM

**Future Excavation Worker Scenario
Estimation of Noncancer Hazard from Dermal Contact
Subsurface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | RfD _{dermal-adj} Subchronic Dermal Adj. RfD ⁽⁴⁾ (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.6 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 3.1E-07 | 9.5E-01 | 2.9E-04 | 1.1E-03 | 0% |
| Iron | 36293 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 2.3E-03 | 2.0E-01 | 1.4E-01 | 1.7E-02 | 4% |
| Manganese | 696 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 4.5E-05 | 2.0E-01 | 2.8E-02 | 1.6E-03 | 0% |
| Thallium | 40 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 2.6E-06 | 2.0E-01 | 1.4E-05 | 1.8E-01 | 40% |
| Vanadium | 5563 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 3.6E-04 | 2.0E-01 | 1.4E-03 | 2.6E-01 | 56% |
| 1,2-Dichloroethane | 0.35 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 6.9E-08 | 8.0E-01 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.17 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 3.3E-08 | 8.0E-01 | 7.2E-01 | 4.6E-08 | 0% |
| Benzene | 0.043 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 1.4E-10 | 8.0E-01 | 3.2E-03 | 4.3E-08 | 0% |
| Chloroform | 0.0022 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 7.1E-12 | 8.0E-01 | 8.0E-03 | 8.9E-10 | 0% |
| cis-1,2-Dichloroethene | 0.27 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 8.7E-10 | 8.0E-01 | 8.0E-02 | 1.1E-08 | 0% |
| Tetrachloroethene | 0.28 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 5.3E-08 | 8.0E-01 | 8.0E-02 | 6.7E-07 | 0% |
| Toluene | 12 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 2.3E-06 | 8.0E-01 | 1.6E+00 | 1.4E-06 | 0% |
| Trichloroethene | 0.13 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 2.5E-08 | 8.0E-01 | 2.4E-04 | 1.0E-04 | 0% |
| Vinyl Chloride | 0.0026 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 8.4E-12 | 8.0E-01 | 2.4E-03 | 3.5E-09 | 0% |
| Xylenes (total) | 15 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 2.9E-06 | 8.0E-01 | 1.6E-01 | 1.8E-05 | 0% |

Notes:

Hazard Index = 4.6E-01

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004

(3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or
U.S. EPA Region 4 RAGS Supplement, online

(4): Subchronic RfDs were not available for iron, thallium, benzene, trichloroethene, vinyl chloride or xylenes, therefore, chronic values were implemented.

Future Excavation Worker Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Subsurface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_n \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_n \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | RfD _i Subchronic Inhalation RfD ⁽⁴⁾ (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.6 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 1.8E-10 | NA | NA | 0% |
| Iron | 36293 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 4.2E-06 | NA | NA | 0% |
| Manganese | 696 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 8.0E-08 | 1.43E-05 | 5.6E-03 | 40% |
| Thallium | 40 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 4.6E-09 | NA | NA | 0% |
| Vanadium | 5563 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 6.4E-07 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.35 | NA | 3.91E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 7.1E-06 | 7.00E-01 | 1.0E-05 | 0% |
| 1,4-Dichlorobenzene | 0.17 | NA | 1.29E+04 | 1 | 250 | 1 | 8 | 70 | 365 | 1.0E-06 | 7.14E-01 | 1.4E-06 | 0% |
| Benzene | 0.043 | NA | 2.73E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 1.2E-06 | 8.57E-03 | 1.4E-04 | 1% |
| Chloroform | 0.0022 | NA | 2.66E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 6.5E-08 | 1.40E-02 | 4.6E-06 | 0% |
| cis-1,2-Dichloroethene | 0.27 | NA | 2.90E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 7.3E-06 | 5.71E-02 | 1.3E-04 | 1% |
| Tetrachloroethene | 0.28 | NA | 2.55E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 8.5E-06 | 1.00E-02 | 8.5E-04 | 6% |
| Toluene | 12 | NA | 3.98E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 2.3E-04 | 1.43E+00 | 1.6E-04 | 1% |
| Trichloroethene | 0.13 | NA | 3.26E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 3.0E-06 | 1.0E-02 | 3.0E-04 | 2% |
| Vinyl Chloride | 0.0026 | NA | 1.04E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 2.0E-07 | 2.9E-02 | 6.9E-06 | 0% |
| Xylenes (total) | 15 | NA | 6.10E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 1.9E-04 | 2.9E-02 | 6.6E-03 | 48% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
- (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable
- (4): A subchronic RfD was only available for 1,4-dichlorobenzene, therefore, chronic values were implemented for the remainder of the chemicals.

| |
|-------------------------------|
| Hazard Index = 1.4E-02 |
|-------------------------------|



Future Excavation Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Subsurface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.6 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 7.4E-08 | 1.5E+00 | 1.1E-07 | 91% |
| Iron | 36293 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.7E-03 | NA | NA | 0% |
| Manganese | 696 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 3.2E-05 | NA | NA | 0% |
| Thallium | 40 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.8E-06 | NA | NA | 0% |
| Vanadium | 5563 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 2.6E-04 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.35 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.6E-08 | 9.1E-02 | 1.5E-09 | 1% |
| 1,4-Dichlorobenzene | 0.17 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 7.9E-09 | 2.4E-02 | 1.9E-10 | 0% |
| Benzene | 0.043 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 2.0E-09 | 5.5E-02 | 1.1E-10 | 0% |
| Chloroform | 0.0022 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.0E-10 | 1.0E-02 | 1.0E-12 | 0% |
| cis-1,2-Dichloroethene | 0.27 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.2E-08 | NA | NA | 0% |
| Tetrachloroethene | 0.28 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.3E-08 | 5.4E-01 | 6.9E-09 | 6% |
| Toluene | 12 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 5.4E-07 | NA | NA | 0% |
| Trichloroethene | 0.13 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 5.9E-09 | 4.0E-01 | 2.3E-09 | 2% |
| Vinyl Chloride | 0.0026 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.2E-10 | 7.2E-01 | 8.6E-11 | 0% |
| Xylenes (total) | 15 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 6.8E-07 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 1.2E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Future Excavation Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Subsurface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.6 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 4.4E-09 | 9.5E-01 | 1.6E+00 | 7.0E-09 | 91% |
| Iron | 36293 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 3.3E-05 | 2.0E-01 | NA | NA | 0% |
| Manganese | 696 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 6.4E-07 | 2.0E-01 | NA | NA | 0% |
| Thallium | 40 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 3.7E-08 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 5563 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 5.1E-06 | 2.0E-01 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.35 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 9.8E-10 | 8.0E-01 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.17 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 4.7E-10 | 8.0E-01 | 3.0E-02 | 1.4E-11 | 0% |
| Benzene | 0.043 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 2.0E-12 | 8.0E-01 | 6.9E-02 | 1.4E-13 | 0% |
| Chloroform | 0.0022 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.0E-13 | 8.0E-01 | 1.3E-02 | 1.3E-15 | 0% |
| cis-1,2-Dichloroethene | 0.27 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.2E-11 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 0.28 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 7.6E-10 | 8.0E-01 | 6.8E-01 | 5.2E-10 | 7% |
| Toluene | 12 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 3.2E-08 | 8.0E-01 | NA | NA | 0% |
| Trichloroethene | 0.13 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 3.5E-10 | 8.0E-01 | 5.0E-01 | 1.8E-10 | 2% |
| Vinyl Chloride | 0.0026 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.2E-13 | 8.0E-01 | 9.0E-01 | 1.1E-13 | 0% |
| Xylenes (total) | 15 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 4.1E-08 | 8.0E-01 | NA | NA | 0% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004

(3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or

U.S. EPA Region 4 RAGS Supplement, online

"NA" = Not applicable

Excess Lifetime Cancer Risk = 7.7E-09

**Future Excavation Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Subsurface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.6 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 2.6E-12 | 1.51E+01 | 4.0E-11 | 0% |
| Iron | 36293 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 6.0E-08 | NA | NA | 0% |
| Manganese | 696 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.1E-09 | NA | NA | 0% |
| Thallium | 40 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 6.6E-11 | NA | NA | 0% |
| Vanadium | 5563 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 9.1E-09 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.35 | NA | 3.91E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.0E-07 | 9.10E-02 | 9.2E-09 | 31% |
| 1,4-Dichlorobenzene | 0.17 | NA | 1.29E+04 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.5E-08 | 2.20E-02 | 3.2E-10 | 1% |
| Benzene | 0.043 | NA | 2.73E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.8E-08 | 2.70E-02 | 4.7E-10 | 2% |
| Chloroform | 0.0022 | NA | 2.66E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 9.2E-10 | 8.10E-02 | 7.5E-11 | 0% |
| cis-1,2-Dichloroethene | 0.27 | NA | 2.90E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.0E-07 | NA | NA | 0% |
| Tetrachloroethene | 0.28 | NA | 2.55E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.2E-07 | 2.10E-02 | 2.5E-09 | 9% |
| Toluene | 12 | NA | 3.98E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 3.3E-06 | NA | NA | 0% |
| Trichloroethene | 0.13 | NA | 3.26E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 4.4E-08 | 3.85E-01 | 1.7E-08 | 57% |
| Vinyl Chloride | 0.0026 | NA | 1.04E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 2.8E-09 | 1.54E-02 | 4.3E-11 | 0% |
| Xylenes (total) | 15 | NA | 6.10E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 2.7E-06 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 2.9E-08

- Notes:
- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
 - (3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable



Appendix H-5.18
Subsurface Soil
Excluding Hot Spots
Future Industrial Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | | | |
|-----------------------|---------------------|---------------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|--------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | | | |
| Soil | Subsurface Soil | Excluding Hot Spots | Arsenic | 4.E-07 | 2.E-07 | 1.E-09 | | | 6.E-07 | 3.E-03 | 1.E-03 | NA | | | | 4.E-03 | | |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 3.E-02 | 2.E-02 | NA | | | | | 4.E-02 | |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 2.E-02 | 1.E-02 | 6.E-03 | | | | | 3.E-02 | |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 3.E-01 | 2.E-01 | NA | | | | | 5.E-01 | |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 3.E+00 | 2.E+00 | NA | | | | | 5.E+00 | |
| | | | 1,2-Dichloroethane | NA | NA | 2.E-07 | | | 2.E-07 | NA | NA | 1.E-05 | | | | | 1.E-05 | |
| | | | 1,4-Dichlorobenzene | 7.E-10 | 4.E-10 | 8.E-09 | | | 9.E-09 | 3.E-06 | 1.E-06 | 5.E-06 | | | | | 9.E-06 | |
| | | | Benzene | 4.E-10 | 3.E-12 | 1.E-08 | | | 1.E-08 | 5.E-06 | 4.E-08 | 1.E-04 | | | | | 1.E-04 | |
| | | | Chloroform | 4.E-12 | 3.E-14 | 2.E-09 | | | 2.E-09 | 1.E-07 | 9.E-10 | 5.E-06 | | | | | 5.E-06 | |
| | | | cis-1,2-Dichloroethene | NA | NA | NA | | | 0.E+00 | 1.E-05 | 1.E-07 | 1.E-04 | | | | | 1.E-04 | |
| | | | Tetrachloroethene | 3.E-08 | 1.E-08 | 6.E-08 | | | 1.E-07 | 1.E-05 | 7.E-06 | 8.E-04 | | | | | 9.E-04 | |
| | | | Toluene | NA | NA | NA | | | 0.E+00 | 7.E-05 | 4.E-05 | 2.E-04 | | | | | 3.E-04 | |
| | | | Trichloroethene | 9.E-09 | 4.E-09 | 4.E-07 | | | 4.E-07 | 2.E-04 | 1.E-04 | 3.E-04 | | | | | 6.E-04 | |
| | | | Vinyl chloride | 3.E-10 | 3.E-12 | 1.E-09 | | | 1.E-09 | 4.E-07 | 3.E-09 | 7.E-06 | | | | | 7.E-06 | |
| | | | Xylenes | NA | NA | NA | | | 0.E+00 | 4.E-05 | 2.E-05 | 7.E-03 | | | | | 7.E-03 | |
| | | | | | | Chemical Total | 5.E-07 | 2.E-07 | 7.E-07 | 0.E+00 | 0.E+00 | 1.E-06 | 3.E+00 | 2.E+00 | 1.E-02 | 0.E+00 | 0.E+00 | 5.E+00 |
| | | | | | | Exposure Point Total | | | | | | 1.E-06 | | | | | | 5.E+00 |
| | | | Exposure Medium Total | | | | | | 1.E-06 | | | | | | 5.E+00 | | | |
| Soil Total | | | | | | | | | 1.E-06 | | | | | | 5.E+00 | | | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 | | | |
| | | | 1,1,2-Trichloroethane | | | | | 2.E-08 | 2.E-08 | | | | | 3.E-04 | 3.E-04 | | | |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 | | | |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | 3.E-02 | 3.E-02 | | | |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | 4.E-04 | 4.E-04 | | | |
| | | | 1,2-Dichloroethane | | | | | 2.E-05 | 2.E-05 | | | | | 7.E-04 | 7.E-04 | | | |
| | | | 1,4-Dichlorobenzene | | | | | 8.E-08 | 8.E-08 | | | | | 4.E-05 | 4.E-05 | | | |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | 2.E-04 | 2.E-04 | | | |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | 1.E-05 | 1.E-05 | | | |
| | | | Benzene | | | | | 6.E-07 | 6.E-07 | | | | | 7.E-03 | 7.E-03 | | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chlorobenzene | | | | | | NA | 0.E+00 | | | | 4.E-03 | 4.E-03 | | | |
| | | | Chloroethane | | | | | 3.E-07 | 3.E-07 | | | | | 1.E-03 | 1.E-03 | | | |
| | | | Chloroform | | | | | 5.E-07 | 5.E-07 | | | | | 1.E-03 | 1.E-03 | | | |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 | | | |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 | | | |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Isopropylbenzene | | | | | | NA | 0.E+00 | | | | 1.E-02 | 1.E-02 | | | |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Methyl tert butyl ether | | | | | | NA | 0.E+00 | | | | 4.E-06 | 4.E-06 | | | |
| | | | Methylcyclohexane | | | | | | NA | 0.E+00 | | | | 1.E-02 | 1.E-02 | | | |
| | | | Methylene chloride | | | | | 7.E-08 | 7.E-08 | | | | | 4.E-04 | 4.E-04 | | | |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | 5.E-04 | 5.E-04 | | | |
| | | | Tetrachloroethene | | | | | 1.E-05 | 1.E-05 | | | | | 2.E-01 | 2.E-01 | | | |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 | | | |
| | | | Trichloroethene | | | | | 1.E-04 | 1.E-04 | | | | | 9.E-02 | 9.E-02 | | | |
| | | | Vinyl chloride | | | | | 3.E-06 | 3.E-06 | | | | | 2.E-02 | 2.E-02 | | | |
| Xylenes (Total) | | | | | NA | 0.E+00 | | | | | 2.E-01 | 2.E-01 | | | | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 2.E-04 | 2.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E-01 | 6.E-01 | | | |
| | | | Exposure Point Total | | | | | | 2.E-04 | | | | | | 6.E-01 | | | |
| | | | Exposure Medium Total | | | | | | 2.E-04 | | | | | | 6.E-01 | | | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 | | | |
| | | | 1,1,2-Trichloroethane | 2.E-06 | 2.E-06 | | | | 5.E-06 | 3.E-02 | 3.E-02 | | | | | 6.E-02 | | |
| | | | 1,1-Dichloroethane | NA | NA | | | | 0.E+00 | 2.E-02 | 2.E-02 | | | | | 4.E-02 | | |
| | | | 1,1-Dichloroethene | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | | 2.E-01 | | |
| | | | 1,2,4-Trichlorobenzene | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | | 0.E+00 | | |
| | | | 1,2-Dichlorobenzene | NA | NA | | | | 0.E+00 | NA | NA | | | | | 0.E+00 | | |
| | | | 1,2-Dichloroethane | 1.E-03 | 1.E-03 | | | | 3.E-03 | NA | NA | | | | | 0.E+00 | | |
| | | | 1,4-Dichlorobenzene | 4.E-06 | 4.E-06 | | | | 7.E-06 | 1.E-02 | 1.E-02 | | | | | 3.E-02 | | |
| | | | 2-Chlorophenol | NA | NA | | | | 0.E+00 | 5.E-02 | 5.E-02 | | | | | 1.E-01 | | |
| | | | 4-Methyl-2-pentanone | NA | NA | | | | 0.E+00 | 9.E-02 | 9.E-02 | | | | | 2.E-01 | | |
| | | | Benzene | 2.E-05 | 2.E-05 | | | | 3.E-05 | 2.E-01 | 2.E-01 | | | | | 4.E-01 | | |
| | | | Bis(2-ethylhexyl)phthalate | 3.E-07 | 3.E-07 | | | | 6.E-07 | 3.E-03 | 3.E-03 | | | | | 6.E-03 | | |
| | | | Bromodichloromethane | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | | 0.E+00 | | |
| | | | Chlorobenzene | NA | NA | | | | 0.E+00 | 7.E-02 | 7.E-02 | | | | | 1.E-01 | | |
| | | | Chloroethane | 2.E-06 | 2.E-06 | | | | 4.E-06 | 5.E-03 | 5.E-03 | | | | | 9.E-03 | | |
| | | | Chloroform | 1.E-06 | 1.E-06 | | | | 3.E-06 | 4.E-02 | 4.E-02 | | | | | 7.E-02 | | |
| | | | cis-1,2-Dichloroethene | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | | 3.E+00 | | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|------------------------------|---------------|---------------|-------------------------------|------------------------|-----------------------|----------------------------------|---------------|---------------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Ethylbenzene | NA | NA | | | | 0.E+00 | 2.E-01 | 2.E-01 | | | | 4.E-01 |
| | | | Iron | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 |
| | | | Isopropylbenzene | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 3.E-01 |
| | | | Manganese | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 6.E-01 |
| | | | Methyl tert butyl ether | 6.E-07 | 6.E-07 | | | | 1.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 1.E-05 | 1.E-05 | | | | 2.E-05 | 7.E-02 | 7.E-02 | | | | 1.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 4.E-03 | 4.E-03 | | | | 9.E-03 |
| | | | Tetrachloroethene | 2.E-03 | 2.E-03 | | | | 4.E-03 | 9.E-01 | 9.E-01 | | | | 2.E+00 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 6.E-01 | 6.E-01 | | | | 1.E+00 |
| | | | Trichloroethene | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+01 | 3.E+01 | | | | 5.E+01 |
| | | | Vinyl chloride | 3.E-04 | 3.E-04 | | | | 6.E-04 | 4.E-01 | 4.E-01 | | | | 8.E-01 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 |
| | | | Chemical Total | 5.E-03 | 5.E-03 | 0.E+00 | 0.E+00 | 0.E+00 | 9.E-03 | 3.E+01 | 3.E+01 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E+01 |
| | | | Exposure Point Total | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Exposure Medium Total | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Groundwater Total | | | | | | 9.E-03 | | | | | | 6.E+01 |

Total Risk Across All Media = **9.E-03**

Total Hazard Across All Media = **67**

Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Subsurface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.6 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 7.8E-07 | 3.0E-04 | 2.6E-03 | 0% |
| Iron | 36293 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.8E-02 | 7.0E-01 | 2.5E-02 | 1% |
| Manganese | 696 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 3.4E-04 | 2.0E-02 | 1.7E-02 | 1% |
| Thallium | 40 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.0E-05 | 7.0E-05 | 2.8E-01 | 9% |
| Vanadium | 5563 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.7E-03 | 1.0E-03 | 2.7E+00 | 89% |
| 1,2-Dichloroethane | 0.35 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.7E-07 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.17 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 8.4E-08 | 3.0E-02 | 2.8E-06 | 0% |
| Benzene | 0.043 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.1E-08 | 4.0E-03 | 5.3E-06 | 0% |
| Chloroform | 0.0022 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.1E-09 | 1.0E-02 | 1.1E-07 | 0% |
| cis-1,2-Dichloroethene | 0.27 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.3E-07 | 1.0E-02 | 1.3E-05 | 0% |
| Tetrachloroethene | 0.28 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.4E-07 | 1.0E-02 | 1.4E-05 | 0% |
| Toluene | 12 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 5.7E-06 | 8.0E-02 | 7.2E-05 | 0% |
| Trichloroethene | 0.13 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 6.2E-08 | 3.0E-04 | 2.1E-04 | 0% |
| Vinyl Chloride | 0.0026 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.3E-09 | 3.0E-03 | 4.2E-07 | 0% |
| Xylenes (total) | 15 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 7.2E-06 | 2.0E-01 | 3.6E-05 | 0% |

Hazard Index = 3.0E+00

Notes: **CDM**
 (1): Soil EPCs (see Appendix H-3)

Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Dermal Contact
Subsurface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} Absorption Efficiency ⁽³⁾ (unitless) | RfD _{dermal-adj} Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------|------------------------------------|
| Arsenic | 1.6 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 3.1E-07 | 9.5E-01 | 2.9E-04 | 1.1E-03 | 0% |
| Iron | 36293 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.3E-03 | 2.0E-01 | 1.4E-01 | 1.7E-02 | 1% |
| Manganese | 696 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 4.5E-05 | 2.0E-01 | 4.0E-03 | 1.1E-02 | 1% |
| Thallium | 40 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.6E-06 | 2.0E-01 | 1.4E-05 | 1.8E-01 | 9% |
| Vanadium | 5563 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 3.6E-04 | 2.0E-01 | 2.0E-04 | 1.8E+00 | 89% |
| 1,2-Dichloroethane | 0.35 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 6.9E-08 | 8.0E-01 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.17 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 3.3E-08 | 8.0E-01 | 2.4E-02 | 1.4E-06 | 0% |
| Benzene | 0.043 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.4E-10 | 8.0E-01 | 3.2E-03 | 4.3E-08 | 0% |
| Chloroform | 0.0022 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 7.1E-12 | 8.0E-01 | 8.0E-03 | 8.9E-10 | 0% |
| cis-1,2-Dichloroethene | 0.27 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 8.7E-10 | 8.0E-01 | 8.0E-03 | 1.1E-07 | 0% |
| Tetrachloroethene | 0.28 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 5.3E-08 | 8.0E-01 | 8.0E-03 | 6.7E-06 | 0% |
| Toluene | 12 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.3E-06 | 8.0E-01 | 6.4E-02 | 3.5E-05 | 0% |
| Trichloroethene | 0.13 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.5E-08 | 8.0E-01 | 2.4E-04 | 1.0E-04 | 0% |
| Vinyl Chloride | 0.0026 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 8.4E-12 | 8.0E-01 | 2.4E-03 | 3.5E-09 | 0% |
| Xylenes (total) | 15 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.9E-06 | 8.0E-01 | 1.6E-01 | 1.8E-05 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

| |
|-------------------------------|
| Hazard Index = 2.0E+00 |
|-------------------------------|

Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Subsurface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | RfD_i Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.6 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 1.8E-10 | NA | NA | 0% |
| Iron | 36293 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 4.2E-06 | NA | NA | 0% |
| Manganese | 696 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 8.0E-08 | 1.43E-05 | 5.6E-03 | 40% |
| Thallium | 40 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 4.6E-09 | NA | NA | 0% |
| Vanadium | 5563 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 6.4E-07 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.35 | NA | 3.91E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 7.1E-06 | 7.00E-01 | 1.0E-05 | 0% |
| 1,4-Dichlorobenzene | 0.17 | NA | 1.29E+04 | 1 | 250 | 25 | 8 | 70 | 9125 | 1.0E-06 | 2.29E-01 | 4.5E-06 | 0% |
| Benzene | 0.043 | NA | 2.73E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 1.2E-06 | 8.57E-03 | 1.4E-04 | 1% |
| Chloroform | 0.0022 | NA | 2.66E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 6.5E-08 | 1.40E-02 | 4.6E-06 | 0% |
| cis-1,2-Dichloroethene | 0.27 | NA | 2.90E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 7.3E-06 | 5.71E-02 | 1.3E-04 | 1% |
| Tetrachloroethene | 0.28 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 8.5E-06 | 1.00E-02 | 8.5E-04 | 6% |
| Toluene | 12 | NA | 3.98E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 2.3E-04 | 1.43E+00 | 1.6E-04 | 1% |
| Trichloroethene | 0.13 | NA | 3.26E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 3.0E-06 | 1.0E-02 | 3.0E-04 | 2% |
| Vinyl Chloride | 0.0026 | NA | 1.04E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 2.0E-07 | 2.9E-02 | 6.9E-06 | 0% |
| Xylenes (total) | 15 | NA | 6.10E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 1.9E-04 | 2.9E-02 | 6.6E-03 | 48% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
 - (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

| |
|-------------------------------|
| Hazard Index = 1.4E-02 |
|-------------------------------|

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Subsurface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
 IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
 AE_i = absorption efficiency (unitless)
 EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
 ED = exposure duration: the typical duration of each exposure event (years)
 BW = body weight (kg)
 AT_c = averaging Time (years)
 C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.6 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 2.8E-07 | 1.5E+00 | 4.2E-07 | 92% |
| Iron | 36293 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 6.3E-03 | NA | NA | 0% |
| Manganese | 696 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.2E-04 | NA | NA | 0% |
| Thallium | 40 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 7.0E-06 | NA | NA | 0% |
| Vanadium | 5563 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 9.7E-04 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.35 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 6.2E-08 | 9.1E-02 | NA | 0% |
| 1,4-Dichlorobenzene | 0.17 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 3.0E-08 | 2.4E-02 | 7.2E-10 | 0% |
| Benzene | 0.043 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 7.5E-09 | 5.5E-02 | 4.1E-10 | 0% |
| Chloroform | 0.0022 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 3.8E-10 | 1.0E-02 | 3.8E-12 | 0% |
| cis-1,2-Dichloroethene | 0.27 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 4.7E-08 | NA | NA | 0% |
| Tetrachloroethene | 0.28 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 4.8E-08 | 5.4E-01 | 2.6E-08 | 6% |
| Toluene | 12 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 2.0E-06 | NA | NA | 0% |
| Trichloroethene | 0.13 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 2.2E-08 | 4.0E-01 | 8.9E-09 | 2% |
| Vinyl Chloride | 0.0026 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 4.5E-10 | 7.2E-01 | 3.3E-10 | 0% |
| Xylenes (total) | 15 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 2.6E-06 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 4.6E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

"CDM" Not applicable

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Subsurface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.6 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.1E-07 | 9.5E-01 | 1.6E+00 | 1.7E-07 | 91% |
| Iron | 36293 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 8.4E-04 | 2.0E-01 | NA | NA | 0% |
| Manganese | 696 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.6E-05 | 2.0E-01 | NA | NA | 0% |
| Thallium | 40 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 9.2E-07 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 5563 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.3E-04 | 2.0E-01 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.35 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.4E-08 | 8.0E-01 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.17 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.2E-08 | 8.0E-01 | 3.0E-02 | 3.5E-10 | 0% |
| Benzene | 0.043 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 5.0E-11 | 8.0E-01 | 6.9E-02 | 3.4E-12 | 0% |
| Chloroform | 0.0022 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.5E-12 | 8.0E-01 | 1.3E-02 | 3.2E-14 | 0% |
| cis-1,2-Dichloroethene | 0.27 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 3.1E-10 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 0.28 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.9E-08 | 8.0E-01 | 6.8E-01 | 1.3E-08 | 7% |
| Toluene | 12 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 8.1E-07 | 8.0E-01 | NA | NA | 0% |
| Trichloroethene | 0.13 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 8.8E-09 | 8.0E-01 | 5.0E-01 | 4.4E-09 | 2% |
| Vinyl Chloride | 0.0026 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 3.0E-12 | 8.0E-01 | 9.0E-01 | 2.7E-12 | 0% |
| Xylenes (total) | 15 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.0E-06 | 8.0E-01 | NA | NA | 0% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004

(3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or

U.S. EPA Region 4 RAGS Supplement, online

"NA" = Not applicable

| | |
|--------------------------------------|----------------|
| Excess Lifetime Cancer Risk = | 1.9E-07 |
|--------------------------------------|----------------|

Future Industrial Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Subsurface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.6 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 6.6E-11 | 1.51E+01 | 9.9E-10 | 0% |
| Iron | 36293 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 1.5E-06 | NA | NA | 0% |
| Manganese | 696 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.9E-08 | NA | NA | 0% |
| Thallium | 40 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 1.6E-09 | NA | NA | 0% |
| Vanadium | 5563 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.3E-07 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.35 | NA | 3.91E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.5E-06 | 9.10E-02 | 2.3E-07 | 31% |
| 1,4-Dichlorobenzene | 0.17 | NA | 1.29E+04 | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.7E-07 | 2.20E-02 | 8.1E-09 | 1% |
| Benzene | 0.043 | NA | 2.73E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 4.4E-07 | 2.70E-02 | 1.2E-08 | 2% |
| Chloroform | 0.0022 | NA | 2.66E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.3E-08 | 8.10E-02 | 1.9E-09 | 0% |
| cis-1,2-Dichloroethene | 0.27 | NA | 2.90E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.6E-06 | NA | NA | 0% |
| Tetrachloroethene | 0.28 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.0E-06 | 2.10E-02 | 6.4E-08 | 9% |
| Toluene | 12 | NA | 3.98E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 8.2E-05 | NA | NA | 0% |
| Trichloroethene | 0.13 | NA | 3.26E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 1.1E-06 | 3.85E-01 | 4.2E-07 | 57% |
| Vinyl Chloride | 0.0026 | NA | 1.04E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 7.0E-08 | 1.54E-02 | 1.1E-09 | 0% |
| Xylenes (total) | 15 | NA | 6.10E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 6.8E-05 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 7.4E-07

- Notes:
- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
 - (3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable



Appendix H-5.19
Subsurface Soil
Excluding Hot Spots
Future Resident

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | | | |
|-----------------------|---------------------|---------------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|--------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | | | |
| Soil | Subsurface Soil | Excluding Hot Spots | Arsenic | 4.E-06 | 4.E-07 | 3.E-09 | | | 4.E-06 | 7.E-02 | 6.E-03 | NA | | | 7.E-02 | | | |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 7.E-01 | 9.E-02 | NA | | | 8.E-01 | | | |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 4.E-01 | 6.E-02 | 2.E-02 | | | 5.E-01 | | | |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 7.E+00 | 1.E+00 | NA | | | 8.E+00 | | | |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 7.E+01 | 1.E+01 | NA | | | 8.E+01 | | | |
| | | | 1,2-Dichloroethane | 3.E-07 | 6.E-07 | 2.E-06 | | | 3.E-06 | NA | NA | 3.E-05 | | | 3.E-05 | | | |
| | | | 1,4-Dichlorobenzene | 6.E-09 | 8.E-10 | 3.E-08 | | | 3.E-08 | 7.E-05 | 8.E-06 | 2.E-05 | | | 1.E-04 | | | |
| | | | Benzene | 4.E-09 | 7.E-12 | 4.E-08 | | | 4.E-08 | 1.E-04 | 2.E-07 | 5.E-04 | | | 6.E-04 | | | |
| | | | Chloroform | 3.E-11 | 7.E-14 | 6.E-09 | | | 6.E-09 | 3.E-06 | 5.E-09 | 2.E-05 | | | 2.E-05 | | | |
| | | | cis-1,2-Dichloroethene | NA | NA | NA | | | 0.E+00 | 3.E-04 | 6.E-07 | 4.E-04 | | | 8.E-04 | | | |
| | | | Tetrachloroethene | 2.E-07 | 3.E-08 | 2.E-07 | | | 5.E-07 | 4.E-04 | 4.E-05 | 3.E-03 | | | 3.E-03 | | | |
| | | | Toluene | NA | NA | NA | | | 0.E+00 | 2.E-03 | 2.E-04 | 5.E-04 | | | 3.E-03 | | | |
| | | | Trichloroethene | 8.E-08 | 9.E-09 | 1.E-06 | | | 1.E-06 | 5.E-03 | 6.E-04 | 1.E-03 | | | 7.E-03 | | | |
| | | | Vinyl chloride | 6.E-09 | 2.E-08 | 3.E-07 | | | 3.E-07 | 1.E-05 | 2.E-08 | 2.E-05 | | | 3.E-05 | | | |
| | | | Xylenes | NA | NA | NA | | | 0.E+00 | 9.E-04 | 1.E-04 | 2.E-02 | | | 2.E-02 | | | |
| | | | | | | Chemical Total | 4.E-06 | 1.E-06 | 4.E-06 | 0.E+00 | 0.E+00 | 9.E-06 | 8.E+01 | 1.E+01 | 5.E-02 | 0.E+00 | 0.E+00 | 9.E+01 |
| | | | | | | Exposure Point Total | | | | | | 9.E-06 | | | | | | 9.E+01 |
| | | | Exposure Medium Total | | | | | | 9.E-06 | | | | | | 9.E+01 | | | |
| | | | Soil Total | | | | | | 9.E-06 | | | | | | 9.E+01 | | | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 6.E-03 | 6.E-03 | | | |
| | | | 1,1,2-Trichloroethane | | | | | 4.E-08 | 4.E-08 | | | | | 4.E-04 | 4.E-04 | | | |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | 3.E-03 | 3.E-03 | | | |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | 5.E-02 | 5.E-02 | | | |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | 5.E-04 | 5.E-04 | | | |
| | | | 1,2-Dichloroethane | | | | | 3.E-05 | 3.E-05 | | | | | 1.E-03 | 1.E-03 | | | |
| | | | 1,4-Dichlorobenzene | | | | | 1.E-07 | 1.E-07 | | | | | 6.E-05 | 6.E-05 | | | |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | 3.E-04 | 3.E-04 | | | |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | 2.E-05 | 2.E-05 | | | |
| | | | Benzene | | | | | 1.E-06 | 1.E-06 | | | | | 1.E-02 | 1.E-02 | | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | 0.E+00 | 0.E+00 | | | | | 0.E+00 | 0.E+00 | | | |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | 6.E-03 | 6.E-03 | | | |
| | | | Chloroethane | | | | | 5.E-07 | 5.E-07 | | | | | 1.E-03 | 1.E-03 | | | |
| | | | Chloroform | | | | | 9.E-07 | 9.E-07 | | | | | 2.E-03 | 2.E-03 | | | |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | 2.E-02 | 2.E-02 | | | |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | 8.E-03 | 8.E-03 | | | |
| | | | Iron | | | | | 0.E+00 | 0.E+00 | | | | | 0.E+00 | 0.E+00 | | | |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | | 2.E-02 | 2.E-02 | | | |
| | | | Manganese | | | | | 0.E+00 | 0.E+00 | | | | | 0.E+00 | 0.E+00 | | | |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | | 6.E-06 | 6.E-06 | | | |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 | | | |
| | | | Methylene chloride | | | | | 1.E-07 | 1.E-07 | | | | | 5.E-04 | 5.E-04 | | | |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | 7.E-04 | 7.E-04 | | | |
| Tetrachloroethene | | | | | 2.E-05 | 2.E-05 | | | | | 2.E-01 | 2.E-01 | | | | | | |
| Toluene | | | | | NA | 0.E+00 | | | | | 3.E-03 | 3.E-03 | | | | | | |
| Trichloroethene | | | | | 2.E-04 | 2.E-04 | | | | | 1.E-01 | 1.E-01 | | | | | | |
| Vinyl chloride | | | | | 5.E-06 | 5.E-06 | | | | | 2.E-02 | 2.E-02 | | | | | | |
| Xylenes (Total) | | | | | NA | 0.E+00 | | | | | 3.E-01 | 3.E-01 | | | | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-04 | 3.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 8.E-01 | 8.E-01 | | | |
| | | | Exposure Point Total | | | | | | 3.E-04 | | | | | | 8.E-01 | | | |
| | | | Exposure Medium Total | | | | | | 3.E-04 | | | | | | 8.E-01 | | | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | | 0.E+00 | 4.E-01 | 4.E-01 | | | | 8.E-01 | | | |
| | | | 1,1,2-Trichloroethane | 4.E-06 | 4.E-06 | | | | 7.E-06 | 1.E-01 | 1.E-01 | | | 2.E-01 | | | | |
| | | | 1,1-Dichloroethane | NA | NA | | | | 0.E+00 | 7.E-02 | 7.E-02 | | | 1.E-01 | | | | |
| | | | 1,1-Dichloroethene | NA | NA | | | | 0.E+00 | 4.E-01 | 4.E-01 | | | 7.E-01 | | | | |
| | | | 1,2,4-Trichlorobenzene | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | 0.E+00 | | | | |
| | | | 1,2-Dichlorobenzene | NA | NA | | | | 0.E+00 | 6.E-02 | 6.E-02 | | | 1.E-01 | | | | |
| | | | 1,2-Dichloroethane | 1.E-02 | 1.E-02 | | | | 2.E-02 | NA | NA | | | 0.E+00 | | | | |
| | | | 1,4-Dichlorobenzene | 6.E-06 | 6.E-06 | | | | 1.E-05 | 9.E-02 | 9.E-02 | | | 2.E-01 | | | | |
| | | | 2-Chlorophenol | NA | NA | | | | 0.E+00 | 2.E-01 | 2.E-01 | | | 3.E-01 | | | | |
| | | | 4-Methyl-2-pentanone | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | 6.E-01 | | | | |
| | | | Benzene | 3.E-05 | 3.E-05 | | | | 5.E-05 | 1.E+00 | 1.E+00 | | | 3.E+00 | | | | |
| | | | Bis(2-ethylhexyl)phthalate | 5.E-07 | 5.E-07 | | | | 1.E-06 | 1.E-02 | 1.E-02 | | | 2.E-02 | | | | |
| | | | Bromodichloromethane | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | 0.E+00 | | | | |
| | | | Chlorobenzene | NA | NA | | | | 0.E+00 | 5.E-01 | 5.E-01 | | | 1.E+00 | | | | |
| | | | Chloroethane | 3.E-04 | 3.E-04 | | | | 7.E-04 | 3.E-02 | 3.E-02 | | | 6.E-02 | | | | |
| | | | Chloroform | 2.E-06 | 2.E-06 | | | | 4.E-06 | 2.E-01 | 2.E-01 | | | 5.E-01 | | | | |
| | | | cis-1,2-Dichloroethene | NA | NA | | | | 0.E+00 | 9.E+00 | 9.E+00 | | | 2.E+01 | | | | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|------------------------------|---------------|---------------|-------------------------------|------------------------|-----------------------|----------------------------------|---------------|---------------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Ethylbenzene | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 2.E+00 |
| | | | Iron | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 |
| | | | Isopropylbenzene | NA | NA | | | | 0.E+00 | 9.E-01 | 9.E-01 | | | | 2.E+00 |
| | | | Manganese | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 2.E+00 |
| | | | Methyl tert butyl ether | 1.E-06 | 1.E-06 | | | | 2.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 9.E-05 | 9.E-05 | | | | 2.E-04 | 4.E-01 | 4.E-01 | | | | 9.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 1.E-02 | 1.E-02 | | | | 3.E-02 |
| | | | Tetrachloroethene | 3.E-03 | 3.E-03 | | | | 6.E-03 | 6.E+00 | 6.E+00 | | | | 1.E+01 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 4.E+00 | 4.E+00 | | | | 8.E+00 |
| | | | Trichloroethene | 2.E-03 | 2.E-03 | | | | 3.E-03 | 2.E+02 | 2.E+02 | | | | 3.E+02 |
| | | | Vinyl chloride | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+00 | 3.E+00 | | | | 5.E+00 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 2.E+00 | 2.E+00 | | | | 4.E+00 |
| | | | Chemical Total | 2.E-02 | 2.E-02 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-02 | 2.E+02 | 2.E+02 | 0.E+00 | 0.E+00 | 0.E+00 | 4.E+02 |
| | | | Exposure Point Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| | | | Exposure Medium Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| | | | Groundwater Total | | | | | | 3.E-02 | | | | | | 4.E+02 |

Total Risk Across All Media = 3.E-02

Total Hazard Across All Media = 486

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Subsurface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.6 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 2.0E-05 | 3.0E-04 | 6.8E-02 | 0% |
| Iron | 36293 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 4.6E-01 | 7.0E-01 | 6.6E-01 | 1% |
| Manganese | 696 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 8.9E-03 | 2.0E-02 | 4.4E-01 | 1% |
| Thallium | 40 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 5.1E-04 | 7.0E-05 | 7.3E+00 | 9% |
| Vanadium | 5563 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 7.1E-02 | 1.0E-03 | 7.1E+01 | 89% |
| 1,2-Dichloroethane | 0.35 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 4.5E-06 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.17 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 2.2E-06 | 3.0E-02 | 7.3E-05 | 0% |
| Benzene | 0.043 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 5.5E-07 | 4.0E-03 | 1.4E-04 | 0% |
| Chloroform | 0.0022 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 2.8E-08 | 1.0E-02 | 2.8E-06 | 0% |
| cis-1,2-Dichloroethene | 0.27 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 3.5E-06 | 1.0E-02 | 3.5E-04 | 0% |
| Tetrachloroethene | 0.28 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 3.5E-06 | 1.0E-02 | 3.5E-04 | 0% |
| Toluene | 12 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 1.5E-04 | 8.0E-02 | 1.9E-03 | 0% |
| Trichloroethene | 0.13 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 1.6E-06 | 3.0E-04 | 5.4E-03 | 0% |
| Vinyl chloride | 0.0026 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 3.3E-08 | 3.0E-03 | 1.1E-05 | 0% |
| Xylenes | 15 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 1.9E-04 | 2.0E-01 | 9.5E-04 | 0% |

Hazard Index = 8.0E+01

Notes:

(1): Soil EPCs (see Appendix H-3)

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Dermal Contact
Subsurface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (years) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} Absorption Efficiency ⁽³⁾ (unitless) | $RfD_{dermal-adj}$ Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------|-----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.6 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.7E-06 | 9.5E-01 | 2.9E-04 | 6.0E-03 | 0% |
| Iron | 36293 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.3E-02 | 2.0E-01 | 1.4E-01 | 9.3E-02 | 1% |
| Manganese | 696 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 2.5E-04 | 2.0E-01 | 4.0E-03 | 6.2E-02 | 1% |
| Thallium | 40 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.4E-05 | 2.0E-01 | 1.4E-05 | 1.0E+00 | 9% |
| Vanadium | 5563 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 2.0E-03 | 2.0E-01 | 2.0E-04 | 1.0E+01 | 89% |
| 1,2-Dichloroethane | 0.35 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 3.8E-07 | 8.0E-01 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.17 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.8E-07 | 8.0E-01 | 2.4E-02 | 7.7E-06 | 0% |
| Benzene | 0.043 | 2,800 | 0.2 | 0.0005 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 7.7E-10 | 8.0E-01 | 3.2E-03 | 2.4E-07 | 0% |
| Chloroform | 0.0022 | 2,800 | 0.2 | 0.0005 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 3.9E-11 | 8.0E-01 | 8.0E-03 | 4.9E-09 | 0% |
| cis-1,2-Dichloroethene | 0.27 | 2,800 | 0.2 | 0.0005 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 4.8E-09 | 8.0E-01 | 8.0E-03 | 6.0E-07 | 0% |
| Tetrachloroethene | 0.28 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 3.0E-07 | 8.0E-01 | 8.0E-03 | 3.7E-05 | 0% |
| Toluene | 12 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.3E-05 | 8.0E-01 | 6.4E-02 | 2.0E-04 | 0% |
| Trichloroethene | 0.13 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.4E-07 | 8.0E-01 | 2.4E-04 | 5.7E-04 | 0% |
| Vinyl chloride | 0.0026 | 2,800 | 0.2 | 0.0005 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 4.7E-11 | 8.0E-01 | 2.4E-03 | 1.9E-08 | 0% |
| Xylenes | 15 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.6E-05 | 8.0E-01 | 1.6E-01 | 9.9E-05 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 1.1E+01

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Subsurface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = [(C_s / \text{PEF}) + (C_s / \text{VF})] * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_n$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.6 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 6.3E-10 | NA | NA | 0% |
| Iron | 36293 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 1.4E-05 | NA | NA | 0% |
| Manganese | 696 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.7E-07 | 1.43E-05 | 1.9E-02 | 40% |
| Thallium | 40 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 1.6E-08 | NA | NA | 0% |
| Vanadium | 5563 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.2E-06 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.35 | NA | 3.91E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.4E-05 | 7.00E-01 | 3.4E-05 | 0% |
| 1,4-Dichlorobenzene | 0.17 | NA | 1.29E+04 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 3.5E-06 | 2.29E-01 | 1.5E-05 | 0% |
| Benzene | 0.043 | NA | 2.73E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 4.2E-06 | 8.57E-03 | 4.9E-04 | 1% |
| Chloroform | 0.0022 | NA | 2.66E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.2E-07 | 1.40E-02 | 1.6E-05 | 0% |
| cis-1,2-Dichloroethene | 0.27 | NA | 2.90E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.5E-05 | 5.71E-02 | 4.3E-04 | 1% |
| Tetrachloroethene | 0.28 | NA | 2.55E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.9E-05 | 1.00E-02 | 2.9E-03 | 6% |
| Toluene | 12 | NA | 3.98E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 7.8E-04 | 1.43E+00 | 5.5E-04 | 1% |
| Trichloroethene | 0.13 | NA | 3.26E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 1.0E-05 | 1.0E-02 | 1.0E-03 | 2% |
| Vinyl chloride | 0.0026 | NA | 1.04E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 6.7E-07 | 2.9E-02 | 2.3E-05 | 0% |
| Xylenes | 15 | NA | 6.10E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 6.5E-04 | 2.9E-02 | 2.3E-02 | 48% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
- (3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not Available

Hazard Index = 4.7E-02

Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Incidental Ingestion
Subsurface Soil, Excluding Hot Spots

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Age Adjusted Soil Ingestion Factor (mg-year/kg-day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | C_1 Conv. Factor (mass) (kg/mg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) | |
|------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------|-----------------------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|----|
| Arsenic | 1.6 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 2.5E-06 | 1.5E+00 | 3.7E-06 | 87% | |
| Iron | 36293 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 5.7E-02 | NA | NA | 0% | |
| Manganese | 696 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 1.1E-03 | NA | NA | 0% | |
| Thallium | 40 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 6.2E-05 | NA | NA | 0% | |
| Vanadium | 5563 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 8.7E-03 | NA | NA | 0% | |
| 1,2-Dichloroethane | 0.35 | | chemical is considered mutagenic, see Table xx for risk calculation | | | | | | 2.54E-07 | 6% | |
| 1,4-Dichlorobenzene | 0.17 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 2.7E-07 | 2.4E-02 | 6.4E-09 | 0% | |
| Benzene | 0.043 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 6.7E-08 | 5.5E-02 | 3.7E-09 | 0% | |
| Chloroform | 0.0022 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 3.4E-09 | 1.0E-02 | 3.4E-11 | 0% | |
| cis-1,2-Dichloroethene | 0.27 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 4.2E-07 | NA | NA | 0% | |
| Tetrachloroethene | 0.28 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 4.3E-07 | 5.4E-01 | 2.3E-07 | 5% | |
| Toluene | 12 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 1.8E-05 | NA | NA | 0% | |
| Trichloroethene | 0.13 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 2.0E-07 | 4.0E-01 | 7.9E-08 | 2% | |
| Vinyl chloride | 0.0026 | | chemical is considered mutagenic, see Table xx for risk calculation | | | | | | | 6.1E-09 | 0% |
| Xylenes | 15 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 2.3E-05 | NA | NA | 0% | |

Excess Lifetime Cancer Risk = 4.3E-06

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Dermal Contact
Subsurface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SFS Age-Adjusted Dermal Factor (mg-year/kg-event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|----------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.6 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 2.4E-07 | 9.5E-01 | 1.6E+00 | 3.7E-07 | 38% |
| Iron | 36293 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 1.8E-03 | 2.0E-01 | NA | NA | 0% |
| Manganese | 696 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 3.4E-05 | 2.0E-01 | NA | NA | 0% |
| Thallium | 40 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 2.0E-06 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 5563 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 2.7E-04 | 8.0E-01 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.35 | | | | | | | | | | | |
| chemical is considered mutagenic, see Table xx for risk calculation | | | | | | | | | | | 5.6E-07 | 57% |
| 1,4-Dichlorobenzene | 0.17 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 2.5E-08 | 8.0E-01 | 3.0E-02 | 7.6E-10 | 0% |
| Benzene | 0.043 | 360 | 0.0005 | 350 | 1 | 1.0E-06 | 25,550 | 1.1E-10 | 8.0E-01 | 6.9E-02 | 7.3E-12 | 0% |
| Chloroform | 0.0022 | 360 | 0.0005 | 350 | 1 | 1.0E-06 | 25,550 | 5.4E-12 | 8.0E-01 | 1.3E-02 | 6.8E-14 | 0% |
| cis-1,2-Dichloroethene | 0.27 | 360 | 0.0005 | 350 | 1 | 1.0E-06 | 25,550 | 6.7E-10 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 0.28 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 4.1E-08 | 8.0E-01 | 6.8E-01 | 2.8E-08 | 3% |
| Toluene | 12 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 1.7E-06 | 8.0E-01 | NA | NA | 0% |
| Trichloroethene | 0.13 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 1.9E-08 | 8.0E-01 | 5.0E-01 | 9.4E-09 | 1% |
| Vinyl chloride | 0.0026 | | | | | | | | | | | |
| chemical is considered mutagenic, see Table xx for risk calculation | | | | | | | | | | | 1.5E-08 | 2% |
| Xylenes | 15 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 2.2E-06 | 8.0E-01 | NA | NA | 0% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S.  AGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004

"NA" = Not applicable

Excess Lifetime Cancer Risk = 9.9E-07

**Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Inhalation Exposure
Subsurface Soil, Excluding Hot Spots**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = [(C_s / \text{PEF}) + (C_s / \text{VF})] * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_c$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- IR_{air-hourly} = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | IR _{air-hourly} Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET _{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT _c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|----------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.6 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 2.2E-10 | 1.51E+01 | 3.3E-09 | 0% |
| Iron | 36293 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 5.0E-06 | NA | NA | 0% |
| Manganese | 696 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 9.6E-08 | NA | NA | 0% |
| Thallium | 40 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 5.5E-09 | NA | NA | 0% |
| Vanadium | 5563 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 7.7E-07 | NA | NA | 0% |
| 1,2-Dichloroethane | 0.35 | | | | | | | | | | | 1.8E-06 | 48% |
| chemical is considered mutagenic, see Table xx for risk calculation | | | | | | | | | | | | | |
| 1,4-Dichlorobenzene | 0.17 | NA | 1.29E+04 | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.2E-06 | 2.20E-02 | 2.7E-08 | 1% |
| Benzene | 0.043 | NA | 2.73E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.5E-06 | 2.70E-02 | 4.0E-08 | 1% |
| Chloroform | 0.0022 | NA | 2.66E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 7.8E-08 | 8.10E-02 | 6.3E-09 | 0% |
| cis-1,2-Dichloroethene | 0.27 | NA | 2.90E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 8.7E-06 | NA | NA | 0% |
| Tetrachloroethene | 0.28 | NA | 2.55E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.0E-05 | 2.10E-02 | 2.1E-07 | 6% |
| Toluene | 12 | NA | 3.98E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 2.8E-04 | NA | NA | 0% |
| Trichloroethene | 0.13 | NA | 3.26E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 3.7E-06 | 3.85E-01 | 1.4E-06 | 37% |
| Vinyl chloride | 0.0026 | | | | | | | | | | | 2.8E-07 | 7% |
| chemical is considered mutagenic, see Table xx for risk calculation | | | | | | | | | | | | | |
| Xylenes | 15 | NA | 6.10E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 2.3E-04 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 3.8E-06

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
- (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

| Parameter | CS (mg/kg) | 0-2 Years Child Mult. (1/day) | 2-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | CSF (mg/kg*day) ⁻¹ | CSF adjustment factor | | | | ED | | | | EP | Risk | | | | Total Risk | |
|--------------------|---------------|-------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------|-----------------------|-----|------|-------|-----|-----|------|-------|----|----------|----------|----------|----------|------------|------------------------|
| | | | | | | | 0-2 | 2-6 | 6-15 | 15-30 | 0-2 | 2-6 | 6-15 | 15-30 | | 0-2 | 2-6 | 6-15 | 15-30 | | |
| 1,2-Dichloroethane | 0.35 | 3.31E-05 | 2.30E-05 | 7.06E-06 | 5.92E-06 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 3.05E-07 | 1.27E-07 | 8.77E-08 | 4.09E-08 | 5.61E-07 | Dermal Risk |
| 1,2-Dichloroethane | 0.35 | 1.74E-05 | 9.59E-06 | 2.46E-06 | 1.41E-06 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 1.60E-07 | 5.30E-08 | 3.06E-08 | 9.73E-09 | 2.54E-07 | Ingestion risk |
| 1,2-Dichloroethane | 0.35 | 5.36E-05 | 5.11E-05 | 5.25E-05 | 5.79E-05 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 4.94E-07 | 2.82E-07 | 6.52E-07 | 3.99E-07 | 1.83E-06 | inhalation risk |

| Parameter | CS (mg/kg) | 0-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | Child CSF (mg/kg*day) ⁻¹ | Adult CSF (mg/kg*day) ⁻¹ | ED | | | EP | Risk | | | Total Risk | |
|----------------|---------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|-----|------|-------|----|----------|----------|----------|------------|------------------|
| | | | | | | | 0-6 | 6-15 | 15-30 | | 0-6 | 6-15 | 15-30 | | |
| Vinyl chloride | 0.0026 | 1.28E-05 | 2.46E-06 | 1.41E-06 | 1.5E+00 | 7.20E-01 | 6 | 9 | 15 | 70 | 4.27E-09 | 1.23E-09 | 5.66E-10 | 6.07E-09 | ingestion |
| Vinyl chloride | 0.0026 | 2.76E-05 | 7.06E-06 | 5.92E-06 | 1.5E+00 | 7.20E-01 | 6 | 9 | 15 | 70 | 9.22E-09 | 3.54E-09 | 2.38E-09 | 1.51E-08 | dermal |
| Vinyl chloride | 0.0026 | 2.49E-04 | 2.05E-04 | 2.26E-04 | 1.5E+00 | 7.20E-01 | 6 | 9 | 15 | 70 | 8.33E-08 | 1.03E-07 | 9.05E-08 | 2.76E-07 | dermal |

Appendix H-5.20
Subsurface Soil
Hot Spot RIMW-6
Future Excavation Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Excavation Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | |
|-----------------------|---------------------|-------------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | |
| Soil | Subsurface Soil | Hot Spot - RIMW-6 | Arsenic | | | | | | | | | | | | | 0.E+00 |
| | | | Iron | | | | | | | | | | | | | 0.E+00 |
| | | | Manganese | | | | | | | | | | | | | 0.E+00 |
| | | | Thallium | | | | | | | | | | | | | 0.E+00 |
| | | | Vanadium | | | | | | | | | | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | 2.E-12 | NA | 1.E-11 | | | NA | NA | 1.E-08 | | | | | 1.E-08 |
| | | | 1,4-Dichlorobenzene | | | | | | | | | | | | | 0.E+00 |
| | | | Benzene | 3.E-12 | 3.E-15 | 1.E-11 | | | 8.E-07 | 1.E-09 | 3.E-06 | | | | | 4.E-06 |
| | | | Chloroform | | | | | | | | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | NA | NA | NA | | | 7.E-04 | 9.E-07 | 1.E-02 | | | | | 1.E-02 |
| | | | Tetrachloroethene | 9.E-08 | 7.E-09 | 3.E-08 | | | 1.E-07 | 1.E-04 | 9.E-06 | 1.E-02 | | | | 1.E-02 |
| | | | Toluene | NA | NA | NA | | | 0.E+00 | 1.E-07 | 1.E-08 | 1.E-06 | | | | 1.E-06 |
| | | | Trichloroethene | 6.E-08 | 4.E-09 | 4.E-07 | | | 5.E-07 | 3.E-02 | 3.E-03 | 8.E-03 | | | | 4.E-02 |
| | | | Vinyl chloride | 1.E-08 | 2.E-11 | 6.E-09 | | | 2.E-08 | 4.E-04 | 5.E-07 | 1.E-03 | | | | 1.E-03 |
| | | | Xylenes | NA | NA | NA | | | 0.E+00 | 4.E-07 | 3.E-08 | 1.E-05 | | | | 1.E-05 |
| | | | Chemical Total | 2.E-07 | 1.E-08 | 5.E-07 | 0.E+00 | 0.E+00 | 6.E-07 | 4.E-02 | 3.E-03 | 3.E-02 | 0.E+00 | 0.E+00 | | 7.E-02 |
| | | | Exposure Point Total | | | | | | 6.E-07 | | | | | | | 7.E-02 |
| Exposure Medium Total | | | | | | 6.E-07 | | | | | | | 7.E-02 | | | |
| Soil Total | | | | | | 6.E-07 | | | | | | | 7.E-02 | | | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | NA | | | | | | 9.E-05 | | 9.E-05 | |
| | | | 1,1,2-Trichloroethane | | | | 2.E-11 | | | | | | 6.E-06 | | 6.E-06 | |
| | | | 1,1-Dichloroethane | | | | NA | | | | | | 1.E-06 | | 1.E-06 | |
| | | | 1,1-Dichloroethene | | | | NA | | | | | | 7.E-04 | | 7.E-04 | |
| | | | 1,2-Dichlorobenzene | | | | NA | | | | | | 8.E-06 | | 8.E-06 | |
| | | | 1,2-Dichloroethane | | | | NA | | | | | | 2.E-05 | | 2.E-05 | |
| | | | 1,4-Dichlorobenzene | | | | 7.E-11 | | | | | | 3.E-07 | | 3.E-07 | |
| | | | 2-Chlorophenol | | | | NA | | | | | | NA | | 0.E+00 | |
| | | | 4-Methyl-2-pentanone | | | | NA | | | | | | 3.E-07 | | 3.E-07 | |
| | | | Benzene | | | | 5.E-10 | | | | | | 2.E-04 | | 2.E-04 | |
| | | | Bis(2-ethylhexyl)phthalate | | | | NA | | | | | | NA | | 0.E+00 | |
| | | | Chlorobenzene | | | | NA | | | | | | 9.E-05 | | 9.E-05 | |
| | | | Chloroethane | | | | NA | | | | | | 5.E-06 | | 5.E-06 | |
| | | | Chloroform | | | | 5.E-10 | | | | | | 3.E-05 | | 3.E-05 | |
| | | | cis-1,2-Dichloroethene | | | | NA | | | | | | 2.E-04 | | 2.E-04 | |
| | | | Ethylbenzene | | | | NA | | | | | | 1.E-04 | | 1.E-04 | |
| | | | Iron | | | | NA | | | | | | NA | | 0.E+00 | |
| | | | Isopropylbenzene | | | | NA | | | | | | 3.E-02 | | 3.E-02 | |
| | | | Manganese | | | | NA | | | | | | NA | | 0.E+00 | |
| | | | Methyl tert butyl ether | | | | NA | | | | | | NA | | 0.E+00 | |
| | | | Methylcyclohexane | | | | NA | | | | | | NA | | 0.E+00 | |
| | | | Methylene chloride | | | | NA | | | | | | 3.E-06 | | 3.E-06 | |
| | | | Naphthalene | | | | NA | | | | | | 8.E-06 | | 8.E-06 | |
| | | | Tetrachloroethene | | | | 1.E-08 | | | | | | 4.E-03 | | 4.E-03 | |
| | | | Toluene | | | | NA | | | | | | 6.E-05 | | 6.E-05 | |
| | | | Trichloroethene | | | | 1.E-07 | | | | | | 2.E-03 | | 2.E-03 | |
| | | | Vinyl chloride | | | | NA | | | | | | 4.E-04 | | 4.E-04 | |
| Xylenes (Total) | | | | NA | | | | | | 4.E-03 | | 4.E-03 | | | | |
| Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 1.E-07 | 0.E+00 | 1.E-07 | 0.E+00 | 0.E+00 | 0.E+00 | 4.E-02 | 0.E+00 | | 4.E-02 | | | |
| Exposure Point Total | | | | | | 1.E-07 | | | | | | | 4.E-02 | | | |
| Exposure Medium Total | | | | | | 1.E-07 | | | | | | | 4.E-02 | | | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | | | | | | | | | | | 0.E+00 | | |
| | | | 1,1,2-Trichloroethane | | | | | | | | | | | 0.E+00 | | |
| | | | 1,1-Dichloroethane | | | | | | | | | | | 0.E+00 | | |
| | | | 1,1-Dichloroethene | | | | | | | | | | | 0.E+00 | | |
| | | | 1,2,4-Trichlorobenzene | | | | | | | | | | | 0.E+00 | | |
| | | | 1,2-Dichlorobenzene | | | | | | | | | | | 0.E+00 | | |
| | | | 1,2-Dichloroethane | | | | | | | | | | | 0.E+00 | | |
| | | | 1,4-Dichlorobenzene | | | | | | | | | | | 0.E+00 | | |
| | | | 2-Chlorophenol | | | | | | | | | | | 0.E+00 | | |
| | | | 4-Methyl-2-pentanone | | | | | | | | | | | 0.E+00 | | |
| | | | Benzene | | | | | | | | | | | 0.E+00 | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | | | | | | 0.E+00 | | |
| | | | Bromodichloromethane | | | | | | | | | | | 0.E+00 | | |
| | | | Chlorobenzene | | | | | | | | | | | 0.E+00 | | |
| | | | Chloroethane | | | | | | | | | | | 0.E+00 | | |
| | | | Chloroform | | | | | | | | | | | 0.E+00 | | |
| | | | cis-1,2-Dichloroethene | | | | | | | | | | | 0.E+00 | | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Excavation Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Ethylbenzene | | | | | | | | | | | | 0.E+00 |
| | | | Iron | | | | | | | | | | | | 0.E+00 |
| | | | Isopropylbenzene | | | | | | | | | | | | 0.E+00 |
| | | | Manganese | | | | | | | | | | | | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | | | | | | | | 0.E+00 |
| | | | Methylcyclohexane | | | | | | | | | | | | 0.E+00 |
| | | | Methylene chloride | | | | | | | | | | | | 0.E+00 |
| | | | Naphthalene | | | | | | | | | | | | 0.E+00 |
| | | | Tetrachloroethene | | | | | | | | | | | | 0.E+00 |
| | | | Toluene | | | | | | | | | | | | 0.E+00 |
| | | | Trichloroethene | | | | | | | | | | | | 0.E+00 |
| | | | Vinyl chloride | | | | | | | | | | | | 0.E+00 |
| | | | Xylenes (Total) | | | | | | | | | | | | 0.E+00 |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 |
| | | | Exposure Point Total | | | | | | | | | | | | 0.E+00 |
| | | | Exposure Medium Total | | | | | | | | | | | | 0.E+00 |
| | | | Groundwater Total | | | | | | | | | | | | 1.E-07 |

Total Risk Across All Media = 8.E-07

Total Hazard Across All Media = 0.1

Future Excavation Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Subsurface Soil -Hot Spot RIMW-6

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Subchronic Oral RfD ⁽²⁾ (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|--------------------|-------------------------------------------|
| 1,2-Dichloroethane | 0.00037 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.2E-09 | NA | NA | 0% |
| Benzene | 0.0010 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 3.3E-09 | 4.0E-03 | 8.2E-07 | 0% |
| cis-1,2-Dichloroethene | 23 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 7.4E-05 | 1.0E-01 | 7.4E-04 | 2% |
| Tetrachloroethene | 3.7 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.2E-05 | 1.0E-01 | 1.2E-04 | 0% |
| Toluene | 0.091 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 2.9E-07 | 2.0E+00 | 1.5E-07 | 0% |
| Trichloroethene | 3.2 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.0E-05 | 3.0E-04 | 3.4E-02 | 96% |
| Vinyl Chloride | 0.37 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.2E-06 | 3.0E-03 | 4.0E-04 | 1% |
| Xylenes (total) | 0.027 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 8.7E-08 | 2.0E-01 | 4.4E-07 | 0% |

Hazard Index = 3.6E-02

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): Subchronic RfDs were not available for iron, thallium, benzene, trichloroethene, vinyl chloride or xylenes, therefore, chronic values were implemented.

Future Excavation Worker Scenario
Estimation of Noncancer Hazard from Dermal Contact
Subsurface Soil -Hot Spot RIMW-6

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} Absorption Efficiency ⁽³⁾ (unitless) | RfD _{dermal-adj} Subchronic Dermal Adj. RfD ⁽⁴⁾ (mg/kg-day) | Hazard Quotient (NA) | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 0.00037 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 7.2E-11 | 8.0E-01 | NA | NA | 0% |
| Benzene | 0.0010 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 3.3E-12 | 8.0E-01 | 3.2E-03 | 1.0E-09 | 0% |
| cis-1,2-Dichloroethene | 23 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 7.4E-08 | 8.0E-01 | 8.0E-02 | 9.3E-07 | 0% |
| Tetrachloroethene | 3.7 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 7.2E-07 | 8.0E-01 | 8.0E-02 | 9.0E-06 | 0% |
| Toluene | 0.091 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 1.8E-08 | 8.0E-01 | 1.6E+00 | 1.1E-08 | 0% |
| Trichloroethene | 3.2 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 6.2E-07 | 8.0E-01 | 2.4E-04 | 2.6E-03 | 100% |
| Vinyl Chloride | 0.37 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 1.2E-09 | 8.0E-01 | 2.4E-03 | 5.0E-07 | 0% |
| Xylenes (total) | 0.027 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 5.2E-09 | 8.0E-01 | 1.6E-01 | 3.3E-08 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online
- (4): Subchronic RfDs were not available for iron, thallium, benzene, trichloroethene, vinyl chloride or xylenes, therefore, chronic values were implemented.

Hazard Index = 2.6E-03

Future Excavation Worker Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Subsurface Soil -Hot Spot RIMW-6

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | RfD_i Subchronic Inhalation RfD ⁽⁴⁾ (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------------------|--------------------|-------------------------------------------|
| 1,2-Dichloroethane | 0.00037 | NA | 3.91E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 7.4E-09 | 7.00E-01 | 1.1E-08 | 0% |
| Benzene | 0.0010 | NA | 2.73E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 2.9E-08 | 8.57E-03 | 3.4E-06 | 0% |
| cis-1,2-Dichloroethene | 23 | NA | 2.90E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 6.2E-04 | 5.71E-02 | 1.1E-02 | 35% |
| Tetrachloroethene | 3.7 | NA | 2.55E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 1.1E-04 | 1.00E-02 | 1.1E-02 | 37% |
| Toluene | 0.091 | NA | 3.98E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 1.8E-06 | 1.43E+00 | 1.3E-06 | 0% |
| Trichloroethene | 3.2 | NA | 3.26E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 7.7E-05 | 1.0E-02 | 7.7E-03 | 25% |
| Vinyl Chloride | 0.37 | NA | 1.04E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 2.8E-05 | 2.9E-02 | 9.8E-04 | 3% |
| Xylenes (total) | 0.027 | NA | 6.10E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 3.5E-07 | 2.9E-02 | 1.2E-05 | 0% |

Notes:

(1): Soil EPCs (see Appenidx H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

(4): A subchronic RfD was only available for 1,4-dichlorobenzene, therefore, chronic values were implemented or the remainder of the chemicals.

Hazard Index = 3.1E-02

Future Excavation Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Subsurface Soil -Hot Spot RIMW-6

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 0.00037 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.7E-11 | 9.1E-02 | 1.6E-12 | 0% |
| Benzene | 0.0010 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 4.7E-11 | 5.5E-02 | 2.6E-12 | 0% |
| cis-1,2-Dichloroethene | 23 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.1E-06 | NA | NA | 0% |
| Tetrachloroethene | 3.7 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.7E-07 | 5.4E-01 | 9.2E-08 | 56% |
| Toluene | 0.091 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 4.2E-09 | NA | NA | 0% |
| Trichloroethene | 3.2 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.5E-07 | 4.0E-01 | 5.9E-08 | 36% |
| Vinyl Chloride | 0.37 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.7E-08 | 7.2E-01 | 1.2E-08 | 8% |
| Xylenes (total) | 0.027 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.2E-09 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 1.6E-07

Notes:

(1): Soil EPCs (see Appenidx H-3)

"NA" = Not applicable

Future Excavation Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Subsurface Soil -Hot Spot RIMW-6

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | $SF_{dermal-adj}$ Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 0.00037 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.0E-12 | 8.0E-01 | NA | NA | 0% |
| Benzene | 0.0010 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 4.7E-14 | 8.0E-01 | 6.9E-02 | 3.2E-15 | 0% |
| cis-1,2-Dichloroethene | 23 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.1E-09 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 3.7 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.0E-08 | 8.0E-01 | 6.8E-01 | 6.9E-09 | 61% |
| Toluene | 0.091 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 2.5E-10 | 8.0E-01 | NA | NA | 0% |
| Trichloroethene | 3.2 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 8.9E-09 | 8.0E-01 | 5.0E-01 | 4.4E-09 | 39% |
| Vinyl Chloride | 0.37 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.7E-11 | 8.0E-01 | 9.0E-01 | 1.5E-11 | 0% |
| Xylenes (total) | 0.027 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 7.5E-11 | 8.0E-01 | NA | NA | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
 - (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online
- "NA" = Not applicable

Excess Lifetime Cancer Risk = 1.1E-08

Future Excavation Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Subsurface Soil -Hot Spot RIMW-6

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 0.00037 | NA | 3.91E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.1E-10 | 9.10E-02 | 9.6E-12 | 0% |
| Benzene | 0.0010 | NA | 2.73E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 4.1E-10 | 2.70E-02 | 1.1E-11 | 0% |
| cis-1,2-Dichloroethene | 23 | NA | 2.90E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 8.9E-06 | NA | NA | 0% |
| Tetrachloroethene | 3.7 | NA | 2.55E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.6E-06 | 2.10E-02 | 3.4E-08 | 7% |
| Toluene | 0.091 | NA | 3.98E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 2.6E-08 | NA | NA | 0% |
| Trichloroethene | 3.2 | NA | 3.26E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.1E-06 | 3.85E-01 | 4.2E-07 | 91% |
| Vinyl Chloride | 0.37 | NA | 1.04E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 4.0E-07 | 1.54E-02 | 6.1E-09 | 1% |
| Xylenes (total) | 0.027 | NA | 6.10E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 4.9E-09 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 4.6E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Appendix H-5.21
Subsurface Soil
Hot Spot RIMW-6
Future Industrial Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | | | |
|----------------------------|-----------------|-------------------|----------------------------|---------------------|-------------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|--------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | | | |
| Soil | Subsurface Soil | Hot Spot - RIMW-6 | Arsenic | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Thallium | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Vanadium | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,2-Dichloroethane | NA | NA | 2.E-10 | | | 2.E-10 | NA | NA | 1.E-08 | | | 1.E-08 | | | |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Benzene | 1.E-11 | 8.E-14 | 3.E-10 | | | 3.E-10 | 1.E-07 | 1.E-09 | 3.E-06 | | | 3.E-06 | | | |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | cis-1,2-Dichloroethene | NA | NA | NA | | | 0.E+00 | 1.E-03 | 9.E-06 | 1.E-02 | | | 1.E-02 | | | |
| | | | Tetrachloroethene | 3.E-07 | 2.E-07 | 9.E-07 | | | 1.E-06 | 2.E-04 | 9.E-05 | 1.E-02 | | | 1.E-02 | | | |
| | | | Toluene | NA | NA | NA | | | 0.E+00 | 6.E-07 | 3.E-07 | 1.E-06 | | | 2.E-06 | | | |
| | | | Trichloroethene | 2.E-07 | 1.E-07 | 1.E-05 | | | 1.E-05 | 5.E-03 | 3.E-03 | 8.E-03 | | | 2.E-02 | | | |
| | | | Vinyl chloride | 5.E-08 | 4.E-10 | 2.E-07 | | | 2.E-07 | 6.E-05 | 5.E-07 | 1.E-03 | | | 1.E-03 | | | |
| | | | Xylenes | NA | NA | NA | | | 0.E+00 | 7.E-08 | 3.E-08 | 1.E-05 | | | 1.E-05 | | | |
| | | | Chemical Total | 6.E-07 | 3.E-07 | 1.E-05 | 0.E+00 | 0.E+00 | 1.E-05 | 7.E-03 | 3.E-03 | 3.E-02 | 0.E+00 | 0.E+00 | 4.E-02 | | | |
| | | | Exposure Point Total | | | | | | 1.E-05 | | | | | 4.E-02 | | | | |
| | | | Exposure Medium Total | | | | | | 1.E-05 | | | | | 4.E-02 | | | | |
| | | | Soil Total | | | | | | 1.E-05 | | | | | 4.E-02 | | | | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 | | | |
| | | | 1,1,2-Trichloroethane | | | | | 2.E-08 | 2.E-08 | | | | | 3.E-04 | 3.E-04 | | | |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 | | | |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | 3.E-02 | 3.E-02 | | | |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | 4.E-04 | 4.E-04 | | | |
| | | | 1,2-Dichloroethane | | | | | 2.E-05 | 2.E-05 | | | | | 7.E-04 | 7.E-04 | | | |
| | | | 1,4-Dichlorobenzene | | | | | 8.E-08 | 8.E-08 | | | | | 4.E-05 | 4.E-05 | | | |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | 2.E-04 | 2.E-04 | | | |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | 1.E-05 | 1.E-05 | | | |
| | | | Benzene | | | | | 6.E-07 | 6.E-07 | | | | | 7.E-03 | 7.E-03 | | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | 4.E-03 | 4.E-03 | | | |
| | | | Chloroethane | | | | | 3.E-07 | 3.E-07 | | | | | 1.E-03 | 1.E-03 | | | |
| | | | Chloroform | | | | | 5.E-07 | 5.E-07 | | | | | 1.E-03 | 1.E-03 | | | |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 | | | |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 | | | |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 | | | |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | | 4.E-06 | 4.E-06 | | | |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 | | | |
| | | | Methylene chloride | | | | | 7.E-08 | 7.E-08 | | | | | 4.E-04 | 4.E-04 | | | |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | 5.E-04 | 5.E-04 | | | |
| | | | Tetrachloroethene | | | | | 1.E-05 | 1.E-05 | | | | | 2.E-01 | 2.E-01 | | | |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 | | | |
| | | | Trichloroethene | | | | | 1.E-04 | 1.E-04 | | | | | 9.E-02 | 9.E-02 | | | |
| | | | Vinyl chloride | | | | | 3.E-06 | 3.E-06 | | | | | 2.E-02 | 2.E-02 | | | |
| | | | Xylenes (Total) | | | | | NA | 0.E+00 | | | | | 2.E-01 | 2.E-01 | | | |
| | | | | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 2.E-04 | 2.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E-01 | 6.E-01 |
| | | | | | | Exposure Point Total | | | | | | 2.E-04 | | | | | 6.E-01 | |
| | | | | | | Exposure Medium Total | | | | | | 2.E-04 | | | | | 6.E-01 | |
| | | | Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | 2.E-01 | |
| 1,1,2-Trichloroethane | 2.E-06 | 2.E-06 | | | | | | | 5.E-06 | 3.E-02 | 3.E-02 | | | 6.E-02 | | | | |
| 1,1-Dichloroethane | NA | NA | | | | | | | 0.E+00 | 2.E-02 | 2.E-02 | | | 4.E-02 | | | | |
| 1,1-Dichloroethene | NA | NA | | | | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | 2.E-01 | | | | |
| 1,2,4-Trichlorobenzene | 0.E+00 | 0.E+00 | | | | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | 0.E+00 | | | | |
| 1,2-Dichlorobenzene | NA | NA | | | | | | | 0.E+00 | NA | NA | | | 0.E+00 | | | | |
| 1,2-Dichloroethane | 1.E-03 | 1.E-03 | | | | | | | 3.E-03 | NA | NA | | | 0.E+00 | | | | |
| 1,4-Dichlorobenzene | 4.E-06 | 4.E-06 | | | | | | | 7.E-06 | 1.E-02 | 1.E-02 | | | 3.E-02 | | | | |
| 2-Chlorophenol | NA | NA | | | | | | | 0.E+00 | 5.E-02 | 5.E-02 | | | 1.E-01 | | | | |
| 4-Methyl-2-pentanone | NA | NA | | | | | | | 0.E+00 | 9.E-02 | 9.E-02 | | | 2.E-01 | | | | |
| Benzene | 2.E-05 | 2.E-05 | | | | | | | 3.E-05 | 2.E-01 | 2.E-01 | | | 4.E-01 | | | | |
| Bis(2-ethylhexyl)phthalate | 3.E-07 | 3.E-07 | | | | | | | 6.E-07 | 3.E-03 | 3.E-03 | | | 6.E-03 | | | | |
| Bromodichloromethane | 0.E+00 | 0.E+00 | | | | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | 0.E+00 | | | | |
| Chlorobenzene | NA | NA | | | | | | | 0.E+00 | 7.E-02 | 7.E-02 | | | 1.E-01 | | | | |
| Chloroethane | 2.E-06 | 2.E-06 | | | | | | | 4.E-06 | 5.E-03 | 5.E-03 | | | 9.E-03 | | | | |
| Chloroform | 1.E-06 | 1.E-06 | | | | | | | 3.E-06 | 4.E-02 | 4.E-02 | | | 7.E-02 | | | | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | | |
|--------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | | |
| | | | cis-1,2-Dichloroethene | NA | NA | | | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 3.E+00 |
| | | | Ethylbenzene | NA | NA | | | | | | 0.E+00 | 2.E-01 | 2.E-01 | | | | 4.E-01 |
| | | | Iron | NA | NA | | | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 |
| | | | Isopropylbenzene | NA | NA | | | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 3.E-01 |
| | | | Manganese | NA | NA | | | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 6.E-01 |
| | | | Methyl tert butyl ether | 6.E-07 | 6.E-07 | | | | | | 1.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 1.E-05 | 1.E-05 | | | | | | 2.E-05 | 7.E-02 | 7.E-02 | | | | 1.E-01 |
| | | | Naphthalene | NA | NA | | | | | | 0.E+00 | 4.E-03 | 4.E-03 | | | | 9.E-03 |
| | | | Tetrachloroethene | 2.E-03 | 2.E-03 | | | | | | 4.E-03 | 9.E-01 | 9.E-01 | | | | 2.E+00 |
| | | | Toluene | NA | NA | | | | | | 0.E+00 | 6.E-01 | 6.E-01 | | | | 1.E+00 |
| | | | Trichloroethene | 1.E-03 | 1.E-03 | | | | | | 2.E-03 | 3.E+01 | 3.E+01 | | | | 5.E+01 |
| | | | Vinyl chloride | 3.E-04 | 3.E-04 | | | | | | 6.E-04 | 4.E-01 | 4.E-01 | | | | 8.E-01 |
| | | | Xylenes (Total) | NA | NA | | | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 |
| | | | Chemical Total | 5.E-03 | 5.E-03 | 0.E+00 | 0.E+00 | 0.E+00 | | | 9.E-03 | 3.E+01 | 3.E+01 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E+01 |
| | | | Exposure Point Total | | | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Exposure Medium Total | | | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Groundwater Total | | | | | | | | 9.E-03 | | | | | | 6.E+01 |

Total Risk Across All Media = 9.E-03

Total Hazard Across All Media = 62

Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Subsurface Soil - Hot Spot RIMW-6

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|--------------------|-------------------------------------------|
| 1,2-Dichloroethane | 0.00037 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.8E-10 | NA | NA | 0% |
| Benzene | 0.0010 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 4.9E-10 | 4.0E-03 | 1.2E-07 | 0% |
| cis-1,2-Dichloroethene | 23 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.1E-05 | 1.0E-02 | 1.1E-03 | 17% |
| Tetrachloroethene | 3.7 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.8E-06 | 1.0E-02 | 1.8E-04 | 3% |
| Toluene | 0.091 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 4.5E-08 | 8.0E-02 | 5.6E-07 | 0% |
| Trichloroethene | 3.2 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.6E-06 | 3.0E-04 | 5.2E-03 | 79% |
| Vinyl Chloride | 0.37 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.8E-07 | 3.0E-03 | 6.0E-05 | 1% |
| Xylenes (total) | 0.027 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.3E-08 | 2.0E-01 | 6.6E-08 | 0% |

Hazard Index = 6.6E-03

Notes:

(1): Soil EPCs (see Appendix H-3)

**Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Dermal Contact
Subsurface Soil - Hot Spot RIMW-6**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | $RfD_{dermal-adj}$ Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------|-------------------------------------------|
| 1,2-Dichloroethane | 0.00037 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 7.2E-11 | 8.0E-01 | NA | NA | 0% |
| Benzene | 0.0010 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 3.3E-12 | 8.0E-01 | 3.2E-03 | 1.0E-09 | 0% |
| cis-1,2-Dichloroethene | 23 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 7.4E-08 | 8.0E-01 | 8.0E-03 | 9.3E-06 | 0% |
| Tetrachloroethene | 3.7 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 7.2E-07 | 8.0E-01 | 8.0E-03 | 9.0E-05 | 3% |
| Toluene | 0.091 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.8E-08 | 8.0E-01 | 6.4E-02 | 2.8E-07 | 0% |
| Trichloroethene | 3.2 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 6.2E-07 | 8.0E-01 | 2.4E-04 | 2.6E-03 | 96% |
| Vinyl Chloride | 0.37 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.2E-09 | 8.0E-01 | 2.4E-03 | 5.0E-07 | 0% |
| Xylenes (total) | 0.027 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 5.2E-09 | 8.0E-01 | 1.6E-01 | 3.3E-08 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

| |
|-------------------------------|
| Hazard Index = 2.7E-03 |
|-------------------------------|

**Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Subsurface Soil - Hot Spot RIMW-6**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)
 PEF = particulate emission factor (m^3/kg)
 VF = volatilization factor (m^3/kg)
 $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m^3/hr)
 EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
 ED = exposure duration: the typical duration of each exposure event (year)
 ET_{inh} = exposure time (hr/day)
 BW = body weight (kg)
 AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m^3/kg) | VF Volatilization Factor ⁽³⁾ (m^3/kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m^3/hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | RfD_i Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------|--------------------------------------------|---------------------------------------------------|---------------------------------------|----------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------|--------------------|-------------------------------------------|
| 1,2-Dichloroethane | 0.00037 | NA | 3.91E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 7.4E-09 | 7.00E-01 | 1.1E-08 | 0% |
| Benzene | 0.0010 | NA | 2.73E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 2.9E-08 | 8.57E-03 | 3.4E-06 | 0% |
| cis-1,2-Dichloroethene | 23 | NA | 2.90E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 6.2E-04 | 5.71E-02 | 1.1E-02 | 35% |
| Tetrachloroethene | 3.7 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 1.1E-04 | 1.00E-02 | 1.1E-02 | 37% |
| Toluene | 0.091 | NA | 3.98E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 1.8E-06 | 1.43E+00 | 1.3E-06 | 0% |
| Trichloroethene | 3.2 | NA | 3.26E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 7.7E-05 | 1.0E-02 | 7.7E-03 | 25% |
| Vinyl Chloride | 0.37 | NA | 1.04E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 2.8E-05 | 2.9E-02 | 9.8E-04 | 3% |
| Xylenes (total) | 0.027 | NA | 6.10E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 3.5E-07 | 2.9E-02 | 1.2E-05 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
 - (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

Hazard Index = 3.1E-02

Future Industrial Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Subsurface Soil - Hot Spot RIMW-6

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 0.00037 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 6.5E-11 | 9.1E-02 | NA | 0% |
| Benzene | 0.0010 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.8E-10 | 5.5E-02 | 9.7E-12 | 0% |
| cis-1,2-Dichloroethene | 23 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 4.0E-06 | NA | NA | 0% |
| Tetrachloroethene | 3.7 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 6.5E-07 | 5.4E-01 | 3.5E-07 | 56% |
| Toluene | 0.091 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.6E-08 | NA | NA | 0% |
| Trichloroethene | 3.2 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 5.6E-07 | 4.0E-01 | 2.2E-07 | 36% |
| Vinyl Chloride | 0.37 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 6.5E-08 | 7.2E-01 | 4.7E-08 | 8% |
| Xylenes (total) | 0.027 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 4.7E-09 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 6.2E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Subsurface Soil - Hot Spot RIMW-6**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 0.00037 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.6E-11 | 8.0E-01 | NA | NA | 0% |
| Benzene | 0.0010 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.2E-12 | 8.0E-01 | 6.9E-02 | 8.0E-14 | 0% |
| cis-1,2-Dichloroethene | 23 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.7E-08 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 3.7 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.6E-07 | 8.0E-01 | 6.8E-01 | 1.7E-07 | 61% |
| Toluene | 0.091 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 6.3E-09 | 8.0E-01 | NA | NA | 0% |
| Trichloroethene | 3.2 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.2E-07 | 8.0E-01 | 5.0E-01 | 1.1E-07 | 39% |
| Vinyl Chloride | 0.37 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 4.3E-10 | 8.0E-01 | 9.0E-01 | 3.8E-10 | 0% |
| Xylenes (total) | 0.027 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.9E-09 | 8.0E-01 | NA | NA | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
 - (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online
- "NA" = Not applicable

Excess Lifetime Cancer Risk = 2.8E-07

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Subsurface Soil - Hot Spot RIMW-6**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / BW * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / BW * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m^3/kg)

VF = volatilization factor (m^3/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m^3/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m^3/kg) | VF Volatilization Factor ⁽³⁾ (m^3/kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m^3/hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | CSF_{inh} Cancer Slope Factor ($\text{mg}/(\text{kg}/\text{day}))^{-1}$ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 0.00037 | NA | 3.91E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.6E-09 | 9.10E-02 | 2.4E-10 | 0% |
| Benzene | 0.0010 | NA | 2.73E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 1.0E-08 | 2.70E-02 | 2.8E-10 | 0% |
| cis-1,2-Dichloroethene | 23 | NA | 2.90E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.2E-04 | NA | NA | 0% |
| Tetrachloroethene | 3.7 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 4.1E-05 | 2.10E-02 | 8.5E-07 | 7% |
| Toluene | 0.091 | NA | 3.98E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 6.4E-07 | NA | NA | 0% |
| Trichloroethene | 3.2 | NA | 3.26E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.7E-05 | 3.85E-01 | 1.1E-05 | 91% |
| Vinyl Chloride | 0.37 | NA | 1.04E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 1.0E-05 | 1.54E-02 | 1.5E-07 | 1% |
| Xylenes (total) | 0.027 | NA | 6.10E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 1.2E-07 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 1.2E-05

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Appendix H-5.22
Subsurface Soil
Hot Spot RIMW-6
Future Resident

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | | |
|----------------------------|-----------------|-------------------|----------------------------|---------------------|-------------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | | |
| Soil | Subsurface Soil | Hot Spot - RIMW-6 | Arsenic | | | | | | 0.E+00 | | | | | | 0.E+00 | | |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 | | |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 | | |
| | | | Thallium | | | | | | 0.E+00 | | | | | | 0.E+00 | | |
| | | | Vanadium | | | | | | 0.E+00 | | | | | | 0.E+00 | | |
| | | | 1,2-Dichloroethane | 3.E-10 | 6.E-10 | 2.E-09 | | | 3.E-09 | NA | NA | 4.E-08 | | | 4.E-08 | | |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | |
| | | | Benzene | 9.E-11 | 2.E-13 | 9.E-10 | | | 1.E-09 | 3.E-06 | 6.E-09 | 1.E-05 | | | 1.E-05 | | |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 | | |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | 3.E-02 | 5.E-05 | 4.E-02 | | | 7.E-02 | | |
| | | | Tetrachloroethene | 3.E-06 | 4.E-07 | 3.E-06 | | | 6.E-06 | 5.E-03 | 5.E-04 | 4.E-02 | | | 4.E-02 | | |
| | | | Toluene | | | | | | 0.E+00 | 1.E-05 | 2.E-06 | 4.E-06 | | | 2.E-05 | | |
| | | | Trichloroethene | 2.E-06 | 2.E-07 | 4.E-05 | | | 4.E-05 | 1.E-01 | 1.E-02 | 3.E-02 | | | 2.E-01 | | |
| | | | Vinyl chloride | 9.E-07 | 2.E-06 | 4.E-05 | | | 4.E-05 | 2.E-03 | 3.E-06 | 3.E-03 | | | 5.E-03 | | |
| | | | Xylenes | | | | | | 0.E+00 | 2.E-06 | 2.E-07 | 4.E-05 | | | 4.E-05 | | |
| Chemical Total | 6.E-06 | 3.E-06 | 8.E-05 | 0.E+00 | 0.E+00 | 9.E-05 | 2.E-01 | 1.E-02 | 1.E-01 | 0.E+00 | 0.E+00 | 3.E-01 | | | | | |
| | | | Exposure Point Total | | | | | | | | | | 9.E-05 | | | | |
| | | | Exposure Medium Total | | | | | | | | | | 9.E-05 | | | | |
| Soil Total | | | | | | | | | | | | | 9.E-05 | | | | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 6.E-03 | 6.E-03 | | |
| | | | 1,1,2-Trichloroethane | | | | | 4.E-08 | 4.E-08 | | | | | 4.E-04 | 4.E-04 | | |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | 3.E-03 | 3.E-03 | | |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | 5.E-02 | 5.E-02 | | |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | 5.E-04 | 5.E-04 | | |
| | | | 1,2-Dichloroethane | | | | | 3.E-05 | 3.E-05 | | | | | 1.E-03 | 1.E-03 | | |
| | | | 1,4-Dichlorobenzene | | | | | 1.E-07 | 1.E-07 | | | | | 6.E-05 | 6.E-05 | | |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | 3.E-04 | 3.E-04 | | |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | 2.E-05 | 2.E-05 | | |
| | | | Benzene | | | | | 1.E-06 | 1.E-06 | | | | | 1.E-02 | 1.E-02 | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | 0.E+00 | 0.E+00 | | | | | 0.E+00 | 0.E+00 | | |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | 6.E-03 | 6.E-03 | | |
| | | | Chloroethane | | | | | 5.E-07 | 5.E-07 | | | | | 1.E-03 | 1.E-03 | | |
| | | | Chloroform | | | | | 9.E-07 | 9.E-07 | | | | | 2.E-03 | 2.E-03 | | |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | 2.E-02 | 2.E-02 | | |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | 8.E-03 | 8.E-03 | | |
| | | | Iron | | | | | 0.E+00 | 0.E+00 | | | | | 0.E+00 | 0.E+00 | | |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | | 2.E-02 | 2.E-02 | | |
| | | | Manganese | | | | | 0.E+00 | 0.E+00 | | | | | 0.E+00 | 0.E+00 | | |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | | 6.E-06 | 6.E-06 | | |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 | | |
| | | | Methylene chloride | | | | | 1.E-07 | 1.E-07 | | | | | 5.E-04 | 5.E-04 | | |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | 7.E-04 | 7.E-04 | | |
| | | | Tetrachloroethene | | | | | 2.E-05 | 2.E-05 | | | | | 2.E-01 | 2.E-01 | | |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | 3.E-03 | 3.E-03 | | |
| | | | Trichloroethene | | | | | 2.E-04 | 2.E-04 | | | | | 1.E-01 | 1.E-01 | | |
| | | | Vinyl chloride | | | | | 5.E-06 | 5.E-06 | | | | | 2.E-02 | 2.E-02 | | |
| | | | Xylenes (Total) | | | | | NA | 0.E+00 | | | | | 3.E-01 | 3.E-01 | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-04 | 3.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 8.E-01 | 8.E-01 | | |
| | | | | | | Exposure Point Total | | | | | | | | | | 3.E-04 | |
| | | | | | | Exposure Medium Total | | | | | | | | | | 3.E-04 | |
| | | | Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | | 0.E+00 | 4.E-01 | 4.E-01 | | | 8.E-01 |
| | | | | | | 1,1,2-Trichloroethane | 4.E-06 | 4.E-06 | | | | 7.E-06 | 1.E-01 | 1.E-01 | | | 2.E-01 |
| 1,1-Dichloroethane | NA | NA | | | | | | | 0.E+00 | 7.E-02 | 7.E-02 | | | 1.E-01 | | | |
| 1,1-Dichloroethene | NA | NA | | | | | | | 0.E+00 | 4.E-01 | 4.E-01 | | | 7.E-01 | | | |
| 1,2,4-Trichlorobenzene | 0.E+00 | 0.E+00 | | | | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | 0.E+00 | | | |
| 1,2-Dichlorobenzene | NA | NA | | | | | | | 0.E+00 | 6.E-02 | 6.E-02 | | | 1.E-01 | | | |
| 1,2-Dichloroethane | 1.E-02 | 1.E-02 | | | | | | | 2.E-02 | NA | NA | | | 0.E+00 | | | |
| 1,4-Dichlorobenzene | 6.E-06 | 6.E-06 | | | | | | | 1.E-05 | 9.E-02 | 9.E-02 | | | 2.E-01 | | | |
| 2-Chlorophenol | NA | NA | | | | | | | 0.E+00 | 2.E-01 | 2.E-01 | | | 3.E-01 | | | |
| 4-Methyl-2-pentanone | NA | NA | | | | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | 6.E-01 | | | |
| Benzene | 3.E-05 | 3.E-05 | | | | | | | 5.E-05 | 1.E+00 | 1.E+00 | | | 3.E+00 | | | |
| Bis(2-ethylhexyl)phthalate | 5.E-07 | 5.E-07 | | | | | | | 1.E-06 | 1.E-02 | 1.E-02 | | | 2.E-02 | | | |
| Bromodichloromethane | 0.E+00 | 0.E+00 | | | | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | 0.E+00 | | | |
| Chlorobenzene | NA | NA | | | | | | | 0.E+00 | 5.E-01 | 5.E-01 | | | 1.E+00 | | | |
| Chloroethane | 3.E-04 | 3.E-04 | | | | | | | 7.E-04 | 3.E-02 | 3.E-02 | | | 6.E-02 | | | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|-------------------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Chloroform | 2.E-06 | 2.E-06 | | | | 4.E-06 | 2.E-01 | 2.E-01 | | | | 5.E-01 |
| | | | cis-1,2-Dichloroethene | NA | NA | | | | 0.E+00 | 9.E+00 | 9.E+00 | | | | 2.E+01 |
| | | | Ethylbenzene | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 2.E+00 |
| | | | Iron | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 |
| | | | Isopropylbenzene | NA | NA | | | | 0.E+00 | 9.E-01 | 9.E-01 | | | | 2.E+00 |
| | | | Manganese | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 2.E+00 |
| | | | Methyl tert butyl ether | 1.E-06 | 1.E-06 | | | | 2.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 9.E-05 | 9.E-05 | | | | 2.E-04 | 4.E-01 | 4.E-01 | | | | 9.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 1.E-02 | 1.E-02 | | | | 3.E-02 |
| | | | Tetrachloroethene | 3.E-03 | 3.E-03 | | | | 6.E-03 | 6.E+00 | 6.E+00 | | | | 1.E+01 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 4.E+00 | 4.E+00 | | | | 8.E+00 |
| | | | Trichloroethene | 2.E-03 | 2.E-03 | | | | 3.E-03 | 2.E+02 | 2.E+02 | | | | 3.E+02 |
| | | | Vinyl chloride | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+00 | 3.E+00 | | | | 5.E+00 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 2.E+00 | 2.E+00 | | | | 4.E+00 |
| | | | Chemical Total | 2.E-02 | 2.E-02 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-02 | 2.E+02 | 2.E+02 | 0.E+00 | 0.E+00 | 0.E+00 | 4.E+02 |
| | | | Exposure Point Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| | | | Exposure Medium Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| Groundwater Total | | | | | | | | | 3.E-02 | | | | | | 4.E+02 |

Total Risk Across All Media = 3.E-02

Total Hazard Across All Media = 395

**Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Subsurface Soil - Hot Spot RIMW-6**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|--------------------|-------------------------------------------|
| 1,2-Dichloroethane | 0.00037 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 4.7E-09 | NA | NA | 0% |
| Benzene | 0.0010 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 1.3E-08 | 4.0E-03 | 3.2E-06 | 0% |
| cis-1,2-Dichloroethene | 23 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 2.9E-04 | 1.0E-02 | 2.9E-02 | 17% |
| Tetrachloroethene | 3.7 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 4.7E-05 | 1.0E-02 | 4.7E-03 | 3% |
| Toluene | 0.091 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 1.2E-06 | 8.0E-02 | 1.5E-05 | 0% |
| Trichloroethene | 3.2 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 4.1E-05 | 3.0E-04 | 1.4E-01 | 79% |
| Vinyl chloride | 0.37 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 4.7E-06 | 3.0E-03 | 1.6E-03 | 1% |
| Xylenes | 0.027 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 3.5E-07 | 2.0E-01 | 1.7E-06 | 0% |

Hazard Index = 1.7E-01

Notes:

(1): Soil EPCs (see Appendix H-3)

**Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Dermal Contact
Subsurface Soil - Hot Spot RIMW-6**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (years) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | RfD _{dermal-adj} Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient (NA) | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|--------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 0.00037 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 4.0E-10 | 8.0E-01 | NA | NA | 0% |
| Benzene | 0.0010 | 2,800 | 0.2 | 0.0005 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.8E-11 | 8.0E-01 | 3.2E-03 | 5.6E-09 | 0% |
| cis-1,2-Dichloroethene | 23 | 2,800 | 0.2 | 0.0005 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 4.1E-07 | 8.0E-01 | 8.0E-03 | 5.1E-05 | 0% |
| Tetrachloroethene | 3.7 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 4.0E-06 | 8.0E-01 | 8.0E-03 | 5.0E-04 | 3% |
| Toluene | 0.091 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 9.8E-08 | 8.0E-01 | 6.4E-02 | 1.5E-06 | 0% |
| Trichloroethene | 3.2 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 3.4E-06 | 8.0E-01 | 2.4E-04 | 1.4E-02 | 96% |
| Vinyl chloride | 0.37 | 2,800 | 0.2 | 0.0005 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 6.6E-09 | 8.0E-01 | 2.4E-03 | 2.8E-06 | 0% |
| Xylenes | 0.027 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 2.9E-08 | 8.0E-01 | 1.6E-01 | 1.8E-07 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 1.5E-02

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Subsurface Soil - Hot Spot RIMW-6

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = [(C_s / \text{PEF}) + (C_s / \text{VF})] * \text{IR}_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_n$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $\text{IR}_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $\text{IR}_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | $\text{ADD}_{\text{inhal}}$ Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient (%) | Percent Distribution of Risk |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|----------------------------------------------------------|------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------|---------------------------|------------------------------------|
| 1,2-Dichloroethane | 0.00037 | NA | 3.91E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.5E-08 | 7.00E-01 | 3.6E-08 | 0% |
| Benzene | 0.0010 | NA | 2.73E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 9.8E-08 | 8.57E-03 | 1.1E-05 | 0% |
| cis-1,2-Dichloroethene | 23 | NA | 2.90E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.1E-03 | 5.71E-02 | 3.7E-02 | 35% |
| Tetrachloroethene | 3.7 | NA | 2.55E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 3.9E-04 | 1.00E-02 | 3.9E-02 | 37% |
| Toluene | 0.091 | NA | 3.98E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 6.1E-06 | 1.43E+00 | 4.3E-06 | 0% |
| Trichloroethene | 3.2 | NA | 3.26E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.6E-04 | 1.0E-02 | 2.6E-02 | 25% |
| Vinyl chloride | 0.37 | NA | 1.04E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 9.5E-05 | 2.9E-02 | 3.3E-03 | 3% |
| Xylenes | 0.027 | NA | 6.10E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 1.2E-06 | 2.9E-02 | 4.1E-05 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
- (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

Hazard Index = 1.0E-01

Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Incidental Ingestion
Subsurface Soil - Hot Spot RIMW-6

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Age Adjusted Soil Ingestion Factor (mg-year/kg-day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | C_1 Conv. Factor (mass) (kg/mg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------|-----------------------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 0.00037 | | chemical is considered mutagenic, see Table xx for risk calculation | | | | | 2.65E-10 | 0% | |
| Benzene | 0.0010 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 1.6E-09 | 5.5E-02 | 8.7E-11 | 0% |
| cis-1,2-Dichloroethene | 23 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 3.6E-05 | NA | NA | 0% |
| Tetrachloroethene | 3.7 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 5.8E-06 | 5.4E-01 | 3.1E-06 | 52% |
| Toluene | 0.091 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 1.4E-07 | NA | NA | 0% |
| Trichloroethene | 3.2 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 5.0E-06 | 4.0E-01 | 2.0E-06 | 33% |
| Vinyl chloride | 0.37 | | chemical is considered mutagenic, see Table xx for risk calculation | | | | | 8.6E-07 | 14% | |
| Xylenes | 0.027 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 4.2E-08 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 6.0E-06

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Dermal Contact
Subsurface Soil - Hot Spot RIMW-6**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SFS Age-Adjusted Dermal Factor (mg-year/kg-event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 0.00037 | | | | | | | | | | 5.9E-10 | 0% |
| Benzene | 0.0010 | 360 | 0.0005 | 350 | 1 | 1.0E-06 | 25,550 | 2.5E-12 | 8.0E-01 | 6.9E-02 | 1.7E-13 | 0% |
| cis-1,2-Dichloroethene | 23 | 360 | 0.0005 | 350 | 1 | 1.0E-06 | 25,550 | 5.7E-08 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 3.7 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 5.5E-07 | 8.0E-01 | 6.8E-01 | 3.7E-07 | 13% |
| Toluene | 0.091 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 1.3E-08 | 8.0E-01 | NA | NA | 0% |
| Trichloroethene | 3.2 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 4.7E-07 | 8.0E-01 | 5.0E-01 | 2.4E-07 | 9% |
| Vinyl chloride | 0.37 | | | | | | | | | | 2.2E-06 | 78% |
| Xylenes | 0.027 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 4.0E-09 | 8.0E-01 | NA | NA | 0% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004

"NA" = Not applicable

Excess Lifetime Cancer Risk = 2.8E-06

**Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Inhalation Exposure
Subsurface Soil - Hot Spot RIMW-6**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = [(C_s / \text{PEF}) + (C_s / \text{VF})] * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_c$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m^3/kg)
- VF = volatilization factor (m^3/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m^3/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m^3/kg) | VF Volatilization Factor ⁽³⁾ (m^3/kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m^3/hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | CSF_{inh} Cancer Slope Factor ($\text{mg}/(\text{kg}/\text{day})^{-1}$) | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|----------------------------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|----------------------------------------------------------|------------------------------|--------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 0.00037 | | | | | | | | | | | | 0% |
| Benzene | 0.0010 | NA | 2.73E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 3.5E-08 | 2.70E-02 | 9.4E-10 | 0% |
| cis-1,2-Dichloroethene | 23 | NA | 2.90E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 7.4E-04 | NA | NA | 0% |
| Tetrachloroethene | 3.7 | NA | 2.55E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.4E-04 | 2.10E-02 | 2.9E-06 | 4% |
| Toluene | 0.091 | NA | 3.98E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 2.1E-06 | NA | NA | 0% |
| Trichloroethene | 3.2 | NA | 3.26E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 9.2E-05 | 3.85E-01 | 3.5E-05 | 46% |
| Vinyl chloride | 0.37 | | | | | | | | | | | | 51% |
| Xylenes | 0.027 | NA | 6.10E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 4.2E-07 | NA | NA | 0% |
| Excess Lifetime Cancer Risk = 7.8E-05 | | | | | | | | | | | | | |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

| Parameter | CS (mg/kg) | 0-2 Years Child Mult. (1/day) | 2-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | CSF (mg/kg*day) ⁻¹ | CSF adjustment factor | | | | ED | | | | EP | Risk | | | | Total Risk | |
|--------------------|---------------|-------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------|-----------------------|-----|------|-------|-----|-----|------|-------|----|----------|----------|----------|----------|---------------|------------------------|
| | | | | | | | 0-2 | 2-6 | 6-15 | 15-30 | 0-2 | 2-6 | 6-15 | 15-30 | | 0-2 | 2-6 | 6-15 | 15-30 | | |
| 1,2-Dichloroethane | 0.00 | 3.31E-05 | 2.30E-05 | 7.06E-06 | 5.92E-06 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 3.19E-10 | 1.33E-10 | 9.16E-11 | 4.27E-11 | 5.86E-10 | Dermal Risk |
| 1,2-Dichloroethane | 0.00 | 1.74E-05 | 9.59E-06 | 2.46E-06 | 1.41E-06 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 1.68E-10 | 5.53E-11 | 3.19E-11 | 1.02E-11 | 2.65E-10 | Ingestion risk |
| 1,2-Dichloroethane | 0.00 | 5.36E-05 | 5.11E-05 | 5.25E-05 | 5.79E-05 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 5.16E-10 | 2.95E-10 | 6.81E-10 | 4.17E-10 | 1.91E-09 | inhalation risk |

| Parameter | CS (mg/kg) | 0-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | Child CSF (mg/kg*day) ⁻¹ | Adult CSF (mg/kg*day) ⁻¹ | ED | | | EP | Risk | | | Total Risk | |
|----------------|---------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|-----|------|-------|----|----------|----------|----------|------------|------------------|
| | | | | | | | 0-6 | 6-15 | 15-30 | | 0-6 | 6-15 | 15-30 | | |
| Vinyl chloride | 0.37 | 1.28E-05 | 2.46E-06 | 1.41E-06 | 1.5E+00 | 7.20E-01 | 6 | 9 | 15 | 70 | 6.08E-07 | 1.75E-07 | 8.05E-08 | 8.64E-07 | ingestion |
| Vinyl chloride | 0.37 | 2.76E-05 | 7.06E-06 | 5.92E-06 | 1.5E+00 | 7.20E-01 | 6 | 9 | 15 | 70 | 1.31E-06 | 5.04E-07 | 3.38E-07 | 2.15E-06 | dermal |
| Vinyl chloride | 0.37 | 2.49E-04 | 2.05E-04 | 2.26E-04 | 1.5E+00 | 7.20E-01 | 6 | 9 | 15 | 70 | 1.19E-05 | 1.46E-05 | 1.29E-05 | 3.93E-05 | dermal |

Appendix H-5.23
Subsurface Soil
Hot Spot RISB-12
Future Excavation Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Excavation Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|-----------------------|---------------------|--------------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| Soil | Subsurface Soil | Hot Spot - RISB-12 | Arsenic | 1.E-07 | 7.E-09 | 4.E-11 | | | 1.E-07 | 2.E-02 | 1.E-03 | NA | | | 2.E-02 |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 2.E-01 | 2.E-02 | NA | | | 2.E-01 |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 2.E-02 | 2.E-03 | 7.E-03 | | | 3.E-02 |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 2.E+00 | 2.E-01 | NA | | | 3.E+00 |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 1.E-01 | 1.E-02 | NA | | | 1.E-01 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | 1.E-08 | 2.E-11 | 6.E-08 | | | 8.E-08 | 5.E-03 | 6.E-06 | 2.E-02 | | | 2.E-02 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | NA | NA | NA | | | 0.E+00 | 1.E-05 | 2.E-08 | 2.E-04 | | | 2.E-04 |
| | | | Tetrachloroethene | 7.E-09 | 6.E-10 | 3.E-09 | | | 1.E-08 | 1.E-05 | 7.E-07 | 9.E-04 | | | 9.E-04 |
| | | | Toluene | NA | NA | NA | | | 0.E+00 | 3.E-03 | 2.E-04 | 3.E-02 | | | 3.E-02 |
| | | | Trichloroethene | 4.E-09 | 3.E-10 | 3.E-08 | | | 4.E-08 | 3.E-03 | 2.E-04 | 6.E-04 | | | 3.E-03 |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Xylenes | NA | NA | NA | | | 0.E+00 | 1.E-02 | 8.E-04 | 3.E-01 | | | 3.E-01 |
| | | | Chemical Total | 1.E-07 | 7.E-09 | 1.E-07 | 0.E+00 | 0.E+00 | 2.E-07 | 3.E+00 | 3.E-01 | 3.E-01 | 0.E+00 | 0.E+00 | 3.E+00 |
| | | | Exposure Point Total | | | | | | 2.E-07 | | | | | | 3.E+00 |
| | | | Exposure Medium Total | | | | | | 2.E-07 | | | | | | 3.E+00 |
| Soil Total | | | | | | | | | 2.E-07 | | | | | | 3.E+00 |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | NA | | 0.E+00 | | | | 9.E-05 | | 9.E-05 |
| | | | 1,1,2-Trichloroethane | | | | 2.E-11 | | 2.E-11 | | | | 6.E-06 | | 6.E-06 |
| | | | 1,1-Dichloroethane | | | | NA | | 0.E+00 | | | | 1.E-06 | | 1.E-06 |
| | | | 1,1-Dichloroethene | | | | NA | | 0.E+00 | | | | 7.E-04 | | 7.E-04 |
| | | | 1,2-Dichlorobenzene | | | | NA | | 0.E+00 | | | | 8.E-06 | | 8.E-06 |
| | | | 1,2-Dichloroethane | | | | NA | | 0.E+00 | | | | 2.E-05 | | 2.E-05 |
| | | | 1,4-Dichlorobenzene | | | | 7.E-11 | | 7.E-11 | | | | 3.E-07 | | 3.E-07 |
| | | | 2-Chlorophenol | | | | NA | | 0.E+00 | | | | NA | | 0.E+00 |
| | | | 4-Methyl-2-pentanone | | | | NA | | 0.E+00 | | | | 3.E-07 | | 3.E-07 |
| | | | Benzene | | | | 5.E-10 | | 5.E-10 | | | | 2.E-04 | | 2.E-04 |
| | | | Bis(2-ethylhexyl)phthalate | | | | NA | | 0.E+00 | | | | NA | | 0.E+00 |
| | | | Chlorobenzene | | | | NA | | 0.E+00 | | | | 9.E-05 | | 9.E-05 |
| | | | Chloroethane | | | | NA | | 0.E+00 | | | | 5.E-06 | | 5.E-06 |
| | | | Chloroform | | | | 5.E-10 | | 5.E-10 | | | | 3.E-05 | | 3.E-05 |
| | | | cis-1,2-Dichloroethene | | | | NA | | 0.E+00 | | | | 2.E-04 | | 2.E-04 |
| | | | Ethylbenzene | | | | NA | | 0.E+00 | | | | 1.E-04 | | 1.E-04 |
| | | | Iron | | | | NA | | 0.E+00 | | | | NA | | 0.E+00 |
| | | | Isopropylbenzene | | | | NA | | 0.E+00 | | | | 3.E-02 | | 3.E-02 |
| | | | Manganese | | | | NA | | 0.E+00 | | | | NA | | 0.E+00 |
| | | | Methyl tert butyl ether | | | | NA | | 0.E+00 | | | | NA | | 0.E+00 |
| | | | Methylcyclohexane | | | | NA | | 0.E+00 | | | | NA | | 0.E+00 |
| | | | Methylene chloride | | | | NA | | 0.E+00 | | | | 3.E-06 | | 3.E-06 |
| | | | Naphthalene | | | | NA | | 0.E+00 | | | | 8.E-06 | | 8.E-06 |
| | | | Tetrachloroethene | | | | 1.E-08 | | 1.E-08 | | | | 4.E-03 | | 4.E-03 |
| | | | Toluene | | | | NA | | 0.E+00 | | | | 6.E-05 | | 6.E-05 |
| | | | Trichloroethene | | | | 1.E-07 | | 1.E-07 | | | | 2.E-03 | | 2.E-03 |
| | | | Vinyl chloride | | | | NA | | 0.E+00 | | | | 4.E-04 | | 4.E-04 |
| Xylenes (Total) | | | | NA | | 0.E+00 | | | | 4.E-03 | | 4.E-03 | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 1.E-07 | 0.E+00 | 1.E-07 | 0.E+00 | 0.E+00 | 0.E+00 | 4.E-02 | 0.E+00 | 4.E-02 |
| | | | Exposure Point Total | | | | | | 1.E-07 | | | | | | 4.E-02 |
| | | | Exposure Medium Total | | | | | | 1.E-07 | | | | | | 4.E-02 |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1,2-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,1-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2,4-Trichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 2-Chlorophenol | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 4-Methyl-2-pentanone | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Bromodichloromethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Ethylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Isopropylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Excavation Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | | |
|-------------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | | |
| | | | Methyl tert butyl ether | | | | | | | | | | | | | | 0.E+00 |
| | | | Methylcyclohexane | | | | | | | | | | | | | | 0.E+00 |
| | | | Methylene chloride | | | | | | | | | | | | | | 0.E+00 |
| | | | Naphthalene | | | | | | | | | | | | | | 0.E+00 |
| | | | Tetrachloroethene | | | | | | | | | | | | | | 0.E+00 |
| | | | Toluene | | | | | | | | | | | | | | 0.E+00 |
| | | | Trichloroethene | | | | | | | | | | | | | | 0.E+00 |
| | | | Vinyl chloride | | | | | | | | | | | | | | 0.E+00 |
| | | | Xylenes (Total) | | | | | | | | | | | | | | 0.E+00 |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | | 0.E+00 | 0.E+00 |
| | | | Exposure Point Total | | | | | | | 0.E+00 | | | | | | | 0.E+00 |
| | | | Exposure Medium Total | | | | | | | 0.E+00 | | | | | | | 0.E+00 |
| Groundwater | | | Total | | | | | | | 1.E-07 | | | | | | | 4.E-02 |

Total Risk Across All Media = 3.E-07

Total Hazard Across All Media = 3

Future Excavation Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Subsurface Soil - Hot Spot RISB-12

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Subchronic Oral RfD ⁽²⁾ (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.5 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 4.8E-06 | 3.0E-04 | 1.6E-02 | 1% |
| Iron | 49000 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.6E-01 | 7.0E-01 | 2.3E-01 | 8% |
| Manganese | 920 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 3.0E-03 | 1.4E-01 | 2.1E-02 | 1% |
| Thallium | 52 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.7E-04 | 7.0E-05 | 2.4E+00 | 86% |
| Vanadium | 210 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 6.8E-04 | 7.0E-03 | 9.7E-02 | 3% |
| Benzene | 5.6 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.8E-05 | 4.0E-03 | 4.5E-03 | 0% |
| cis-1,2-Dichloroethene | 0.39 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.3E-06 | 1.0E-01 | 1.3E-05 | 0% |
| Tetrachloroethene | 0.30 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 9.7E-07 | 1.0E-01 | 9.7E-06 | 0% |
| Toluene | 1900 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 6.1E-03 | 2.0E+00 | 3.1E-03 | 0% |
| Trichloroethene | 0.24 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 7.7E-07 | 3.0E-04 | 2.6E-03 | 0% |
| Xylenes (total) | 650 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 2.1E-03 | 2.0E-01 | 1.0E-02 | 0% |

Hazard Index = 2.8E+00

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): Subchronic RfDs were not available for iron, thallium, benzene, trichloroethene, vinyl chloride or xylenes, therefore, chronic values were implemented.

**Future Excavation Worker Scenario
Estimation of Noncancer Hazard from Dermal Contact
Subsurface Soil - Hot Spot RISB-12**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} Absorption Efficiency ⁽³⁾ (unitless) | $RfD_{dermal-adj}$ Subchronic Dermal Adj. RfD ⁽⁴⁾ (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.5 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 2.9E-07 | 9.5E-01 | 2.9E-04 | 1.0E-03 | 0% |
| Iron | 49000 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 3.2E-03 | 2.0E-01 | 1.4E-01 | 2.3E-02 | 8% |
| Manganese | 920 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 5.9E-05 | 2.0E-01 | 2.8E-02 | 2.1E-03 | 1% |
| Thallium | 52 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 3.4E-06 | 2.0E-01 | 1.4E-05 | 2.4E-01 | 87% |
| Vanadium | 210 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 1.4E-05 | 2.0E-01 | 1.4E-03 | 9.7E-03 | 4% |
| Benzene | 5.6 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 1.8E-08 | 8.0E-01 | 3.2E-03 | 5.7E-06 | 0% |
| cis-1,2-Dichloroethene | 0.39 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 1.3E-09 | 8.0E-01 | 8.0E-02 | 1.6E-08 | 0% |
| Tetrachloroethene | 0.30 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 5.8E-08 | 8.0E-01 | 8.0E-02 | 7.3E-07 | 0% |
| Toluene | 1900 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 3.7E-04 | 8.0E-01 | 1.6E+00 | 2.3E-04 | 0% |
| Trichloroethene | 0.24 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 4.6E-08 | 8.0E-01 | 2.4E-04 | 1.9E-04 | 0% |
| Xylenes (total) | 650 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 1.3E-04 | 8.0E-01 | 1.6E-01 | 7.9E-04 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online
- (4): Subchronic RfDs were not available for iron, thallium, benzene, trichloroethene, vinyl chloride or xylenes, therefore, chronic values were implemented.

Hazard Index = 2.8E-01

Future Excavation Worker Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Subsurface Soil - Hot Spot RISB-12

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m^3/kg)
- VF = volatilization factor (m^3/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m^3/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m^3/kg) | VF Volatilization Factor ⁽³⁾ (m^3/kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m^3/hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | RfD _i Subchronic Inhalation RfD ⁽⁴⁾ (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.5 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 1.7E-10 | NA | NA | 0% |
| Iron | 49000 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 5.6E-06 | NA | NA | 0% |
| Manganese | 920 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 1.1E-07 | 1.43E-05 | 7.4E-03 | 2% |
| Thallium | 52 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 6.0E-09 | NA | NA | 0% |
| Vanadium | 210 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 2.4E-08 | NA | NA | 0% |
| Benzene | 5.6 | NA | 2.73E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 1.6E-04 | 8.57E-03 | 1.9E-02 | 5% |
| cis-1,2-Dichloroethene | 0.39 | NA | 2.90E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 1.1E-05 | 5.71E-02 | 1.8E-04 | 0% |
| Tetrachloroethene | 0.30 | NA | 2.55E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 9.2E-06 | 1.00E-02 | 9.2E-04 | 0% |
| Toluene | 1900 | NA | 3.98E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 3.7E-02 | 1.43E+00 | 2.6E-02 | 8% |
| Trichloroethene | 0.24 | NA | 3.26E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 5.8E-06 | 1.0E-02 | 5.8E-04 | 0% |
| Xylenes (total) | 650 | NA | 6.10E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 8.3E-03 | 2.9E-02 | 2.9E-01 | 84% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

(4): A subchronic RfD was only available for 1,4-dichlorobenzene, therefore, chronic values were implemented for the remainder of the chemicals.

Hazard Index = 3.5E-01

**Future Excavation Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Subsurface Soil - Hot Spot RISB-12**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_0 Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.5 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 6.9E-08 | 1.5E+00 | 1.0E-07 | 80% |
| Iron | 49000 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 2.3E-03 | NA | NA | 0% |
| Manganese | 920 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 4.2E-05 | NA | NA | 0% |
| Thallium | 52 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 2.4E-06 | NA | NA | 0% |
| Vanadium | 210 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 9.7E-06 | NA | NA | 0% |
| Benzene | 5.6 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 2.6E-07 | 5.5E-02 | 1.4E-08 | 11% |
| cis-1,2-Dichloroethene | 0.39 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.8E-08 | NA | NA | 0% |
| Tetrachloroethene | 0.30 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.4E-08 | 5.4E-01 | 7.5E-09 | 6% |
| Toluene | 1900 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 8.8E-05 | NA | NA | 0% |
| Trichloroethene | 0.24 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.1E-08 | 4.0E-01 | 4.4E-09 | 3% |
| Xylenes (total) | 650 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 3.0E-05 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 1.3E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Future Excavation Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Subsurface Soil - Hot Spot RISB-12**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.5 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 4.2E-09 | 9.5E-01 | 1.6E+00 | 6.6E-09 | 88% |
| Iron | 49000 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 4.5E-05 | 2.0E-01 | NA | NA | 0% |
| Manganese | 920 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 8.5E-07 | 2.0E-01 | NA | NA | 0% |
| Thallium | 52 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 4.8E-08 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 210 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.9E-07 | 2.0E-01 | NA | NA | 0% |
| Benzene | 5.6 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 2.6E-10 | 8.0E-01 | 6.9E-02 | 1.8E-11 | 0% |
| cis-1,2-Dichloroethene | 0.39 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.8E-11 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 0.30 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 8.3E-10 | 8.0E-01 | 6.8E-01 | 5.6E-10 | 8% |
| Toluene | 1900 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 5.3E-06 | 8.0E-01 | NA | NA | 0% |
| Trichloroethene | 0.24 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 6.6E-10 | 8.0E-01 | 5.0E-01 | 3.3E-10 | 4% |
| Xylenes (total) | 650 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.8E-06 | 8.0E-01 | NA | NA | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
 - (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or
U.S. EPA Region 4 RAGS Supplement, online
- "NA" = Not applicable

| | |
|--------------------------------------|----------------|
| Excess Lifetime Cancer Risk = | 7.5E-09 |
|--------------------------------------|----------------|

**Future Excavation Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Subsurface Soil - Hot Spot RISB-12**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m^3/kg)
- VF = volatilization factor (m^3/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m^3/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m^3/kg) | VF Volatilization Factor ⁽³⁾ (m^3/kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m^3/hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.5 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 2.5E-12 | 1.51E+01 | 3.7E-11 | 0% |
| Iron | 49000 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 8.1E-08 | NA | NA | 0% |
| Manganese | 920 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.5E-09 | NA | NA | 0% |
| Thallium | 52 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 8.6E-11 | NA | NA | 0% |
| Vanadium | 210 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 3.5E-10 | NA | NA | 0% |
| Benzene | 5.6 | NA | 2.73E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 2.3E-06 | 2.70E-02 | 6.2E-08 | 64% |
| cis-1,2-Dichloroethene | 0.39 | NA | 2.90E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.5E-07 | NA | NA | 0% |
| Tetrachloroethene | 0.30 | NA | 2.55E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.3E-07 | 2.10E-02 | 2.8E-09 | 3% |
| Toluene | 1900 | NA | 3.98E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 5.3E-04 | NA | NA | 0% |
| Trichloroethene | 0.24 | NA | 3.26E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 8.2E-08 | 3.85E-01 | 3.2E-08 | 33% |
| Xylenes (total) | 650 | NA | 6.10E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.2E-04 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 9.6E-08

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
- (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

Appendix H-5.24
Subsurface Soil
Hot Spot RISB-12
Future Industrial Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | | | |
|----------------------------|-----------------|--------------------|----------------------------|---------------------|-------------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|--------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | | | |
| Soil | Subsurface Soil | Hot Spot - RISB-12 | Arsenic | 4.E-07 | 2.E-07 | 9.E-10 | | | | 6.E-07 | 2.E-03 | 1.E-03 | NA | | | 3.E-03 | | |
| | | | Iron | NA | NA | NA | | | | 0.E+00 | 3.E-02 | 2.E-02 | NA | | | 6.E-02 | | |
| | | | Manganese | NA | NA | NA | | | | 0.E+00 | 2.E-02 | 1.E-02 | 7.E-03 | | | 4.E-02 | | |
| | | | Thallium | NA | NA | NA | | | | 0.E+00 | 4.E-01 | 2.E-01 | NA | | | 6.E-01 | | |
| | | | Vanadium | NA | NA | NA | | | | 0.E+00 | 1.E-01 | 7.E-02 | NA | | | 2.E-01 | | |
| | | | 1,2-Dichloroethane | | | | | | | 0.E+00 | | | | | | 0.E+00 | | |
| | | | 1,4-Dichlorobenzene | | | | | | | 0.E+00 | | | | | | 0.E+00 | | |
| | | | Benzene | 5.E-08 | 4.E-10 | 2.E-06 | | | | 2.E-06 | 7.E-04 | 6.E-06 | 2.E-02 | | | 2.E-02 | | |
| | | | Chloroform | | | | | | | 0.E+00 | | | | | | 0.E+00 | | |
| | | | cis-1,2-Dichloroethene | NA | NA | NA | | | | 0.E+00 | 2.E-05 | 2.E-07 | 2.E-04 | | | 2.E-04 | | |
| | | | Tetrachloroethene | 3.E-08 | 1.E-08 | 7.E-08 | | | | 1.E-07 | 1.E-05 | 7.E-06 | 9.E-04 | | | 9.E-04 | | |
| | | | Toluene | NA | NA | NA | | | | 0.E+00 | 1.E-02 | 6.E-03 | 3.E-02 | | | 4.E-02 | | |
| | | | Trichloroethene | 2.E-08 | 8.E-09 | 8.E-07 | | | | 8.E-07 | 4.E-04 | 2.E-04 | 6.E-04 | | | 1.E-03 | | |
| | | | Vinyl chloride | | | | | | | 0.E+00 | | | | | | 0.E+00 | | |
| | | | Xylenes | NA | NA | NA | | | | 0.E+00 | 2.E-03 | 8.E-04 | 3.E-01 | | | 3.E-01 | | |
| | | | | | | Chemical Total | 5.E-07 | 2.E-07 | 2.E-06 | 0.E+00 | 0.E+00 | 3.E-06 | 5.E-01 | 4.E-01 | 3.E-01 | 0.E+00 | 0.E+00 | 1.E+00 |
| | | | | | | Exposure Point Total | | | | | | 3.E-06 | | | | | | 1.E+00 |
| | | | Exposure Medium Total | | | | | | 3.E-06 | | | | | | 1.E+00 | | | |
| Soil Total | | | | | | | | | 3.E-06 | | | | | | 1.E+00 | | | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | | NA | | | | | | 5.E-03 | 5.E-03 | | |
| | | | 1,1,2-Trichloroethane | | | | | | 2.E-08 | 2.E-08 | | | | | 3.E-04 | 3.E-04 | | |
| | | | 1,1-Dichloroethane | | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 | | |
| | | | 1,1-Dichloroethene | | | | | | NA | 0.E+00 | | | | | 3.E-02 | 3.E-02 | | |
| | | | 1,2-Dichlorobenzene | | | | | | NA | 0.E+00 | | | | | 4.E-04 | 4.E-04 | | |
| | | | 1,2-Dichloroethane | | | | | | 2.E-05 | 2.E-05 | | | | | 7.E-04 | 7.E-04 | | |
| | | | 1,4-Dichlorobenzene | | | | | | 8.E-08 | 8.E-08 | | | | | 4.E-05 | 4.E-05 | | |
| | | | 2-Chlorophenol | | | | | | NA | 0.E+00 | | | | | 2.E-04 | 2.E-04 | | |
| | | | 4-Methyl-2-pentanone | | | | | | NA | 0.E+00 | | | | | 1.E-05 | 1.E-05 | | |
| | | | Benzene | | | | | | 6.E-07 | 6.E-07 | | | | | 7.E-03 | 7.E-03 | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | | 0.E+00 | | | | | 0.E+00 | 0.E+00 | | |
| | | | Chlorobenzene | | | | | | NA | 0.E+00 | | | | | 4.E-03 | 4.E-03 | | |
| | | | Chloroethane | | | | | | 3.E-07 | 3.E-07 | | | | | 1.E-03 | 1.E-03 | | |
| | | | Chloroform | | | | | | 5.E-07 | 5.E-07 | | | | | 1.E-03 | 1.E-03 | | |
| | | | cis-1,2-Dichloroethene | | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 | | |
| | | | Ethylbenzene | | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 | | |
| | | | Iron | | | | | | | 0.E+00 | | | | | | 0.E+00 | | |
| | | | Isopropylbenzene | | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 | | |
| | | | Manganese | | | | | | | 0.E+00 | | | | | | 0.E+00 | | |
| | | | Methyl tert butyl ether | | | | | | NA | 0.E+00 | | | | | 4.E-06 | 4.E-06 | | |
| | | | Methylcyclohexane | | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 | | |
| | | | Methylene chloride | | | | | | 7.E-08 | 7.E-08 | | | | | 4.E-04 | 4.E-04 | | |
| | | | Naphthalene | | | | | | NA | 0.E+00 | | | | | 5.E-04 | 5.E-04 | | |
| | | | Tetrachloroethene | | | | | | 1.E-05 | 1.E-05 | | | | | 2.E-01 | 2.E-01 | | |
| | | | Toluene | | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 | | |
| | | | Trichloroethene | | | | | | 1.E-04 | 1.E-04 | | | | | 9.E-02 | 9.E-02 | | |
| | | | Vinyl chloride | | | | | | 3.E-06 | 3.E-06 | | | | | 2.E-02 | 2.E-02 | | |
| | | | Xylenes (Total) | | | | | | NA | 0.E+00 | | | | | 2.E-01 | 2.E-01 | | |
| | | | | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 2.E-04 | 2.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E-01 | 6.E-01 |
| | | | | | | Exposure Point Total | | | | | | 2.E-04 | | | | | | 6.E-01 |
| | | | | | | Exposure Medium Total | | | | | | 2.E-04 | | | | | | 6.E-01 |
| | | | Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 |
| | | | | | | 1,1,2-Trichloroethane | 2.E-06 | 2.E-06 | | | | 5.E-06 | 3.E-02 | 3.E-02 | | | | 6.E-02 |
| 1,1-Dichloroethane | NA | NA | | | | | | | 0.E+00 | 2.E-02 | 2.E-02 | | | | 4.E-02 | | | |
| 1,1-Dichloroethene | NA | NA | | | | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 | | | |
| 1,2,4-Trichlorobenzene | 0.E+00 | 0.E+00 | | | | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 | | | |
| 1,2-Dichlorobenzene | NA | NA | | | | | | | 0.E+00 | NA | NA | | | | 0.E+00 | | | |
| 1,2-Dichloroethane | 1.E-03 | 1.E-03 | | | | | | | 3.E-03 | NA | NA | | | | 0.E+00 | | | |
| 1,4-Dichlorobenzene | 4.E-06 | 4.E-06 | | | | | | | 7.E-06 | 1.E-02 | 1.E-02 | | | | 3.E-02 | | | |
| 2-Chlorophenol | NA | NA | | | | | | | 0.E+00 | 5.E-02 | 5.E-02 | | | | 1.E-01 | | | |
| 4-Methyl-2-pentanone | NA | NA | | | | | | | 0.E+00 | 9.E-02 | 9.E-02 | | | | 2.E-01 | | | |
| Benzene | 2.E-05 | 2.E-05 | | | | | | | 3.E-05 | 2.E-01 | 2.E-01 | | | | 4.E-01 | | | |
| Bis(2-ethylhexyl)phthalate | 3.E-07 | 3.E-07 | | | | | | | 6.E-07 | 3.E-03 | 3.E-03 | | | | 6.E-03 | | | |
| Bromodichloromethane | 0.E+00 | 0.E+00 | | | | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 | | | |
| Chlorobenzene | NA | NA | | | | | | | 0.E+00 | 7.E-02 | 7.E-02 | | | | 1.E-01 | | | |
| Chloroethane | 2.E-06 | 2.E-06 | | | | | | | 4.E-06 | 5.E-03 | 5.E-03 | | | | 9.E-03 | | | |
| Chloroform | 1.E-06 | 1.E-06 | | | | | | | 3.E-06 | 4.E-02 | 4.E-02 | | | | 7.E-02 | | | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | cis-1,2-Dichloroethene | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 3.E+00 |
| | | | Ethylbenzene | NA | NA | | | | 0.E+00 | 2.E-01 | 2.E-01 | | | | 4.E-01 |
| | | | Iron | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 |
| | | | Isopropylbenzene | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 3.E-01 |
| | | | Manganese | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 6.E-01 |
| | | | Methyl tert butyl ether | 6.E-07 | 6.E-07 | | | | 1.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 1.E-05 | 1.E-05 | | | | 2.E-05 | 7.E-02 | 7.E-02 | | | | 1.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 4.E-03 | 4.E-03 | | | | 9.E-03 |
| | | | Tetrachloroethene | 2.E-03 | 2.E-03 | | | | 4.E-03 | 9.E-01 | 9.E-01 | | | | 2.E+00 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 6.E-01 | 6.E-01 | | | | 1.E+00 |
| | | | Trichloroethene | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+01 | 3.E+01 | | | | 5.E+01 |
| | | | Vinyl chloride | 3.E-04 | 3.E-04 | | | | 6.E-04 | 4.E-01 | 4.E-01 | | | | 8.E-01 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 |
| | | | Chemical Total | 5.E-03 | 5.E-03 | 0.E+00 | 0.E+00 | 0.E+00 | 9.E-03 | 3.E+01 | 3.E+01 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E+01 |
| | | | Exposure Point Total | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Exposure Medium Total | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Groundwater Total | | | | | | 9.E-03 | | | | | | 6.E+01 |

Total Risk Across All Media = **9.E-03**

Total Hazard Across All Media = **63**

Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Subsurface Soil - Hot Spot RISB-12

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.5 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 7.3E-07 | 3.0E-04 | 2.4E-03 | 0% |
| Iron | 49000 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.4E-02 | 7.0E-01 | 3.4E-02 | 6% |
| Manganese | 920 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 4.5E-04 | 2.0E-02 | 2.3E-02 | 4% |
| Thallium | 52 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.5E-05 | 7.0E-05 | 3.6E-01 | 67% |
| Vanadium | 210 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.0E-04 | 1.0E-03 | 1.0E-01 | 19% |
| Benzene | 5.6 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.7E-06 | 4.0E-03 | 6.8E-04 | 0% |
| cis-1,2-Dichloroethene | 0.39 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.9E-07 | 1.0E-02 | 1.9E-05 | 0% |
| Tetrachloroethene | 0.30 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.5E-07 | 1.0E-02 | 1.5E-05 | 0% |
| Toluene | 1900 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 9.3E-04 | 8.0E-02 | 1.2E-02 | 2% |
| Trichloroethene | 0.24 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.2E-07 | 3.0E-04 | 3.9E-04 | 0% |
| Xylenes (total) | 650 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 3.2E-04 | 2.0E-01 | 1.6E-03 | 0% |

Hazard Index = 5.4E-01

Notes:

(1): Soil EPCs (see Appendix H-3)

**Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Dermal Contact
Subsurface Soil - Hot Spot RISB-12**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | RF _{dermal-adj} Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.5 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.9E-07 | 9.5E-01 | 2.9E-04 | 1.0E-03 | 0% |
| Iron | 49000 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 3.2E-03 | 2.0E-01 | 1.4E-01 | 2.3E-02 | 6% |
| Manganese | 920 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 5.9E-05 | 2.0E-01 | 4.0E-03 | 1.5E-02 | 4% |
| Thallium | 52 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 3.4E-06 | 2.0E-01 | 1.4E-05 | 2.4E-01 | 68% |
| Vanadium | 210 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.4E-05 | 2.0E-01 | 2.0E-04 | 6.8E-02 | 19% |
| Benzene | 5.6 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.8E-08 | 8.0E-01 | 3.2E-03 | 5.7E-06 | 0% |
| cis-1,2-Dichloroethene | 0.39 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.3E-09 | 8.0E-01 | 8.0E-03 | 1.6E-07 | 0% |
| Tetrachloroethene | 0.30 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 5.8E-08 | 8.0E-01 | 8.0E-03 | 7.3E-06 | 0% |
| Toluene | 1900 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 3.7E-04 | 8.0E-01 | 6.4E-02 | 5.8E-03 | 2% |
| Trichloroethene | 0.24 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 4.6E-08 | 8.0E-01 | 2.4E-04 | 1.9E-04 | 0% |
| Xylenes (total) | 650 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.3E-04 | 8.0E-01 | 1.6E-01 | 7.9E-04 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 3.5E-01

**Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Subsurface Soil - Hot Spot RISB-12**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | RfD_i Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.5 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 1.7E-10 | NA | NA | 0% |
| Iron | 49000 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 5.6E-06 | NA | NA | 0% |
| Manganese | 920 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 1.1E-07 | 1.43E-05 | 7.4E-03 | 2% |
| Thallium | 52 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 6.0E-09 | NA | NA | 0% |
| Vanadium | 210 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 2.4E-08 | NA | NA | 0% |
| Benzene | 5.6 | NA | 2.73E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 1.6E-04 | 8.57E-03 | 1.9E-02 | 5% |
| cis-1,2-Dichloroethene | 0.39 | NA | 2.90E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 1.1E-05 | 5.71E-02 | 1.8E-04 | 0% |
| Tetrachloroethene | 0.30 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 9.2E-06 | 1.00E-02 | 9.2E-04 | 0% |
| Toluene | 1900 | NA | 3.98E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 3.7E-02 | 1.43E+00 | 2.6E-02 | 8% |
| Trichloroethene | 0.24 | NA | 3.26E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 5.8E-06 | 1.0E-02 | 5.8E-04 | 0% |
| Xylenes (total) | 650 | NA | 6.10E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 8.3E-03 | 2.9E-02 | 2.9E-01 | 84% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Hazard Index = 3.5E-01

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Subsurface Soil - Hot Spot RISB-12**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.5 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 2.6E-07 | 1.5E+00 | 3.9E-07 | 80% |
| Iron | 49000 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 8.6E-03 | NA | NA | 0% |
| Manganese | 920 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.6E-04 | NA | NA | 0% |
| Thallium | 52 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 9.1E-06 | NA | NA | 0% |
| Vanadium | 210 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 3.7E-05 | NA | NA | 0% |
| Benzene | 5.6 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 9.8E-07 | 5.5E-02 | 5.4E-08 | 11% |
| cis-1,2-Dichloroethene | 0.39 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 6.8E-08 | NA | NA | 0% |
| Tetrachloroethene | 0.30 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 5.2E-08 | 5.4E-01 | 2.8E-08 | 6% |
| Toluene | 1900 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 3.3E-04 | NA | NA | 0% |
| Trichloroethene | 0.24 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 4.2E-08 | 4.0E-01 | 1.7E-08 | 3% |
| Xylenes (total) | 650 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.1E-04 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 4.9E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Subsurface Soil - Hot Spot RISB-12**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.5 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.0E-07 | 9.5E-01 | 1.6E+00 | 1.6E-07 | 88% |
| Iron | 49000 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.1E-03 | 2.0E-01 | NA | NA | 0% |
| Manganese | 920 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.1E-05 | 2.0E-01 | NA | NA | 0% |
| Thallium | 52 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.2E-06 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 210 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 4.8E-06 | 2.0E-01 | NA | NA | 0% |
| Benzene | 5.6 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 6.5E-09 | 8.0E-01 | 6.9E-02 | 4.4E-10 | 0% |
| cis-1,2-Dichloroethene | 0.39 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 4.5E-10 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 0.30 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.1E-08 | 8.0E-01 | 6.8E-01 | 1.4E-08 | 8% |
| Toluene | 1900 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.3E-04 | 8.0E-01 | NA | NA | 0% |
| Trichloroethene | 0.24 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.7E-08 | 8.0E-01 | 5.0E-01 | 8.3E-09 | 4% |
| Xylenes (total) | 650 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 4.5E-05 | 8.0E-01 | NA | NA | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
 - (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online
- "NA" = Not applicable

Excess Lifetime Cancer Risk = 1.9E-07

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Subsurface Soil - Hot Spot RISB-12**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m^3/kg)
- VF = volatilization factor (m^3/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m^3/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m^3/kg) | VF Volatilization Factor ⁽³⁾ (m^3/kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m^3/hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.5 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 6.2E-11 | 1.51E+01 | 9.3E-10 | 0% |
| Iron | 49000 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.0E-06 | NA | NA | 0% |
| Manganese | 920 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.8E-08 | NA | NA | 0% |
| Thallium | 52 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.1E-09 | NA | NA | 0% |
| Vanadium | 210 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 8.6E-09 | NA | NA | 0% |
| Benzene | 5.6 | NA | 2.73E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 5.7E-05 | 2.70E-02 | 1.5E-06 | 64% |
| cis-1,2-Dichloroethene | 0.39 | NA | 2.90E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.8E-06 | NA | NA | 0% |
| Tetrachloroethene | 0.30 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.3E-06 | 2.10E-02 | 6.9E-08 | 3% |
| Toluene | 1900 | NA | 3.98E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 1.3E-02 | NA | NA | 0% |
| Trichloroethene | 0.24 | NA | 3.26E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.1E-06 | 3.85E-01 | 7.9E-07 | 33% |
| Xylenes (total) | 650 | NA | 6.10E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.0E-03 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 2.4E-06

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
- (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

Appendix H-5.25
Subsurface Soil
Hot Spot RISB-12
Future Resident

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|------------------------------|---------------------|--------------------|-----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| Soil | Subsurface Soil | Hot Spot - RISB-12 | Arsenic | 4.E-06 | 4.E-07 | 3.E-09 | | | 4.E-06 | 6.E-02 | 6.E-03 | NA | | | 7.E-02 |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 9.E-01 | 1.E-01 | NA | | | 1.E+00 |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 6.E-01 | 8.E-02 | 3.E-02 | | | 7.E-01 |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 9.E+00 | 1.E+00 | NA | | | 1.E+01 |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 3.E+00 | 4.E-01 | NA | | | 3.E+00 |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | 5.E-07 | 9.E-10 | 5.E-06 | | | 6.E-06 | 2.E-02 | 3.E-05 | 6.E-02 | | | 8.E-02 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | NA | NA | NA | | | 0.E+00 | 5.E-04 | 9.E-07 | NA | | | 5.E-04 |
| | | | Tetrachloroethene | 3.E-07 | 3.E-08 | 2.E-07 | | | 5.E-07 | 4.E-04 | 4.E-05 | 3.E-03 | | | 4.E-03 |
| | | | Toluene | NA | NA | NA | | | 0.E+00 | 3.E-01 | 3.E-02 | 9.E-02 | | | 4.E-01 |
| | | | Trichloroethene | 1.E-07 | 2.E-08 | 3.E-06 | | | 3.E-06 | 1.E-02 | 1.E-03 | 2.E-03 | | | 1.E-02 |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Xylenes | NA | NA | NA | | | 0.E+00 | 4.E-02 | 4.E-03 | 1.E+00 | | | 1.E+00 |
| Chemical Total | 4.E-06 | 4.E-07 | 8.E-06 | 0.E+00 | 0.E+00 | 1.E-05 | 1.E+01 | 2.E+00 | 1.E+00 | 0.E+00 | 0.E+00 | 2.E+01 | | | |
| Exposure Point Total | | | | | | 1.E-05 | | | | | | 2.E+01 | | | |
| Exposure Medium Total | | | | | | 1.E-05 | | | | | | 2.E+01 | | | |
| Soil Total | | | | | | 1.E-05 | | | | | | 2.E+01 | | | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | 6.E-03 | 6.E-03 | |
| | | | 1,1,2-Trichloroethane | | | | | 4.E-08 | 4.E-08 | | | | 4.E-04 | 4.E-04 | |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | 3.E-03 | 3.E-03 | |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | 5.E-02 | 5.E-02 | |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | 5.E-04 | 5.E-04 | |
| | | | 1,2-Dichloroethane | | | | | 3.E-05 | 3.E-05 | | | | 1.E-03 | 1.E-03 | |
| | | | 1,4-Dichlorobenzene | | | | | 1.E-07 | 1.E-07 | | | | 6.E-05 | 6.E-05 | |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | 3.E-04 | 3.E-04 | |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | 2.E-05 | 2.E-05 | |
| | | | Benzene | | | | | 1.E-06 | 1.E-06 | | | | 1.E-02 | 1.E-02 | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | 6.E-03 | 6.E-03 | |
| | | | Chloroethane | | | | | 5.E-07 | 5.E-07 | | | | 1.E-03 | 1.E-03 | |
| | | | Chloroform | | | | | 9.E-07 | 9.E-07 | | | | 2.E-03 | 2.E-03 | |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | 2.E-02 | 2.E-02 | |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | 8.E-03 | 8.E-03 | |
| | | | Iron | | | | | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | 2.E-02 | 2.E-02 | |
| | | | Manganese | | | | | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | 6.E-06 | 6.E-06 | |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | 1.E-02 | 1.E-02 | |
| | | | Methylene chloride | | | | | 1.E-07 | 1.E-07 | | | | 5.E-04 | 5.E-04 | |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | 7.E-04 | 7.E-04 | |
| | | | Tetrachloroethene | | | | | 2.E-05 | 2.E-05 | | | | 2.E-01 | 2.E-01 | |
| | | | Toluene | | | | | NA | 0.E+00 | | | | 3.E-03 | 3.E-03 | |
| | | | Trichloroethene | | | | | 2.E-04 | 2.E-04 | | | | 1.E-01 | 1.E-01 | |
| | | | Vinyl chloride | | | | | 5.E-06 | 5.E-06 | | | | 2.E-02 | 2.E-02 | |
| | | | Xylenes (Total) | | | | | NA | 0.E+00 | | | | 3.E-01 | 3.E-01 | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-04 | 3.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 8.E-01 | 8.E-01 |
| | | | Exposure Point Total | | | | | | 3.E-04 | | | | | 8.E-01 | 8.E-01 |
| Exposure Medium Total | | | | | | 3.E-04 | | | | | 8.E-01 | 8.E-01 | | | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | 0.E+00 | 4.E-01 | 4.E-01 | | | | 8.E-01 | |
| | | | 1,1,2-Trichloroethane | 4.E-06 | 4.E-06 | | | 7.E-06 | 1.E-01 | 1.E-01 | | | | 2.E-01 | |
| | | | 1,1-Dichloroethane | NA | NA | | | 0.E+00 | 7.E-02 | 7.E-02 | | | | 1.E-01 | |
| | | | 1,1-Dichloroethene | NA | NA | | | 0.E+00 | 4.E-01 | 4.E-01 | | | | 7.E-01 | |
| | | | 1,2,4-Trichlorobenzene | 0.E+00 | 0.E+00 | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 | |
| | | | 1,2-Dichlorobenzene | NA | NA | | | 0.E+00 | 6.E-02 | 6.E-02 | | | | 1.E-01 | |
| | | | 1,2-Dichloroethane | 1.E-02 | 1.E-02 | | | 2.E-02 | NA | NA | | | | 0.E+00 | |
| | | | 1,4-Dichlorobenzene | 6.E-06 | 6.E-06 | | | 1.E-05 | 9.E-02 | 9.E-02 | | | | 2.E-01 | |
| | | | 2-Chlorophenol | NA | NA | | | 0.E+00 | 2.E-01 | 2.E-01 | | | | 3.E-01 | |
| | | | 4-Methyl-2-pentanone | NA | NA | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 6.E-01 | |
| | | | Benzene | 3.E-05 | 3.E-05 | | | 5.E-05 | 1.E+00 | 1.E+00 | | | | 3.E+00 | |
| | | | Bis(2-ethylhexyl)phthalate | 5.E-07 | 5.E-07 | | | 1.E-06 | 1.E-02 | 1.E-02 | | | | 2.E-02 | |
| | | | Bromodichloromethane | 0.E+00 | 0.E+00 | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 | |
| | | | Chlorobenzene | NA | NA | | | 0.E+00 | 5.E-01 | 5.E-01 | | | | 1.E+00 | |
| | | | Chloroethane | 3.E-04 | 3.E-04 | | | 7.E-04 | 3.E-02 | 3.E-02 | | | | 6.E-02 | |
| | | | Chloroform | 2.E-06 | 2.E-06 | | | 4.E-06 | 2.E-01 | 2.E-01 | | | | 5.E-01 | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|-------------------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | cis-1,2-Dichloroethene | NA | NA | | | | 0.E+00 | 9.E+00 | 9.E+00 | | | | 2.E+01 |
| | | | Ethylbenzene | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 2.E+00 |
| | | | Iron | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 |
| | | | Isopropylbenzene | NA | NA | | | | 0.E+00 | 9.E-01 | 9.E-01 | | | | 2.E+00 |
| | | | Manganese | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 2.E+00 |
| | | | Methyl tert butyl ether | 1.E-06 | 1.E-06 | | | | 2.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 9.E-05 | 9.E-05 | | | | 2.E-04 | 4.E-01 | 4.E-01 | | | | 9.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 1.E-02 | 1.E-02 | | | | 3.E-02 |
| | | | Tetrachloroethene | 3.E-03 | 3.E-03 | | | | 6.E-03 | 6.E+00 | 6.E+00 | | | | 1.E+01 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 4.E+00 | 4.E+00 | | | | 8.E+00 |
| | | | Trichloroethene | 2.E-03 | 2.E-03 | | | | 3.E-03 | 2.E+02 | 2.E+02 | | | | 3.E+02 |
| | | | Vinyl chloride | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+00 | 3.E+00 | | | | 5.E+00 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 2.E+00 | 2.E+00 | | | | 4.E+00 |
| | | | Chemical Total | 2.E-02 | 2.E-02 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-02 | 2.E+02 | 2.E+02 | 0.E+00 | 0.E+00 | 0.E+00 | 4.E+02 |
| | | | Exposure Point Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| | | | Exposure Medium Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| Groundwater Total | | | | | | | | | 3.E-02 | | | | | | 4.E+02 |

Total Risk Across All Media = 3.E-02

Total Hazard Across All Media = 412

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Subsurface Soil - Hot Spot RISB-12

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.5 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 1.9E-05 | 3.0E-04 | 6.4E-02 | 0% |
| Iron | 49000 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 6.3E-01 | 7.0E-01 | 8.9E-01 | 6% |
| Manganese | 920 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 1.2E-02 | 2.0E-02 | 5.9E-01 | 4% |
| Thallium | 52 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 6.6E-04 | 7.0E-05 | 9.5E+00 | 67% |
| Vanadium | 210 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 2.7E-03 | 1.0E-03 | 2.7E+00 | 19% |
| Benzene | 5.6 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 7.2E-05 | 4.0E-03 | 1.8E-02 | 0% |
| cis-1,2-Dichloroethene | 0.39 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 5.0E-06 | 1.0E-02 | 5.0E-04 | 0% |
| Tetrachloroethene | 0.30 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 3.8E-06 | 1.0E-02 | 3.8E-04 | 0% |
| Toluene | 1,900 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 2.4E-02 | 8.0E-02 | 3.0E-01 | 2% |
| Trichloroethene | 0.24 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 3.1E-06 | 3.0E-04 | 1.0E-02 | 0% |
| Xylenes | 650 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 8.3E-03 | 2.0E-01 | 4.2E-02 | 0% |

Hazard Index = 1.4E+01

Notes:

(1): Soil EPCs (see Appendix H-3)

**Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Dermal Contact
Subsurface Soil - Hot Spot RISB-12**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (years) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | RfD _{dermal-adj} Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient (%) | Percent Distribution of Risk |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|--------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------|------------------------------------|
| Arsenic | 1.5 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.6E-06 | 9.5E-01 | 2.9E-04 | 5.7E-03 | 0% |
| Iron | 49000 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.8E-02 | 2.0E-01 | 1.4E-01 | 1.3E-01 | 6% |
| Manganese | 920 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 3.3E-04 | 2.0E-01 | 4.0E-03 | 8.2E-02 | 4% |
| Thallium | 52 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.9E-05 | 2.0E-01 | 1.4E-05 | 1.3E+00 | 68% |
| Vanadium | 210 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 7.5E-05 | 2.0E-01 | 2.0E-04 | 3.8E-01 | 19% |
| Benzene | 5.6 | 2,800 | 0.2 | 0.0005 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.0E-07 | 8.0E-01 | 3.2E-03 | 3.1E-05 | 0% |
| cis-1,2-Dichloroethene | 0.39 | 2,800 | 0.2 | 0.0005 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 7.0E-09 | 8.0E-01 | 8.0E-03 | 8.7E-07 | 0% |
| Tetrachloroethene | 0.30 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 3.2E-07 | 8.0E-01 | 8.0E-03 | 4.0E-05 | 0% |
| Toluene | 1,900 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 2.0E-03 | 8.0E-01 | 6.4E-02 | 3.2E-02 | 2% |
| Trichloroethene | 0.24 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 2.6E-07 | 8.0E-01 | 2.4E-04 | 1.1E-03 | 0% |
| Xylenes | 650 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 7.0E-04 | 8.0E-01 | 1.6E-01 | 4.4E-03 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 2.0E+00

**Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Subsurface Soil - Hot Spot RISB-12**

PSC Site
Rock Hill, South Carolina

$$ADD_{inhal\ lung} = [(C_s / PEF) + (C_s / VF)] * IR_{air-hourly} * EF * ED * ET_{inh} / BW * AT_n$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- IR_{air-hourly} = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_n = averaging time (days)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | IR _{air-hourly} Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET _{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 1.5 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 5.9E-10 | NA | NA | 0% |
| Iron | 49000 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 1.9E-05 | NA | NA | 0% |
| Manganese | 920 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 3.6E-07 | 1.43E-05 | 2.5E-02 | 2% |
| Thallium | 52 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.0E-08 | NA | NA | 0% |
| Vanadium | 210 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 8.2E-08 | NA | NA | 0% |
| Benzene | 5.6 | NA | 2.73E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 5.4E-04 | 8.57E-03 | 6.4E-02 | 5% |
| cis-1,2-Dichloroethene | 0.39 | NA | 2.90E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 3.6E-05 | 5.71E-02 | NA | 0% |
| Tetrachloroethene | 0.30 | NA | 2.55E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 3.1E-05 | 1.00E-02 | 3.1E-03 | 0% |
| Toluene | 1,900 | NA | 3.98E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 1.3E-01 | 1.43E+00 | 8.9E-02 | 8% |
| Trichloroethene | 0.24 | NA | 3.26E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.0E-05 | 1.0E-02 | 2.0E-03 | 0% |
| Xylenes | 650 | NA | 6.10E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.8E-02 | 2.9E-02 | 9.9E-01 | 84% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
- (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

| |
|-------------------------------|
| Hazard Index = 1.2E+00 |
|-------------------------------|

Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Incidental Ingestion
Subsurface Soil - Hot Spot RISB-12

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Age Adgusted Soil Ingestion Factor (mg-year/kg-day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | C_1 Conv. Factor (mass) (kg/mg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------|-----------------------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.5 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 2.3E-06 | 1.5E+00 | 3.5E-06 | 80% |
| Iron | 49000 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 7.7E-02 | NA | NA | 0% |
| Manganese | 920 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 1.4E-03 | NA | NA | 0% |
| Thallium | 52 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 8.1E-05 | NA | NA | 0% |
| Vanadium | 210 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 3.3E-04 | NA | NA | 0% |
| Benzene | 5.6 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 8.7E-06 | 5.5E-02 | 4.8E-07 | 11% |
| cis-1,2-Dichloroethene | 0.39 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 6.1E-07 | NA | NA | 0% |
| Tetrachloroethene | 0.30 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 4.7E-07 | 5.4E-01 | 2.5E-07 | 6% |
| Toluene | 1,900 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 3.0E-03 | NA | NA | 0% |
| Trichloroethene | 0.24 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 3.7E-07 | 4.0E-01 | 1.5E-07 | 3% |
| Xylenes | 650 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 1.0E-03 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 4.4E-06

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Dermal Contact
Subsurface Soil - Hot Spot RISB-12**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SFS Age-Adjusted Dermal Factor (mg-year/kg-event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.5 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 2.2E-07 | 9.5E-01 | 1.6E+00 | 3.5E-07 | 88% |
| Iron | 49000 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 2.4E-03 | 2.0E-01 | NA | NA | 0% |
| Manganese | 920 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 4.5E-05 | 2.0E-01 | NA | NA | 0% |
| Thallium | 52 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 2.6E-06 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 210 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 1.0E-05 | 8.0E-01 | NA | NA | 0% |
| Benzene | 5.6 | 360 | 0.0005 | 350 | 1 | 1.0E-06 | 25,550 | 1.4E-08 | 8.0E-01 | 6.9E-02 | 9.5E-10 | 0% |
| cis-1,2-Dichloroethene | 0.39 | 360 | 0.0005 | 350 | 1 | 1.0E-06 | 25,550 | 9.6E-10 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 0.30 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 4.4E-08 | 8.0E-01 | 6.8E-01 | 3.0E-08 | 8% |
| Toluene | 1,900 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 2.8E-04 | 8.0E-01 | NA | NA | 0% |
| Trichloroethene | 0.24 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 3.6E-08 | 8.0E-01 | 5.0E-01 | 1.8E-08 | 4% |
| Xylenes | 650 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 9.6E-05 | 8.0E-01 | NA | NA | 0% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004

"NA" = Not applicable

Excess Lifetime Cancer Risk = 4.0E-07

**Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Inhalation Exposure
Subsurface Soil - Hot Spot RISB-12**

PSC Site
Rock Hill, South Carolina

$$ADD_{inhal\ lung} = [(C_s / PEF) + (C_s / VF)] * IR_{air-hourly} * EF * ED * ET_{inh} / BW * AT_c$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- IR_{air-hourly} = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | IR _{air-hourly} Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET _{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT _c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 1.5 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 2.1E-10 | 1.51E+01 | 3.1E-09 | 0% |
| Iron | 49000 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 6.8E-06 | NA | NA | 0% |
| Manganese | 920 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.3E-07 | NA | NA | 0% |
| Thallium | 52 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 7.2E-09 | NA | NA | 0% |
| Vanadium | 210 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 2.9E-08 | NA | NA | 0% |
| Benzene | 5.6 | NA | 2.73E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.9E-04 | 2.70E-02 | 5.2E-06 | 64% |
| cis-1,2-Dichloroethene | 0.39 | NA | 2.90E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.3E-05 | NA | NA | 0% |
| Tetrachloroethene | 0.30 | NA | 2.55E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.1E-05 | 2.10E-02 | 2.3E-07 | 3% |
| Toluene | 1,900 | NA | 3.98E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 4.5E-02 | NA | NA | 0% |
| Trichloroethene | 0.24 | NA | 3.26E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 6.9E-06 | 3.85E-01 | 2.7E-06 | 33% |
| Xylenes | 650 | NA | 6.10E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.0E-02 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 8.1E-06

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

| Parameter | CS (mg/kg) | 0-2 Years Child Mult. (1/day) | 2-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | CSF (mg/kg*day) ⁻¹ | CSF adjustment factor | | | | ED | | | | EP | Risk | | | | Total Risk | | |
|--------------------|---------------|-------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------|-----------------------|-----|------|-------|-----|-----|------|-------|----|----------|----------|----------|----------|---------------|----------|-----------------|
| | | | | | | | 0-2 | 2-6 | 6-15 | 15-30 | 0-2 | 2-6 | 6-15 | 15-30 | | 0-2 | 2-6 | 6-15 | 15-30 | | | |
| 1,2-Dichloroethane | ##### | 3.31E-05 | 2.30E-05 | 7.06E-06 | 5.92E-06 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | Dermal Risk |
| 1,2-Dichloroethane | ##### | 1.74E-05 | 9.59E-06 | 2.46E-06 | 1.41E-06 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | Ingestion risk |
| 1,2-Dichloroethane | ##### | 5.36E-05 | 5.11E-05 | 5.25E-05 | 5.79E-05 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | Inhalation risk |

4 8
4 8
4.5 9
4.5 9

| Parameter | CS (mg/kg) | 0-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | Child CSF (mg/kg*day) ⁻¹ | Adult CSF (mg/kg*day) ⁻¹ | ED | | | EP | Risk | | | Total Risk | |
|----------------|---------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|-----|------|-------|----|----------|----------|----------|------------|-----------|
| | | | | | | | 0-6 | 6-15 | 15-30 | | 0-6 | 6-15 | 15-30 | | |
| Vinyl chloride | 0.00 | 1.28E-05 | 2.46E-06 | 1.41E-06 | 1.5E+00 | 7.20E-01 | 6 | 9 | 15 | 70 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | ingestion |
| Vinyl chloride | 0.00 | 2.76E-05 | 7.06E-06 | 5.92E-06 | 1.5E+00 | 7.20E-01 | 6 | 9 | 15 | 70 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | dermal |
| Vinyl chloride | 0.00 | 2.49E-04 | 2.05E-04 | 2.26E-04 | 1.5E+00 | 7.20E-01 | 6 | 9 | 15 | 70 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | dermal |

5.5 11
5.5 11
7 13
7 13
8 16
8 16

8.6 0.52 6-15
0.15 0-2
0.26 2-6

Appendix H-5.26
Subsurface Soil
Hot Spot RISB-18
Future Excavation Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Excavation Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|-----------------------|---------------------|--------------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| Soil | Subsurface Soil | Hot Spot - RISB-18 | Arsenic | 6.E-08 | 4.E-09 | 2.E-11 | | | 7.E-08 | 1.E-02 | 6.E-04 | NA | | | 1.E-02 |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 1.E-01 | 1.E-02 | NA | | | 1.E-01 |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 2.E-02 | 2.E-03 | 7.E-03 | | | 3.E-02 |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 1.E+00 | 1.E-01 | NA | | | 1.E+00 |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 2.E-02 | 2.E-03 | NA | | | 2.E-02 |
| | | | 1,2-Dichloroethane | 2.E-08 | NA | 1.E-07 | | | 1.E-07 | NA | NA | 1.E-04 | | | 1.E-04 |
| | | | 1,4-Dichlorobenzene | 4.E-09 | 3.E-10 | 8.E-09 | | | 1.E-08 | 1.E-05 | 1.E-06 | 3.E-05 | | | 5.E-05 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | NA | NA | NA | | | 0.E+00 | 1.E-05 | 2.E-08 | 2.E-04 | | | 2.E-04 |
| | | | Tetrachloroethene | 8.E-10 | 6.E-11 | 3.E-10 | | | 1.E-09 | 1.0E-06 | 8.E-08 | 1.E-04 | | | 1.E-04 |
| | | | Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Trichloroethene | 8.E-09 | 6.E-10 | 6.E-08 | | | 7.E-08 | 5.E-03 | 4.E-04 | 1.E-03 | | | 6.E-03 |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Xylenes | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chemical Total | 1.E-07 | 5.E-09 | 2.E-07 | 0.E+00 | 0.E+00 | 3.E-07 | 1.E+00 | 1.E-01 | 8.E-03 | 0.E+00 | 0.E+00 | 1.E+00 |
| | | | Exposure Point Total | | | | | | 3.E-07 | | | | | | 1.E+00 |
| | | | Exposure Medium Total | | | | | | 3.E-07 | | | | | | 1.E+00 |
| Soil Total | | | | | | | | | 3.E-07 | | | | | | 1.E+00 |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | 9.E-05 | 9.E-05 | |
| | | | 1,1,2-Trichloroethane | | | | | 2.E-11 | 2.E-11 | | | | 6.E-06 | 6.E-06 | |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | 1.E-06 | 1.E-06 | |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | 7.E-04 | 7.E-04 | |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | 8.E-06 | 8.E-06 | |
| | | | 1,2-Dichloroethane | | | | | NA | 0.E+00 | | | | 2.E-05 | 2.E-05 | |
| | | | 1,4-Dichlorobenzene | | | | | 7.E-11 | 7.E-11 | | | | 3.E-07 | 3.E-07 | |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | NA | 0.E+00 | |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | 3.E-07 | 3.E-07 | |
| | | | Benzene | | | | | 5.E-10 | 5.E-10 | | | | 2.E-04 | 2.E-04 | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | NA | 0.E+00 | | | | NA | 0.E+00 | |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | 9.E-05 | 9.E-05 | |
| | | | Chloroethane | | | | | NA | 0.E+00 | | | | 5.E-06 | 5.E-06 | |
| | | | Chloroform | | | | | 5.E-10 | 5.E-10 | | | | 3.E-05 | 3.E-05 | |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | 2.E-04 | 2.E-04 | |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | 1.E-04 | 1.E-04 | |
| | | | Iron | | | | | NA | 0.E+00 | | | | NA | 0.E+00 | |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | 3.E-02 | 3.E-02 | |
| | | | Manganese | | | | | NA | 0.E+00 | | | | NA | 0.E+00 | |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | NA | 0.E+00 | |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | NA | 0.E+00 | |
| | | | Methylene chloride | | | | | NA | 0.E+00 | | | | 3.E-06 | 3.E-06 | |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | 8.E-06 | 8.E-06 | |
| | | | Tetrachloroethene | | | | | 1.E-08 | 1.E-08 | | | | 4.E-03 | 4.E-03 | |
| | | | Toluene | | | | | NA | 0.E+00 | | | | 6.E-05 | 6.E-05 | |
| | | | Trichloroethene | | | | | 1.E-07 | 1.E-07 | | | | 2.E-03 | 2.E-03 | |
| | | | Vinyl chloride | | | | | NA | 0.E+00 | | | | 4.E-04 | 4.E-04 | |
| Xylenes (Total) | | | | | NA | 0.E+00 | | | | 4.E-03 | 4.E-03 | | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 1.E-07 | 0.E+00 | 1.E-07 | 0.E+00 | 0.E+00 | 0.E+00 | 4.E-02 | 4.E-02 | |
| | | | Exposure Point Total | | | | | | 1.E-07 | | | | | 4.E-02 | |
| | | | Exposure Medium Total | | | | | | 1.E-07 | | | | | 4.E-02 | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | | | | | | 0.E+00 | | | | | 0.E+00 | |
| | | | 1,1,2-Trichloroethane | | | | | | 0.E+00 | | | | | 0.E+00 | |
| | | | 1,1-Dichloroethane | | | | | | 0.E+00 | | | | | 0.E+00 | |
| | | | 1,1-Dichloroethene | | | | | | 0.E+00 | | | | | 0.E+00 | |
| | | | 1,2,4-Trichlorobenzene | | | | | | 0.E+00 | | | | | 0.E+00 | |
| | | | 1,2-Dichlorobenzene | | | | | | 0.E+00 | | | | | 0.E+00 | |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | 0.E+00 | |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | 0.E+00 | |
| | | | 2-Chlorophenol | | | | | | 0.E+00 | | | | | 0.E+00 | |
| | | | 4-Methyl-2-pentanone | | | | | | 0.E+00 | | | | | 0.E+00 | |
| | | | Benzene | | | | | | 0.E+00 | | | | | 0.E+00 | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | 0.E+00 | |
| | | | Bromodichloromethane | | | | | | 0.E+00 | | | | | 0.E+00 | |
| | | | Chlorobenzene | | | | | | 0.E+00 | | | | | 0.E+00 | |
| | | | Chloroethane | | | | | | 0.E+00 | | | | | 0.E+00 | |
| | | | Chloroform | | | | | | 0.E+00 | | | | | 0.E+00 | |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | 0.E+00 | |
| Ethylbenzene | | | | | | 0.E+00 | | | | | 0.E+00 | | | | |
| Iron | | | | | | 0.E+00 | | | | | 0.E+00 | | | | |
| Isopropylbenzene | | | | | | 0.E+00 | | | | | 0.E+00 | | | | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Excavation Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Exposure Route Total | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|----------------------------------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | |
| | | | Manganese | | | | | | 0.E+00 | | | | | | | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | | 0.E+00 | | | | | | | 0.E+00 |
| | | | Methylcyclohexane | | | | | | 0.E+00 | | | | | | | 0.E+00 |
| | | | Methylene chloride | | | | | | 0.E+00 | | | | | | | 0.E+00 |
| | | | Naphthalene | | | | | | 0.E+00 | | | | | | | 0.E+00 |
| | | | Tetrachloroethene | | | | | | 0.E+00 | | | | | | | 0.E+00 |
| | | | Toluene | | | | | | 0.E+00 | | | | | | | 0.E+00 |
| | | | Trichloroethene | | | | | | 0.E+00 | | | | | | | 0.E+00 |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | | 0.E+00 |
| | | | Xylenes (Total) | | | | | | 0.E+00 | | | | | | | 0.E+00 |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 |
| | | | Exposure Point Total | | | | | | 0.E+00 | | | | | | | 0.E+00 |
| | | | Exposure Medium Total | | | | | | 0.E+00 | | | | | | | 0.E+00 |
| | | | Groundwater Total | | | | | | 1.E-07 | | | | | | | 4.E-02 |

Total Risk Across All Media = 4.E-07

Total Hazard Across All Media = 1

Future Excavation Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Subsurface Soil - Hot Spot RISB-18

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Subchronic Oral RfD ⁽²⁾ (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------|----------------------------------------------------------------|
| Arsenic | 0.92 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 3.0E-06 | 3.0E-04 | 9.9E-03 | 1% |
| Iron | 21000 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 6.8E-02 | 7.0E-01 | 9.7E-02 | 8% |
| Manganese | 830 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 2.7E-03 | 1.4E-01 | 1.9E-02 | 2% |
| Thallium | 22 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 7.1E-05 | 7.0E-05 | 1.0E+00 | 87% |
| Vanadium | 42 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.4E-04 | 7.0E-03 | 1.9E-02 | 2% |
| 1,2-Dichloroethane | 4.8 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.5E-05 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 4.0 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.3E-05 | 9.0E-01 | 1.4E-05 | 0% |
| cis-1,2-Dichloroethene | 0.46 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.5E-06 | 1.0E-01 | 1.5E-05 | 0% |
| Tetrachloroethene | 0.031 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.0E-07 | 1.0E-01 | 1.0E-06 | 0% |
| Trichloroethene | 0.45 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.5E-06 | 3.0E-04 | 4.9E-03 | 0% |

Hazard Index = 1.2E+00

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): Subchronic RfDs were not available for iron, thallium, benzene, trichloroethene, vinyl chloride or xylenes, therefore, chronic values were implemented.

**Future Excavation Worker Scenario
Estimation of Noncancer Hazard from Dermal Contact
Subsurface Soil - Hot Spot RISB-18**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | RfD _{dermal-adj} Subchronic Dermal Adj. RfD ⁽⁴⁾ (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 0.92 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 1.8E-07 | 9.5E-01 | 2.9E-04 | 6.3E-04 | 1% |
| Iron | 21000 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 1.4E-03 | 2.0E-01 | 1.4E-01 | 9.7E-03 | 8% |
| Manganese | 830 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 5.4E-05 | 2.0E-01 | 2.8E-02 | 1.9E-03 | 2% |
| Thallium | 22 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 1.4E-06 | 2.0E-01 | 1.4E-05 | 1.0E-01 | 87% |
| Vanadium | 42 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 2.7E-06 | 2.0E-01 | 1.4E-03 | 1.9E-03 | 2% |
| 1,2-Dichloroethane | 4.8 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 9.3E-07 | 8.0E-01 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 4.0 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 7.7E-07 | 8.0E-01 | 7.2E-01 | 1.1E-06 | 0% |
| cis-1,2-Dichloroethene | 0.46 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 1.5E-09 | 8.0E-01 | 8.0E-02 | 1.9E-08 | 0% |
| Tetrachloroethene | 0.031 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 6.0E-09 | 8.0E-01 | 8.0E-02 | 7.5E-08 | 0% |
| Trichloroethene | 0.45 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 8.8E-08 | 8.0E-01 | 2.4E-04 | 3.6E-04 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online
- (4): Subchronic RfDs were not available for iron, thallium, benzene, trichloroethene, vinyl chloride or xylenes, therefore, chronic values were implemented.

Hazard Index = 1.2E-01

**Future Excavation Worker Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Subsurface Soil - Hot Spot RISB-18**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | RfD _i Subchronic Inhalation RfD ⁽⁴⁾ (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 0.92 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 1.1E-10 | NA | NA | 0% |
| Iron | 21000 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 2.4E-06 | NA | NA | 0% |
| Manganese | 830 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 9.6E-08 | 1.43E-05 | 6.7E-03 | 81% |
| Thallium | 22 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 2.5E-09 | NA | NA | 0% |
| Vanadium | 42 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 4.8E-09 | NA | NA | 0% |
| 1,2-Dichloroethane | 4.8 | NA | 3.91E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 9.6E-05 | 7.00E-01 | 1.4E-04 | 2% |
| 1,4-Dichlorobenzene | 4.0 | NA | 1.29E+04 | 1 | 250 | 1 | 8 | 70 | 365 | 2.4E-05 | 7.14E-01 | 3.4E-05 | 0% |
| cis-1,2-Dichloroethene | 0.46 | NA | 2.90E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 1.2E-05 | 5.71E-02 | 2.2E-04 | 3% |
| Tetrachloroethene | 0.031 | NA | 2.55E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 9.5E-07 | 1.00E-02 | 9.5E-05 | 1% |
| Trichloroethene | 0.45 | NA | 3.26E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 1.1E-05 | 1.0E-02 | 1.1E-03 | 13% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

(4): A subchronic RfD was only available for 1,4-dichlorobenzene, therefore, chronic values were implemented for the remainder of the chemicals.

Hazard Index = 8.3E-03

**Future Excavation Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Subsurface Soil - Hot Spot RISB-18**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|--------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 0.92 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 4.2E-08 | 1.5E+00 | 6.4E-08 | 65% |
| Iron | 21000 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 9.7E-04 | NA | NA | 0% |
| Manganese | 830 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 3.8E-05 | NA | NA | 0% |
| Thallium | 22 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.0E-06 | NA | NA | 0% |
| Vanadium | 42 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.9E-06 | NA | NA | 0% |
| 1,2-Dichloroethane | 4.8 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 2.2E-07 | 9.1E-02 | 2.0E-08 | 21% |
| 1,4-Dichlorobenzene | 4.0 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.8E-07 | 2.4E-02 | 4.4E-09 | 5% |
| cis-1,2-Dichloroethene | 0.46 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 2.1E-08 | NA | NA | 0% |
| Tetrachloroethene | 0.031 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.4E-09 | 5.4E-01 | 7.7E-10 | 1% |
| Trichloroethene | 0.45 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 2.1E-08 | 4.0E-01 | 8.3E-09 | 9% |

Excess Lifetime Cancer Risk = 9.7E-08

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Future Excavation Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Subsurface Soil - Hot Spot RISB-18**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 0.92 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 2.5E-09 | 9.5E-01 | 1.6E+00 | 4.0E-09 | 80% |
| Iron | 21000 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.9E-05 | 2.0E-01 | NA | NA | 0% |
| Manganese | 830 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 7.7E-07 | 2.0E-01 | NA | NA | 0% |
| Thallium | 22 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 2.0E-08 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 42 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 3.9E-08 | 2.0E-01 | NA | NA | 0% |
| 1,2-Dichloroethane | 4.8 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.3E-08 | 8.0E-01 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 4.0 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.1E-08 | 8.0E-01 | 3.0E-02 | 3.3E-10 | 7% |
| cis-1,2-Dichloroethene | 0.46 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 2.1E-11 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 0.031 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 8.6E-11 | 8.0E-01 | 6.8E-01 | 5.8E-11 | 1% |
| Trichloroethene | 0.45 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.3E-09 | 8.0E-01 | 5.0E-01 | 6.3E-10 | 12% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
 - (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online
- "NA" = Not applicable

| | |
|--------------------------------------|----------------|
| Excess Lifetime Cancer Risk = | 5.0E-09 |
|--------------------------------------|----------------|

**Future Excavation Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Subsurface Soil - Hot Spot RISB-18**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 0.92 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.5E-12 | 1.51E+01 | 2.3E-11 | 0% |
| Iron | 21000 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 3.5E-08 | NA | NA | 0% |
| Manganese | 830 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.4E-09 | NA | NA | 0% |
| Thallium | 22 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 3.6E-11 | NA | NA | 0% |
| Vanadium | 42 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 6.9E-11 | NA | NA | 0% |
| 1,2-Dichloroethane | 4.8 | NA | 3.91E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.4E-06 | 9.10E-02 | 1.2E-07 | 65% |
| 1,4-Dichlorobenzene | 4.0 | NA | 1.29E+04 | 1 | 250 | 1 | 8 | 70 | 25,550 | 3.5E-07 | 2.20E-02 | 7.6E-09 | 4% |
| cis-1,2-Dichloroethene | 0.46 | NA | 2.90E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.8E-07 | NA | NA | 0% |
| Tetrachloroethene | 0.031 | NA | 2.55E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.4E-08 | 2.10E-02 | 2.9E-10 | 0% |
| Trichloroethene | 0.45 | NA | 3.26E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.6E-07 | 3.85E-01 | 6.0E-08 | 31% |

Excess Lifetime Cancer Risk = 1.9E-07

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
- (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

Appendix H-5.27
Subsurface Soil
Hot Spot RISB-18
Future Industrial Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|-----------------------|---------------------|--------------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| Soil | Subsurface Soil | Hot Spot - RISB-18 | Arsenic | 2.E-07 | 1.E-07 | 6.E-10 | | | 3.E-07 | 2.E-03 | 6.E-04 | NA | | | 2.E-03 |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 1.E-02 | 1.E-02 | NA | | | 2.E-02 |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 2.E-02 | 1.E-02 | 7.E-03 | | | 4.E-02 |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 2.E-01 | 1.E-01 | NA | | | 3.E-01 |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 2.E-02 | 1.E-02 | NA | | | 3.E-02 |
| | | | 1,2-Dichloroethane | NA | NA | 3.E-06 | | | 3.E-06 | NA | NA | 1.E-04 | | | 1.E-04 |
| | | | 1,4-Dichlorobenzene | 2.E-08 | 8.E-09 | 2.E-07 | | | 2.E-07 | 7.E-05 | 3.E-05 | 1.E-04 | | | 2.E-04 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | NA | NA | NA | | | 0.E+00 | 2.E-05 | 2.E-07 | 2.E-04 | | | 2.E-04 |
| | | | Tetrachloroethene | 3.E-09 | 1.E-09 | 7.E-09 | | | 1.E-08 | 2.E-06 | 8.E-07 | 1.E-04 | | | 1.E-04 |
| | | | Toluene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Trichloroethene | 3.E-08 | 2.E-08 | 1.E-06 | | | 2.E-06 | 7.E-04 | 4.E-04 | 1.E-03 | | | 2.E-03 |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Xylenes | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chemical Total | 3.E-07 | 1.E-07 | 5.E-06 | 0.E+00 | 0.E+00 | 5.E-06 | 2.E-01 | 1.E-01 | 8.E-03 | 0.E+00 | 0.E+00 | 4.E-01 |
| | | | Exposure Point Total | | | | | | 5.E-06 | | | | | | 4.E-01 |
| | | | Exposure Medium Total | | | | | | 5.E-06 | | | | | | 4.E-01 |
| Soil Total | | | | | | | | | 5.E-06 | | | | | | 4.E-01 |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 |
| | | | 1,1,2-Trichloroethane | | | | | 2.E-08 | 2.E-08 | | | | | 3.E-04 | 3.E-04 |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | 3.E-02 | 3.E-02 |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | 4.E-04 | 4.E-04 |
| | | | 1,2-Dichloroethane | | | | | 2.E-05 | 2.E-05 | | | | | 7.E-04 | 7.E-04 |
| | | | 1,4-Dichlorobenzene | | | | | 8.E-08 | 8.E-08 | | | | | 4.E-05 | 4.E-05 |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | 2.E-04 | 2.E-04 |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | 1.E-05 | 1.E-05 |
| | | | Benzene | | | | | 6.E-07 | 6.E-07 | | | | | 7.E-03 | 7.E-03 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | NA | 0.E+00 | | | | | 0.E+00 | 0.E+00 |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | 4.E-03 | 4.E-03 |
| | | | Chloroethane | | | | | 3.E-07 | 3.E-07 | | | | | 1.E-03 | 1.E-03 |
| | | | Chloroform | | | | | 5.E-07 | 5.E-07 | | | | | 1.E-03 | 1.E-03 |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 |
| | | | Iron | | | | | NA | 0.E+00 | | | | | 0.E+00 | 0.E+00 |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 |
| | | | Manganese | | | | | NA | 0.E+00 | | | | | 0.E+00 | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | | 4.E-06 | 4.E-06 |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 |
| | | | Methylene chloride | | | | | 7.E-08 | 7.E-08 | | | | | 4.E-04 | 4.E-04 |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | 5.E-04 | 5.E-04 |
| | | | Tetrachloroethene | | | | | 1.E-05 | 1.E-05 | | | | | 2.E-01 | 2.E-01 |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 |
| | | | Trichloroethene | | | | | 1.E-04 | 1.E-04 | | | | | 9.E-02 | 9.E-02 |
| | | | Vinyl chloride | | | | | 3.E-06 | 3.E-06 | | | | | 2.E-02 | 2.E-02 |
| Xylenes (Total) | | | | | NA | 0.E+00 | | | | | 2.E-01 | 2.E-01 | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 2.E-04 | 2.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E-01 | 6.E-01 |
| | | | Exposure Point Total | | | | | | 2.E-04 | | | | | | 6.E-01 |
| | | | Exposure Medium Total | | | | | | 2.E-04 | | | | | | 6.E-01 |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 |
| | | | 1,1,2-Trichloroethane | 2.E-06 | 2.E-06 | | | | 5.E-06 | 3.E-02 | 3.E-02 | | | | 6.E-02 |
| | | | 1,1-Dichloroethane | NA | NA | | | | 0.E+00 | 2.E-02 | 2.E-02 | | | | 4.E-02 |
| | | | 1,1-Dichloroethene | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 |
| | | | 1,2,4-Trichlorobenzene | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 |
| | | | 1,2-Dichlorobenzene | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | 1.E-03 | 1.E-03 | | | | 3.E-03 | NA | NA | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | 4.E-06 | 4.E-06 | | | | 7.E-06 | 1.E-02 | 1.E-02 | | | | 3.E-02 |
| | | | 2-Chlorophenol | NA | NA | | | | 0.E+00 | 5.E-02 | 5.E-02 | | | | 1.E-01 |
| | | | 4-Methyl-2-pentanone | NA | NA | | | | 0.E+00 | 9.E-02 | 9.E-02 | | | | 2.E-01 |
| | | | Benzene | 2.E-05 | 2.E-05 | | | | 3.E-05 | 2.E-01 | 2.E-01 | | | | 4.E-01 |
| | | | Bis(2-ethylhexyl)phthalate | 3.E-07 | 3.E-07 | | | | 6.E-07 | 3.E-03 | 3.E-03 | | | | 6.E-03 |
| | | | Bromodichloromethane | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 |
| | | | Chlorobenzene | NA | NA | | | | 0.E+00 | 7.E-02 | 7.E-02 | | | | 1.E-01 |
| | | | Chloroethane | 2.E-06 | 2.E-06 | | | | 4.E-06 | 5.E-03 | 5.E-03 | | | | 9.E-03 |
| | | | Chloroform | 1.E-06 | 1.E-06 | | | | 3.E-06 | 4.E-02 | 4.E-02 | | | | 7.E-02 |
| | | | cis-1,2-Dichloroethene | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 3.E+00 |
| | | | Ethylbenzene | NA | NA | | | | 0.E+00 | 2.E-01 | 2.E-01 | | | | 4.E-01 |
| | | | Iron | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 |
| | | | Isopropylbenzene | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 3.E-01 |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Manganese | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 6.E-01 |
| | | | Methyl tert butyl ether | 6.E-07 | 6.E-07 | | | | 1.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 1.E-05 | 1.E-05 | | | | 2.E-05 | 7.E-02 | 7.E-02 | | | | 1.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 4.E-03 | 4.E-03 | | | | 9.E-03 |
| | | | Tetrachloroethene | 2.E-03 | 2.E-03 | | | | 4.E-03 | 9.E-01 | 9.E-01 | | | | 2.E+00 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 6.E-01 | 6.E-01 | | | | 1.E+00 |
| | | | Trichloroethene | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+01 | 3.E+01 | | | | 5.E+01 |
| | | | Vinyl chloride | 3.E-04 | 3.E-04 | | | | 6.E-04 | 4.E-01 | 4.E-01 | | | | 8.E-01 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 |
| | | | Chemical Total | 5.E-03 | 5.E-03 | 0.E+00 | 0.E+00 | 0.E+00 | 9.E-03 | 3.E+01 | 3.E+01 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E+01 |
| | | | Exposure Point Total | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Exposure Medium Total | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Groundwater Total | | | | | | 9.E-03 | | | | | | 6.E+01 |

Total Risk Across All Media = 9.E-03

Total Hazard Across All Media = 62

Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Subsurface Soil- Hot Spot RISB-18

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient (mg/kg-day) | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|-----------------------------------|-------------------------------------------|
| Arsenic | 0.92 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 4.5E-07 | 3.0E-04 | 1.5E-03 | 1% |
| Iron | 21000 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.0E-02 | 7.0E-01 | 1.5E-02 | 7% |
| Manganese | 830 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 4.1E-04 | 2.0E-02 | 2.0E-02 | 10% |
| Thallium | 22 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.1E-05 | 7.0E-05 | 1.5E-01 | 73% |
| Vanadium | 42 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.1E-05 | 1.0E-03 | 2.1E-02 | 10% |
| 1,2-Dichloroethane | 4.8 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.3E-06 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 4.0 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.0E-06 | 3.0E-02 | 6.5E-05 | 0% |
| cis-1,2-Dichloroethene | 0.46 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.3E-07 | 1.0E-02 | 2.3E-05 | 0% |
| Tetrachloroethene | 0.031 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.5E-08 | 1.0E-02 | 1.5E-06 | 0% |
| Toluene | 0.044 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.2E-08 | 8.0E-02 | 2.7E-07 | 0% |
| Trichloroethene | 0.45 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.2E-07 | 3.0E-04 | 7.4E-04 | 0% |

Hazard Index = 2.1E-01

Notes:

(1): Soil EPCs (see Appendix H-3)

**Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Dermal Contact
Subsurface Soil- Hot Spot RISB-18**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | RFD _{dermal-adj} Chronic Dermal Adj. RFD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 0.92 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.8E-07 | 9.5E-01 | 2.9E-04 | 6.3E-04 | 0% |
| Iron | 21000 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.4E-03 | 2.0E-01 | 1.4E-01 | 9.7E-03 | 7% |
| Manganese | 830 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 5.4E-05 | 2.0E-01 | 4.0E-03 | 1.3E-02 | 10% |
| Thallium | 22 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.4E-06 | 2.0E-01 | 1.4E-05 | 1.0E-01 | 73% |
| Vanadium | 42 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.7E-06 | 2.0E-01 | 2.0E-04 | 1.4E-02 | 10% |
| 1,2-Dichloroethane | 4.8 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 9.3E-07 | 8.0E-01 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 4.0 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 7.7E-07 | 8.0E-01 | 2.4E-02 | 3.2E-05 | 0% |
| cis-1,2-Dichloroethene | 0.46 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.5E-09 | 8.0E-01 | 8.0E-03 | 1.9E-07 | 0% |
| Tetrachloroethene | 0.031 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 6.0E-09 | 8.0E-01 | 8.0E-03 | 7.5E-07 | 0% |
| Toluene | 0.044 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 8.5E-09 | 8.0E-01 | 6.4E-02 | 1.3E-07 | 0% |
| Trichloroethene | 0.45 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 8.8E-08 | 8.0E-01 | 2.4E-04 | 3.6E-04 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 1.4E-01

**Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Subsurface Soil- Hot Spot RISB-18**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m^3/kg)
- VF = volatilization factor (m^3/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m^3/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m^3/kg) | VF Volatilization Factor ⁽³⁾ (m^3/kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m^3/hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | RfD_i Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 0.92 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 1.1E-10 | NA | NA | 0% |
| Iron | 21000 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 2.4E-06 | NA | NA | 0% |
| Manganese | 830 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 9.6E-08 | 1.43E-05 | 6.7E-03 | 80% |
| Thallium | 22 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 2.5E-09 | NA | NA | 0% |
| Vanadium | 42 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 4.8E-09 | NA | NA | 0% |
| 1,2-Dichloroethane | 4.8 | NA | 3.91E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 9.6E-05 | 7.00E-01 | 1.4E-04 | 2% |
| 1,4-Dichlorobenzene | 4.0 | NA | 1.29E+04 | 1 | 250 | 25 | 8 | 70 | 9125 | 2.4E-05 | 2.29E-01 | 1.1E-04 | 1% |
| cis-1,2-Dichloroethene | 0.46 | NA | 2.90E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 1.2E-05 | 5.71E-02 | 2.2E-04 | 3% |
| Tetrachloroethene | 0.031 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 9.5E-07 | 1.00E-02 | 9.5E-05 | 1% |
| Toluene | 0.044 | NA | 3.98E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 8.7E-07 | 1.43E+00 | 6.1E-07 | 0% |
| Trichloroethene | 0.45 | NA | 3.26E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 1.1E-05 | 1.0E-02 | 1.1E-03 | 13% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Hazard Index = 8.3E-03

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Subsurface Soil- Hot Spot RISB-18**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 0.92 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.6E-07 | 1.5E+00 | 2.4E-07 | 82% |
| Iron | 21000 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 3.7E-03 | NA | NA | 0% |
| Manganese | 830 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.5E-04 | NA | NA | 0% |
| Thallium | 22 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 3.8E-06 | NA | NA | 0% |
| Vanadium | 42 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 7.3E-06 | NA | NA | 0% |
| 1,2-Dichloroethane | 4.8 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 8.4E-07 | 9.1E-02 | NA | 0% |
| 1,4-Dichlorobenzene | 4.0 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 7.0E-07 | 2.4E-02 | 1.7E-08 | 6% |
| cis-1,2-Dichloroethene | 0.46 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 8.0E-08 | NA | NA | 0% |
| Tetrachloroethene | 0.031 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 5.4E-09 | 5.4E-01 | 2.9E-09 | 1% |
| Toluene | 0.044 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 7.7E-09 | NA | NA | 0% |
| Trichloroethene | 0.45 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 7.9E-08 | 4.0E-01 | 3.2E-08 | 11% |

Excess Lifetime Cancer Risk = 2.9E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Subsurface Soil- Hot Spot RISB-18**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 0.92 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 6.4E-08 | 9.5E-01 | 1.6E+00 | 1.0E-07 | 80% |
| Iron | 21000 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 4.8E-04 | 2.0E-01 | NA | NA | 0% |
| Manganese | 830 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.9E-05 | 2.0E-01 | NA | NA | 0% |
| Thallium | 22 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 5.1E-07 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 42 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 9.7E-07 | 2.0E-01 | NA | NA | 0% |
| 1,2-Dichloroethane | 4.8 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 3.3E-07 | 8.0E-01 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 4.0 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.8E-07 | 8.0E-01 | 3.0E-02 | 8.3E-09 | 7% |
| cis-1,2-Dichloroethene | 0.46 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 5.3E-10 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 0.031 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.1E-09 | 8.0E-01 | 6.8E-01 | 1.4E-09 | 1% |
| Toluene | 0.044 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 3.0E-09 | 8.0E-01 | NA | NA | 0% |
| Trichloroethene | 0.45 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 3.1E-08 | 8.0E-01 | 5.0E-01 | 1.6E-08 | 12% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
 - (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online
- "NA" = Not applicable

Excess Lifetime Cancer Risk = 1.3E-07

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Subsurface Soil- Hot Spot RISB-18**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m^3/kg)
- VF = volatilization factor (m^3/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m^3/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m^3/kg) | VF Volatilization Factor ⁽³⁾ (m^3/kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m^3/hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 0.92 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.8E-11 | 1.51E+01 | 5.7E-10 | 0% |
| Iron | 21000 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 8.6E-07 | NA | NA | 0% |
| Manganese | 830 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.4E-08 | NA | NA | 0% |
| Thallium | 22 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 9.0E-10 | NA | NA | 0% |
| Vanadium | 42 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 1.7E-09 | NA | NA | 0% |
| 1,2-Dichloroethane | 4.8 | NA | 3.91E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.4E-05 | 9.10E-02 | 3.1E-06 | 65% |
| 1,4-Dichlorobenzene | 4.0 | NA | 1.29E+04 | 1 | 250 | 25 | 8 | 70 | 25,550 | 8.6E-06 | 2.20E-02 | 1.9E-07 | 4% |
| cis-1,2-Dichloroethene | 0.46 | NA | 2.90E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 4.4E-06 | NA | NA | 0% |
| Tetrachloroethene | 0.031 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.4E-07 | 2.10E-02 | 7.1E-09 | 0% |
| Toluene | 0.044 | NA | 3.98E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.1E-07 | NA | NA | 0% |
| Trichloroethene | 0.45 | NA | 3.26E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.9E-06 | 3.85E-01 | 1.5E-06 | 31% |

Excess Lifetime Cancer Risk = 4.8E-06

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Appendix H-5.28
Subsurface Soil
Hot Spot RISB-18
Future Resident

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | |
|-----------------------|---------------------|--------------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | |
| Soil | Subsurface Soil | Hot Spot - RISB-18 | Arsenic | 2.E-06 | 2.E-07 | 2.E-09 | | | | 2.E-06 | 4.E-02 | 3.E-03 | NA | | | 4.E-02 |
| | | | Iron | NA | NA | NA | | | | 0.E+00 | 4.E-01 | 5.E-02 | NA | | | 4.E-01 |
| | | | Manganese | NA | NA | NA | | | | 0.E+00 | 5.E-01 | 7.E-02 | 2.E-02 | | | 6.E-01 |
| | | | Thallium | NA | NA | NA | | | | 0.E+00 | 4.E+00 | 6.E-01 | NA | | | 5.E+00 |
| | | | Vanadium | NA | NA | NA | | | | 0.E+00 | 5.E-01 | 8.E-02 | NA | | | 6.E-01 |
| | | | 1,2-Dichloroethane | 3.E-06 | 8.E-06 | 2.E-05 | | | | 4.E-05 | NA | NA | 5.E-04 | | | 5.E-04 |
| | | | 1,4-Dichlorobenzene | 1.E-07 | 2.E-08 | 6.E-07 | | | | 8.E-07 | 2.E-03 | 2.E-04 | 4.E-04 | | | 2.E-03 |
| | | | Benzene | | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | cis-1,2-Dichloroethene | NA | NA | NA | | | | 0.E+00 | 6.E-04 | 1.E-06 | 7.E-04 | | | 1.E-03 |
| | | | Tetrachloroethene | 3.E-08 | 3.E-09 | 2.E-08 | | | | 5.E-08 | 4.E-05 | 4.E-06 | 3.E-04 | | | 4.E-04 |
| | | | Toluene | | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Trichloroethene | 3.E-07 | 3.E-08 | 5.E-06 | | | | 5.E-06 | 2.E-02 | 2.E-03 | 4.E-03 | | | 2.E-02 |
| | | | Vinyl chloride | | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Xylenes | | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chemical Total | 6.E-06 | 8.E-06 | 3.E-05 | 0.E+00 | 0.E+00 | 4.E-05 | 6.E+00 | 8.E-01 | 3.E-02 | 0.E+00 | 0.E+00 | 6.E+00 | |
| | | | Exposure Point Total | | | | | | 4.E-05 | | | | | | 6.E+00 | |
| | | | Exposure Medium Total | | | | | | 4.E-05 | | | | | | 6.E+00 | |
| Soil Total | | | | | | | | | 4.E-05 | | | | | | 6.E+00 | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | | 6.E-03 | 6.E-03 |
| | | | 1,1,2-Trichloroethane | | | | | 4.E-08 | 4.E-08 | | | | | | 4.E-04 | 4.E-04 |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | | 3.E-03 | 3.E-03 |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | | 5.E-02 | 5.E-02 |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | | 5.E-04 | 5.E-04 |
| | | | 1,2-Dichloroethane | | | | | 3.E-05 | 3.E-05 | | | | | | 1.E-03 | 1.E-03 |
| | | | 1,4-Dichlorobenzene | | | | | 1.E-07 | 1.E-07 | | | | | | 6.E-05 | 6.E-05 |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | | 3.E-04 | 3.E-04 |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | | 2.E-05 | 2.E-05 |
| | | | Benzene | | | | | 1.E-06 | 1.E-06 | | | | | | 1.E-02 | 1.E-02 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | 0.E+00 | 0.E+00 | | | | | | 0.E+00 | 0.E+00 |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | | 6.E-03 | 6.E-03 |
| | | | Chloroethane | | | | | 5.E-07 | 5.E-07 | | | | | | 1.E-03 | 1.E-03 |
| | | | Chloroform | | | | | 9.E-07 | 9.E-07 | | | | | | 2.E-03 | 2.E-03 |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | | 2.E-02 | 2.E-02 |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | | 8.E-03 | 8.E-03 |
| | | | Iron | | | | | 0.E+00 | 0.E+00 | | | | | | 0.E+00 | 0.E+00 |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | | | 2.E-02 | 2.E-02 |
| | | | Manganese | | | | | 0.E+00 | 0.E+00 | | | | | | 0.E+00 | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | | | 6.E-06 | 6.E-06 |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | | 1.E-02 | 1.E-02 |
| | | | Methylene chloride | | | | | 1.E-07 | 1.E-07 | | | | | | 5.E-04 | 5.E-04 |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | | 7.E-04 | 7.E-04 |
| | | | Tetrachloroethene | | | | | 2.E-05 | 2.E-05 | | | | | | 2.E-01 | 2.E-01 |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | | 3.E-03 | 3.E-03 |
| | | | Trichloroethene | | | | | 2.E-04 | 2.E-04 | | | | | | 1.E-01 | 1.E-01 |
| | | | Vinyl chloride | | | | | 5.E-06 | 5.E-06 | | | | | | 2.E-02 | 2.E-02 |
| Xylenes (Total) | | | | | NA | 0.E+00 | | | | | | 3.E-01 | 3.E-01 | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-04 | 3.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 8.E-01 | 8.E-01 | |
| | | | Exposure Point Total | | | | | | 3.E-04 | | | | | | 8.E-01 | |
| | | | Exposure Medium Total | | | | | | 3.E-04 | | | | | | 8.E-01 | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | | 0.E+00 | 4.E-01 | 4.E-01 | | | | 8.E-01 | |
| | | | 1,1,2-Trichloroethane | 4.E-06 | 4.E-06 | | | | 7.E-06 | 1.E-01 | 1.E-01 | | | | 2.E-01 | |
| | | | 1,1-Dichloroethane | NA | NA | | | | 0.E+00 | 7.E-02 | 7.E-02 | | | | 1.E-01 | |
| | | | 1,1-Dichloroethene | NA | NA | | | | 0.E+00 | 4.E-01 | 4.E-01 | | | | 7.E-01 | |
| | | | 1,2,4-Trichlorobenzene | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 | |
| | | | 1,2-Dichlorobenzene | NA | NA | | | | 0.E+00 | 6.E-02 | 6.E-02 | | | | 1.E-01 | |
| | | | 1,2-Dichloroethane | 1.E-02 | 1.E-02 | | | | 2.E-02 | NA | NA | | | | 0.E+00 | |
| | | | 1,4-Dichlorobenzene | 6.E-06 | 6.E-06 | | | | 1.E-05 | 9.E-02 | 9.E-02 | | | | 2.E-01 | |
| | | | 2-Chlorophenol | NA | NA | | | | 0.E+00 | 2.E-01 | 2.E-01 | | | | 3.E-01 | |
| | | | 4-Methyl-2-pentanone | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 6.E-01 | |
| | | | Benzene | 3.E-05 | 3.E-05 | | | | 5.E-05 | 1.E+00 | 1.E+00 | | | | 3.E+00 | |
| | | | Bis(2-ethylhexyl)phthalate | 5.E-07 | 5.E-07 | | | | 1.E-06 | 1.E-02 | 1.E-02 | | | | 2.E-02 | |
| | | | Bromodichloromethane | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 | |
| | | | Chlorobenzene | NA | NA | | | | 0.E+00 | 5.E-01 | 5.E-01 | | | | 1.E+00 | |
| | | | Chloroethane | 3.E-04 | 3.E-04 | | | | 7.E-04 | 3.E-02 | 3.E-02 | | | | 6.E-02 | |
| | | | Chloroform | 2.E-06 | 2.E-06 | | | | 4.E-06 | 2.E-01 | 2.E-01 | | | | 5.E-01 | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|------------------------------|---------------|---------------|-------------------------------|------------------------|-----------------------|----------------------------------|---------------|---------------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | cis-1,2-Dichloroethene | NA | NA | | | | 0.E+00 | 9.E+00 | 9.E+00 | | | | 2.E+01 |
| | | | Ethylbenzene | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 2.E+00 |
| | | | Iron | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 |
| | | | Isopropylbenzene | NA | NA | | | | 0.E+00 | 9.E-01 | 9.E-01 | | | | 2.E+00 |
| | | | Manganese | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 2.E+00 |
| | | | Methyl tert butyl ether | 1.E-06 | 1.E-06 | | | | 2.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 9.E-05 | 9.E-05 | | | | 2.E-04 | 4.E-01 | 4.E-01 | | | | 9.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 1.E-02 | 1.E-02 | | | | 3.E-02 |
| | | | Tetrachloroethene | 3.E-03 | 3.E-03 | | | | 6.E-03 | 6.E+00 | 6.E+00 | | | | 1.E+01 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 4.E+00 | 4.E+00 | | | | 8.E+00 |
| | | | Trichloroethene | 2.E-03 | 2.E-03 | | | | 3.E-03 | 2.E+02 | 2.E+02 | | | | 3.E+02 |
| | | | Vinyl chloride | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+00 | 3.E+00 | | | | 5.E+00 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 2.E+00 | 2.E+00 | | | | 4.E+00 |
| | | | Chemical Total | 2.E-02 | 2.E-02 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-02 | 2.E+02 | 2.E+02 | 0.E+00 | 0.E+00 | 0.E+00 | 4.E+02 |
| | | | Exposure Point Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| | | | Exposure Medium Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| | | | Groundwater Total | | | | | | 3.E-02 | | | | | | 4.E+02 |

Total Risk Across All Media = **3.E-02**

Total Hazard Across All Media = **401**

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Subsurface Soil - RISB-18

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient (mg/kg-day) | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|-----------------------------------|-------------------------------------------|
| Arsenic | 0.92 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 1.2E-05 | 3.0E-04 | 3.9E-02 | 1% |
| Iron | 21000 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 2.7E-01 | 7.0E-01 | 3.8E-01 | 7% |
| Manganese | 830 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 1.1E-02 | 2.0E-02 | 5.3E-01 | 10% |
| Thallium | 22 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 2.8E-04 | 7.0E-05 | 4.0E+00 | 73% |
| Vanadium | 42 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 5.4E-04 | 1.0E-03 | 5.4E-01 | 10% |
| 1,2-Dichloroethane | 4.8 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 6.1E-05 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 4.0 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 5.1E-05 | 3.0E-02 | 1.7E-03 | 0% |
| cis-1,2-Dichloroethene | 0.46 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 5.9E-06 | 1.0E-02 | 5.9E-04 | 0% |
| Tetrachloroethene | 0.031 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 4.0E-07 | 1.0E-02 | 4.0E-05 | 0% |
| Toluene | 0.044 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 5.6E-07 | 8.0E-02 | 7.0E-06 | 0% |
| Trichloroethene | 0.45 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 5.8E-06 | 3.0E-04 | 1.9E-02 | 0% |

Hazard Index = 5.5E+00

Notes:

(1): Soil EPCs (see Appendix H-3)

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Dermal Contact
Subsurface Soil - RISB-18

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (years) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} Absorption Efficiency ⁽³⁾ (unitless) | $RfD_{dermal-adj}$ Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------|-----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 0.92 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 9.9E-07 | 9.5E-01 | 2.9E-04 | 3.5E-03 | 0% |
| Iron | 21000 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 7.5E-03 | 2.0E-01 | 1.4E-01 | 5.4E-02 | 7% |
| Manganese | 830 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 3.0E-04 | 2.0E-01 | 4.0E-03 | 7.4E-02 | 10% |
| Thallium | 22 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 7.9E-06 | 2.0E-01 | 1.4E-05 | 5.6E-01 | 73% |
| Vanadium | 42 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.5E-05 | 2.0E-01 | 2.0E-04 | 7.5E-02 | 10% |
| 1,2-Dichloroethane | 4.8 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 5.2E-06 | 8.0E-01 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 4.0 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 4.3E-06 | 8.0E-01 | 2.4E-02 | 1.8E-04 | 0% |
| cis-1,2-Dichloroethene | 0.46 | 2,800 | 0.2 | 0.0005 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 8.2E-09 | 8.0E-01 | 8.0E-03 | 1.0E-06 | 0% |
| Tetrachloroethene | 0.031 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 3.3E-08 | 8.0E-01 | 8.0E-03 | 4.2E-06 | 0% |
| Toluene | 0.044 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 4.7E-08 | 8.0E-01 | 6.4E-02 | 7.4E-07 | 0% |
| Trichloroethene | 0.45 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 4.9E-07 | 8.0E-01 | 2.4E-04 | 2.0E-03 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

| |
|-------------------------------|
| Hazard Index = 7.7E-01 |
|-------------------------------|

**Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Subsurface Soil - RISB-18**

PSC Site
Rock Hill, South Carolina

$$ADD_{inhal\ lung} = [(C_s / PEF) + (C_s / VF)] * IR_{air-hourly} * EF * ED * ET_{inh} / BW * AT_n$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- IR_{air-hourly} = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_n = averaging time (days)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | IR _{air-hourly} Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET _{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 0.92 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 3.6E-10 | NA | NA | 0% |
| Iron | 21000 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 8.2E-06 | NA | NA | 0% |
| Manganese | 830 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 3.2E-07 | 1.43E-05 | 2.3E-02 | 80% |
| Thallium | 22 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 8.6E-09 | NA | NA | 0% |
| Vanadium | 42 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 1.6E-08 | NA | NA | 0% |
| 1,2-Dichloroethane | 4.8 | NA | 3.91E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 3.3E-04 | 7.00E-01 | 4.7E-04 | 2% |
| 1,4-Dichlorobenzene | 4.0 | NA | 1.29E+04 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 8.2E-05 | 2.29E-01 | 3.6E-04 | 1% |
| cis-1,2-Dichloroethene | 0.46 | NA | 2.90E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 4.2E-05 | 5.71E-02 | 7.4E-04 | 3% |
| Tetrachloroethene | 0.031 | NA | 2.55E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 3.2E-06 | 1.00E-02 | 3.2E-04 | 1% |
| Toluene | 0.044 | NA | 3.98E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.9E-06 | 1.43E+00 | 2.1E-06 | 0% |
| Trichloroethene | 0.45 | NA | 3.26E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 3.7E-05 | 1.0E-02 | 3.7E-03 | 13% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
 - (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

| |
|-------------------------------|
| Hazard Index = 2.8E-02 |
|-------------------------------|

**Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Incidental Ingestion
Subsurface Soil - RISB-18**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Age Adjusted Soil Ingestion Factor (mg-year/kg-day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | C_1 Conv. Factor (mass) (kg/mg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------|-----------------------------------------------|------------------------------------------------------|---------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 0.92 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 1.4E-06 | 1.5E+00 | 2.2E-06 | 36% |
| Iron | 21000 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 3.3E-02 | NA | NA | 0% |
| Manganese | 830 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 1.3E-03 | NA | NA | 0% |
| Thallium | 22 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 3.4E-05 | NA | NA | 0% |
| Vanadium | 42 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 6.6E-05 | NA | NA | 0% |
| 1,2-Dichloroethane | 4.8 | | chemical is considered mutagenic, see Table xx for risk calculation | | | | | | 3.44E-06 | 57% |
| 1,4-Dichlorobenzene | 4.0 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 6.2E-06 | 2.4E-02 | 1.5E-07 | 2% |
| cis-1,2-Dichloroethene | 0.46 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 7.2E-07 | NA | NA | 0% |
| Tetrachloroethene | 0.031 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 4.8E-08 | 5.4E-01 | 2.6E-08 | 0% |
| Toluene | 0.044 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 6.9E-08 | NA | NA | 0% |
| Trichloroethene | 0.45 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 7.1E-07 | 4.0E-01 | 2.8E-07 | 5% |

Excess Lifetime Cancer Risk = 6.1E-06

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Dermal Contact
Subsurface Soil - RISB-18**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SFS Age-Adjusted Dermal Factor (mg-year/kg-event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | $SF_{dermal-adj}$ Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) | |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|------------|
| Arsenic | 0.92 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 1.4E-07 | 9.5E-01 | 1.6E+00 | 2.1E-07 | 3% | |
| Iron | 21000 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 1.0E-03 | 2.0E-01 | NA | NA | 0% | |
| Manganese | 830 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 4.1E-05 | 2.0E-01 | NA | NA | 0% | |
| Thallium | 22 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 1.1E-06 | 2.0E-01 | NA | NA | 0% | |
| Vanadium | 42 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 2.1E-06 | 8.0E-01 | NA | NA | 0% | |
| 1,2-Dichloroethane | 4.8 | | | | | | | | | | | | |
| | | | | chemical is considered mutagenic, see Table xx for risk calculation | | | | | | | | 7.6E-06 | 97% |
| 1,4-Dichlorobenzene | 4.0 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 5.9E-07 | 8.0E-01 | 3.0E-02 | 1.8E-08 | 0% | |
| cis-1,2-Dichloroethene | 0.46 | 360 | 0.0005 | 350 | 1 | 1.0E-06 | 25,550 | 1.1E-09 | 8.0E-01 | NA | NA | 0% | |
| Tetrachloroethene | 0.031 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 4.6E-09 | 8.0E-01 | 6.8E-01 | 3.1E-09 | 0% | |
| Toluene | 0.044 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 6.5E-09 | 8.0E-01 | NA | NA | 0% | |
| Trichloroethene | 0.45 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 6.7E-08 | 8.0E-01 | 5.0E-01 | 3.3E-08 | 0% | |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004

"NA" = Not applicable

| | |
|--------------------------------------|----------------|
| Excess Lifetime Cancer Risk = | 7.9E-06 |
|--------------------------------------|----------------|

**Future Adult (1-31) Resident Scenario
Estimation of **Cancer** Risk from Inhalation Exposure
Subsurface Soil - RISB-18**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = [(C_s / \text{PEF}) + (C_s / \text{VF})] * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_c$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | CSF_{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 0.92 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.3E-10 | 1.51E+01 | 1.9E-09 | 0% |
| Iron | 21000 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 2.9E-06 | NA | NA | 0% |
| Manganese | 830 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.1E-07 | NA | NA | 0% |
| Thallium | 22 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 3.0E-09 | NA | NA | 0% |
| Vanadium | 42 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 5.8E-09 | NA | NA | 0% |
| 1,2-Dichloroethane | 4.8 | | | | | | | | | | | 2.5E-05 | 81% |
| 1,4-Dichlorobenzene | 4.0 | NA | 1.29E+04 | 1 | 350 | 30 | 16 | 70 | 25,550 | 2.9E-05 | 2.20E-02 | 6.4E-07 | 2% |
| cis-1,2-Dichloroethene | 0.46 | NA | 2.90E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.5E-05 | NA | NA | 0% |
| Tetrachloroethene | 0.031 | NA | 2.55E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.1E-06 | 2.10E-02 | 2.4E-08 | 0% |
| Toluene | 0.044 | NA | 3.98E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.0E-06 | NA | NA | 0% |
| Trichloroethene | 0.45 | NA | 3.26E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.3E-05 | 3.85E-01 | 5.0E-06 | 16% |

Excess Lifetime Cancer Risk = 3.0E-05

Notes:
 (1): Soil EPCs (see Appendix H-3)
 (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
 (3): U.S. EPA Region 9 PRG Tables (online)
 "NA" = Not applicable

| Parameter | CS (mg/kg) | 0-2 Years Child Mult. (1/day) | 2-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | CSF (mg/kg*day) ⁻¹ | CSF adjustment factor | | | | ED | | | | EP | Risk | | | | Total Risk | |
|--------------------|---------------|-------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------|-----------------------|-----|------|-------|-----|-----|------|-------|----|----------|----------|----------|----------|---------------|------------------------|
| | | | | | | | 0-2 | 2-6 | 6-15 | 15-30 | 0-2 | 2-6 | 6-15 | 15-30 | | 0-2 | 2-6 | 6-15 | 15-30 | | |
| 1,2-Dichloroethane | 4.80 | 3.31E-05 | 2.30E-05 | 7.06E-06 | 5.92E-06 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 4.13E-06 | 1.72E-06 | 1.19E-06 | 5.54E-07 | 7.60E-06 | Dermal Risk |
| 1,2-Dichloroethane | 4.80 | 1.74E-05 | 9.59E-06 | 2.46E-06 | 1.41E-06 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 2.18E-06 | 7.18E-07 | 4.14E-07 | 1.32E-07 | 3.44E-06 | Ingestion risk |
| 1,2-Dichloroethane | 4.80 | 5.36E-05 | 5.11E-05 | 5.25E-05 | 5.79E-05 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 6.69E-06 | 3.83E-06 | 8.84E-06 | 5.41E-06 | 2.48E-05 | inhalation risk |

Appendix H-5.29
Subsurface Soil
Hot Spot RISB-25
Future Excavation Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Excavation Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | | | |
|----------------------------|-----------------|--------------------|----------------------------|---------------------|-------------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|--------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | | | |
| Soil | Subsurface Soil | Hot Spot - RISB-25 | Arsenic | 2.E-07 | 1.E-08 | 7.E-11 | | | 2.E-07 | 3.E-02 | 2.E-03 | NA | | | 3.E-02 | | | |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 1.E-01 | 1.E-02 | NA | | | 1.E-01 | | | |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 8.E-03 | 8.E-04 | 3.E-03 | | | 1.E-02 | | | |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 1.E+00 | 1.E-01 | NA | | | 1.E+00 | | | |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 3.E-02 | 3.E-03 | NA | | | 3.E-02 | | | |
| | | | 1,2-Dichloroethane | 2.E-07 | 1.E-08 | 1.E-06 | | | 1.E-06 | NA | NA | 1.E-03 | | | 1.E-03 | | | |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chloroform | 3.E-10 | 4.E-13 | 2.E-08 | | | 2.E-08 | 2.E-04 | 3.E-07 | 1.E-03 | | | 2.E-03 | | | |
| | | | cis-1,2-Dichloroethene | NA | NA | NA | | | 0.E+00 | 1.E-04 | 2.E-07 | 2.E-03 | | | 2.E-03 | | | |
| | | | Tetrachloroethene | 7.E-09 | 6.E-10 | 3.E-09 | | | 1.E-08 | 1.E-05 | 7.E-07 | 9.E-04 | | | 9.E-04 | | | |
| | | | Toluene | NA | NA | NA | | | 0.E+00 | 5.E-07 | 4.E-08 | 4.E-06 | | | 5.E-06 | | | |
| | | | Trichloroethene | 9.E-09 | 7.E-10 | 6.E-08 | | | 7.E-08 | 5.E-03 | 4.E-04 | 1.E-03 | | | 7.E-03 | | | |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Xylenes | NA | NA | | | | 0.E+00 | 3.E-06 | 2.E-07 | 8.E-05 | | | 8.E-05 | | | |
| | | | | | | Chemical Total | 4.E-07 | 3.E-08 | 1.E-06 | 0.E+00 | 0.E+00 | 2.E-06 | 1.E+00 | 1.E-01 | 1.E-02 | 0.E+00 | 0.E+00 | 1.E+00 |
| | | | | | | Exposure Point Total | | | | | | 2.E-06 | | | | | | 1.E+00 |
| | | | Exposure Medium Total | | | | | | 2.E-06 | | | | | | 1.E+00 | | | |
| Soil Total | | | | | | | | | 2.E-06 | | | | | | 1.E+00 | | | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | NA | | 0.E+00 | | | 9.E-05 | | | 9.E-05 | | | |
| | | | 1,1,2-Trichloroethane | | | | 2.E-11 | | 2.E-11 | | | 6.E-06 | | | 6.E-06 | | | |
| | | | 1,1-Dichloroethane | | | | NA | | 0.E+00 | | | 1.E-06 | | | 1.E-06 | | | |
| | | | 1,1-Dichloroethene | | | | NA | | 0.E+00 | | | 7.E-04 | | | 7.E-04 | | | |
| | | | 1,2-Dichlorobenzene | | | | NA | | 0.E+00 | | | 8.E-06 | | | 8.E-06 | | | |
| | | | 1,2-Dichloroethane | | | | NA | | 0.E+00 | | | 2.E-05 | | | 2.E-05 | | | |
| | | | 1,4-Dichlorobenzene | | | | 7.E-11 | | 7.E-11 | | | 3.E-07 | | | 3.E-07 | | | |
| | | | 2-Chlorophenol | | | | NA | | 0.E+00 | | | NA | | | 0.E+00 | | | |
| | | | 4-Methyl-2-pentanone | | | | NA | | 0.E+00 | | | 3.E-07 | | | 3.E-07 | | | |
| | | | Benzene | | | | 5.E-10 | | 5.E-10 | | | 2.E-04 | | | 2.E-04 | | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | NA | | 0.E+00 | | | NA | | | 0.E+00 | | | |
| | | | Chlorobenzene | | | | NA | | 0.E+00 | | | 9.E-05 | | | 9.E-05 | | | |
| | | | Chloroethane | | | | NA | | 0.E+00 | | | 5.E-06 | | | 5.E-06 | | | |
| | | | Chloroform | | | | 5.E-10 | | 5.E-10 | | | 3.E-05 | | | 3.E-05 | | | |
| | | | cis-1,2-Dichloroethene | | | | NA | | 0.E+00 | | | 2.E-04 | | | 2.E-04 | | | |
| | | | Ethylbenzene | | | | NA | | 0.E+00 | | | 1.E-04 | | | 1.E-04 | | | |
| | | | Iron | | | | NA | | 0.E+00 | | | NA | | | 0.E+00 | | | |
| | | | Isopropylbenzene | | | | NA | | 0.E+00 | | | 3.E-02 | | | 3.E-02 | | | |
| | | | Manganese | | | | NA | | 0.E+00 | | | NA | | | 0.E+00 | | | |
| | | | Methyl tert butyl ether | | | | NA | | 0.E+00 | | | NA | | | 0.E+00 | | | |
| | | | Methylcyclohexane | | | | NA | | 0.E+00 | | | NA | | | 0.E+00 | | | |
| | | | Methylene chloride | | | | NA | | 0.E+00 | | | 3.E-06 | | | 3.E-06 | | | |
| | | | Naphthalene | | | | NA | | 0.E+00 | | | 8.E-06 | | | 8.E-06 | | | |
| | | | Tetrachloroethene | | | | 1.E-08 | | 1.E-08 | | | 4.E-03 | | | 4.E-03 | | | |
| | | | Toluene | | | | NA | | 0.E+00 | | | 6.E-05 | | | 6.E-05 | | | |
| | | | Trichloroethene | | | | 1.E-07 | | 1.E-07 | | | 2.E-03 | | | 2.E-03 | | | |
| | | | Vinyl chloride | | | | NA | | 0.E+00 | | | 4.E-04 | | | 4.E-04 | | | |
| | | | Xylenes (Total) | | | | NA | | 0.E+00 | | | 4.E-03 | | | 4.E-03 | | | |
| | | | | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 1.E-07 | 0.E+00 | 1.E-07 | 0.E+00 | 0.E+00 | 0.E+00 | 4.E-02 | 0.E+00 | 4.E-02 |
| | | | | | | Exposure Point Total | | | | | | 1.E-07 | | | | | | 4.E-02 |
| | | | | | | Exposure Medium Total | | | | | | 1.E-07 | | | | | | 4.E-02 |
| | | | Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | | | | 1,1,2-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 |
| 1,1-Dichloroethane | | | | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| 1,1-Dichloroethene | | | | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| 1,2,4-Trichlorobenzene | | | | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| 1,2-Dichlorobenzene | | | | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| 1,2-Dichloroethane | | | | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| 1,4-Dichlorobenzene | | | | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| 2-Chlorophenol | | | | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| 4-Methyl-2-pentanone | | | | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Benzene | | | | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Bis(2-ethylhexyl)phthalate | | | | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Bromodichloromethane | | | | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Chlorobenzene | | | | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Chloroethane | | | | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Chloroform | | | | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| cis-1,2-Dichloroethene | | | | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Excavation Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | | |
|-------------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | |
| | | | Ethylbenzene | | | | | | | | | | | | | 0.E+00 |
| | | | Iron | | | | | | | | | | | | | 0.E+00 |
| | | | Isopropylbenzene | | | | | | | | | | | | | 0.E+00 |
| | | | Manganese | | | | | | | | | | | | | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | | | | | | | | | 0.E+00 |
| | | | Methylcyclohexane | | | | | | | | | | | | | 0.E+00 |
| | | | Methylene chloride | | | | | | | | | | | | | 0.E+00 |
| | | | Naphthalene | | | | | | | | | | | | | 0.E+00 |
| | | | Tetrachloroethene | | | | | | | | | | | | | 0.E+00 |
| | | | Toluene | | | | | | | | | | | | | 0.E+00 |
| | | | Trichloroethene | | | | | | | | | | | | | 0.E+00 |
| | | | Vinyl chloride | | | | | | | | | | | | | 0.E+00 |
| | | | Xylenes (Total) | | | | | | | | | | | | | 0.E+00 |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 |
| | | | Exposure Point Total | | | | | | | | | | | | | 0.E+00 |
| | | | Exposure Medium Total | | | | | | | | | | | | | 0.E+00 |
| Groundwater | Total | | | | | | | | | | | | | | | 1.E-07 |

Total Risk Across All Media = 2.E-06

Total Hazard Across All Media = 2

Future Excavation Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Subsurface Soil - Hot Spot RISB-25

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
 IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
 AE_i = absorption efficiency (unitless)
 EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
 ED = exposure duration: the typical duration of each exposure event (years)
 BW = body weight (kg)
 AT_n = averaging Time (years)
 C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Subchronic Oral RfD ⁽²⁾ (mg/kg-day) | Hazard Quotient (3.0E-02) | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|---------------------------------|-------------------------------------------|
| Arsenic | 2.8 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 9.0E-06 | 3.0E-04 | 3.0E-02 | 2% |
| Iron | 22000 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 7.1E-02 | 7.0E-01 | 1.0E-01 | 8% |
| Manganese | 340 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.1E-03 | 1.4E-01 | 7.8E-03 | 1% |
| Thallium | 25 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 8.1E-05 | 7.0E-05 | 1.2E+00 | 87% |
| Vanadium | 63 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 2.0E-04 | 7.0E-03 | 2.9E-02 | 2% |
| 1,2-Dichloroethane | 45.00 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.5E-04 | NA | NA | 0% |
| Chloroform | 0.69 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 2.2E-06 | 1.0E-02 | 2.2E-04 | 0% |
| cis-1,2-Dichloroethene | 4.1 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.3E-05 | 1.0E-01 | 1.3E-04 | 0% |
| Tetrachloroethene | 0.30 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 9.7E-07 | 1.0E-01 | 9.7E-06 | 0% |
| Trichloroethene | 0.47 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.5E-06 | 3.0E-04 | 5.1E-03 | 0% |
| Xylenes (total) | 0.17 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 5.5E-07 | 2.0E-01 | 2.7E-06 | 0% |

Hazard Index = 1.3E+00

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): Subchronic RfDs were not available for iron, thallium, benzene, trichloroethene, vinyl chloride or xylenes, therefore, chronic values were implemented.

Future Excavation Worker Scenario
Estimation of Noncancer Hazard from Dermal Contact
Subsurface Soil - Hot Spot RISB-25

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

- where:
- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
 - SA = skin surface area in contact with soil on days exposed (cm²)
 - AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
 - AE_d = absorption efficiency (unitless)
 - EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
 - ED = exposure duration: the typical duration of each exposure event (year)
 - EV = event frequency (events/day)
 - BW = body weight (kg)
 - AT_n = averaging time (days)
 - C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | RfD _{dermal-adj} Subchronic Dermal Adj. RfD ⁽⁴⁾ (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 2.8 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 5.4E-07 | 9.5E-01 | 2.9E-04 | 1.9E-03 | 1% |
| Iron | 22000 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 1.4E-03 | 2.0E-01 | 1.4E-01 | 1.0E-02 | 8% |
| Manganese | 340 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 2.2E-05 | 2.0E-01 | 2.8E-02 | 7.8E-04 | 1% |
| Thallium | 25 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 1.6E-06 | 2.0E-01 | 1.4E-05 | 1.2E-01 | 88% |
| Vanadium | 63 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 4.1E-06 | 2.0E-01 | 1.4E-03 | 2.9E-03 | 2% |
| 1,2-Dichloroethane | 45.00 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 8.7E-06 | 8.0E-01 | NA | NA | 0% |
| Chloroform | 0.69 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 2.2E-09 | 8.0E-01 | 8.0E-03 | 2.8E-07 | 0% |
| cis-1,2-Dichloroethene | 4.1 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 1.3E-08 | 8.0E-01 | 8.0E-02 | 1.7E-07 | 0% |
| Tetrachloroethene | 0.30 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 5.8E-08 | 8.0E-01 | 8.0E-02 | 7.3E-07 | 0% |
| Trichloroethene | 0.47 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 9.1E-08 | 8.0E-01 | 2.4E-04 | 3.8E-04 | 0% |
| Xylenes (total) | 0.17 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 3.3E-08 | 8.0E-01 | 1.6E-01 | 2.1E-07 | 0% |

- Notes:
- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
 - (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online
 - (4): Subchronic RfDs were not available for iron, thallium, benzene, trichloroethene, vinyl chloride or xylenes, therefore, chronic values were implemented.

Hazard Index = 1.3E-01

Future Excavation Worker Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Subsurface Soil - Hot Spot RISB-25

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

- where:
- C_s = concentration of contaminant in the airborne particulates (mg/kg)
 - PEF = particulate emission factor (m^3/kg)
 - VF = volatilization factor (m^3/kg)
 - $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m^3/hr)
 - EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
 - ED = exposure duration: the typical duration of each exposure event (year)
 - ET_{inh} = exposure time (hr/day)
 - BW = body weight (kg)
 - AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m^3/kg) | VF Volatilization Factor ⁽³⁾ (m^3/kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m^3/hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | RfD _i Subchronic Inhalation RfD ⁽⁴⁾ (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 2.8 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 3.2E-10 | NA | NA | 0% |
| Iron | 22000 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 2.5E-06 | NA | NA | 0% |
| Manganese | 340 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 3.9E-08 | 1.43E-05 | 2.7E-03 | 29% |
| Thallium | 25 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 2.9E-09 | NA | NA | 0% |
| Vanadium | 63 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 365 | 7.3E-09 | NA | NA | 0% |
| 1,2-Dichloroethane | 45.00 | NA | 3.91E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 9.0E-04 | 7.00E-01 | 1.3E-03 | 13% |
| Chloroform | 0.69 | NA | 2.66E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 2.0E-05 | 1.40E-02 | 1.5E-03 | 15% |
| cis-1,2-Dichloroethene | 4.1 | NA | 2.90E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 1.1E-04 | 5.71E-02 | 1.9E-03 | 20% |
| Tetrachloroethene | 0.30 | NA | 2.55E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 9.2E-06 | 1.00E-02 | 9.2E-04 | 10% |
| Trichloroethene | 0.47 | NA | 3.26E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 1.1E-05 | 1.0E-02 | 1.1E-03 | 12% |
| Xylenes (total) | 0.17 | NA | 6.10E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 2.2E-06 | 2.9E-02 | 7.6E-05 | 1% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
- (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable
- (4): A subchronic RfD was only available for 1,4-dichlorobenzene, therefore, chronic values were implemented or the remainder of the chemicals.

| |
|-------------------------------|
| Hazard Index = 9.5E-03 |
|-------------------------------|

Future Excavation Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Subsurface Soil - Hot Spot RISB-25

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 2.8 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.3E-07 | 1.5E+00 | 1.9E-07 | 49% |
| Iron | 22000 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.0E-03 | NA | NA | 0% |
| Manganese | 340 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.6E-05 | NA | NA | 0% |
| Thallium | 25 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.2E-06 | NA | NA | 0% |
| Vanadium | 63 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 2.9E-06 | NA | NA | 0% |
| 1,2-Dichloroethane | 45.00 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 2.1E-06 | 9.1E-02 | 1.9E-07 | 47% |
| Chloroform | 0.69 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 3.2E-08 | 1.0E-02 | 3.2E-10 | 0% |
| cis-1,2-Dichloroethene | 4.1 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.9E-07 | NA | NA | 0% |
| Tetrachloroethene | 0.30 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.4E-08 | 5.4E-01 | 7.5E-09 | 2% |
| Trichloroethene | 0.47 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 2.2E-08 | 4.0E-01 | 8.7E-09 | 2% |
| Xylenes (total) | 0.17 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 7.8E-09 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 4.0E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Future Excavation Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Subsurface Soil - Hot Spot RISB-25**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} Absorption Efficiency ⁽³⁾ (unitless) | $SF_{dermal-adj}$ Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 2.8 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 7.7E-09 | 9.5E-01 | 1.6E+00 | 1.2E-08 | 44% |
| Iron | 22000 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 2.0E-05 | 2.0E-01 | NA | NA | 0% |
| Manganese | 340 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 3.1E-07 | 2.0E-01 | NA | NA | 0% |
| Thallium | 25 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 2.3E-08 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 63 | 3,300 | 0.2 | 0.01 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 5.8E-08 | 2.0E-01 | NA | NA | 0% |
| 1,2-Dichloroethane | 45.00 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.2E-07 | 8.0E-01 | 1.1E-01 | 1.4E-08 | 51% |
| Chloroform | 0.69 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 3.2E-11 | 8.0E-01 | 1.3E-02 | 4.0E-13 | 0% |
| cis-1,2-Dichloroethene | 4.1 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.9E-10 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 0.30 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 8.3E-10 | 8.0E-01 | 6.8E-01 | 5.6E-10 | 2% |
| Trichloroethene | 0.47 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.3E-09 | 8.0E-01 | 5.0E-01 | 6.5E-10 | 2% |
| Xylenes (total) | 0.17 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 4.7E-10 | 8.0E-01 | NA | NA | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
 - (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or
U.S. EPA Region 4 RAGS Supplement, online
- "NA" = Not applicable

| | |
|--------------------------------------|----------------|
| Excess Lifetime Cancer Risk = | 2.8E-08 |
|--------------------------------------|----------------|

**Future Excavation Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Subsurface Soil - Hot Spot RISB-25**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 2.8 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 4.6E-12 | 1.51E+01 | 7.0E-11 | 0% |
| Iron | 22000 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 3.6E-08 | NA | NA | 0% |
| Manganese | 340 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 5.6E-10 | NA | NA | 0% |
| Thallium | 25 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 4.1E-11 | NA | NA | 0% |
| Vanadium | 63 | 6.80E+08 | NA | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.0E-10 | NA | NA | 0% |
| 1,2-Dichloroethane | 45.00 | NA | 3.91E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.3E-05 | 9.10E-02 | 1.2E-06 | 93% |
| Chloroform | 0.69 | NA | 2.66E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 2.9E-07 | 8.10E-02 | 2.3E-08 | 2% |
| cis-1,2-Dichloroethene | 4.1 | NA | 2.90E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.6E-06 | NA | NA | 0% |
| Tetrachloroethene | 0.30 | NA | 2.55E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.3E-07 | 2.10E-02 | 2.8E-09 | 0% |
| Trichloroethene | 0.47 | NA | 3.26E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.6E-07 | 3.85E-01 | 6.2E-08 | 5% |
| Xylenes (total) | 0.17 | NA | 6.10E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 3.1E-08 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 1.3E-06

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Appendix H-5.30
Subsurface Soil
Hot Spot RISB-25
Future Industrial Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|-----------------------|---------------------|--------------------|------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| Soil | Subsurface Soil | Hot Spot - RISB-25 | Arsenic | 7.E-07 | 3.E-07 | 2.E-09 | | | 1.E-06 | 5.E-03 | 2.E-03 | NA | | | 6.E-03 |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 2.E-02 | 1.E-02 | NA | | | 3.E-02 |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 8.E-03 | 5.E-03 | 3.E-03 | | | 2.E-02 |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 2.E-01 | 1.E-01 | NA | | | 3.E-01 |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 3.E-02 | 2.E-02 | NA | | | 5.E-02 |
| | | | 1,2-Dichloroethane | NA | NA | 3.E-05 | | | 3.E-05 | NA | NA | 1.E-03 | | | 1.E-03 |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chloroform | 1.E-09 | 1.E-11 | 6.E-07 | | | 6.E-07 | 3.E-05 | 3.E-07 | 1.E-03 | | | 1.E-03 |
| | | | cis-1,2-Dichloroethene | NA | NA | NA | | | 0.E+00 | 2.E-04 | 2.E-06 | 2.E-03 | | | 2.E-03 |
| | | | Tetrachloroethene | 3.E-08 | 1.E-08 | 7.E-08 | | | 1.E-07 | 1.E-05 | 7.E-06 | 9.E-04 | | | 9.E-04 |
| | | | Toluene | NA | NA | NA | | | 0.E+00 | 2.E-06 | 9.E-07 | 4.E-06 | | | 7.E-06 |
| | | | Trichloroethene | 3.E-08 | 2.E-08 | 2.E-06 | | | 2.E-06 | 8.E-04 | 4.E-04 | 1.E-03 | | | 2.E-03 |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Xylenes | NA | NA | NA | | | 0.E+00 | 4.E-07 | 2.E-07 | 8.E-05 | | | 8.E-05 |
| | | | Chemical Total | 8.E-07 | 3.E-07 | 3.E-05 | 0.E+00 | 0.E+00 | 3.E-05 | 2.E-01 | 2.E-01 | 1.E-02 | 0.E+00 | 0.E+00 | 4.E-01 |
| | | | Exposure Point Total | | | | | | 3.E-05 | | | | | | 4.E-01 |
| | | | Exposure Medium Total | | | | | | 3.E-05 | | | | | | 4.E-01 |
| | | | Soil Total | | | | | | 3.E-05 | | | | | | 4.E-01 |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 |
| | | | 1,1,2-Trichloroethane | | | | | 2.E-08 | 2.E-08 | | | | | 3.E-04 | 3.E-04 |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | 3.E-02 | 3.E-02 |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | 4.E-04 | 4.E-04 |
| | | | 1,2-Dichloroethane | | | | | 2.E-05 | 2.E-05 | | | | | 7.E-04 | 7.E-04 |
| | | | 1,4-Dichlorobenzene | | | | | 8.E-08 | 8.E-08 | | | | | 4.E-05 | 4.E-05 |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | 2.E-04 | 2.E-04 |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | 1.E-05 | 1.E-05 |
| | | | Benzene | | | | | 6.E-07 | 6.E-07 | | | | | 7.E-03 | 7.E-03 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | 4.E-03 | 4.E-03 |
| | | | Chloroethane | | | | | 3.E-07 | 3.E-07 | | | | | 1.E-03 | 1.E-03 |
| | | | Chloroform | | | | | 5.E-07 | 5.E-07 | | | | | 1.E-03 | 1.E-03 |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | | 4.E-06 | 4.E-06 |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 |
| | | | Methylene chloride | | | | | 7.E-08 | 7.E-08 | | | | | 4.E-04 | 4.E-04 |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | 5.E-04 | 5.E-04 |
| | | | Tetrachloroethene | | | | | 1.E-05 | 1.E-05 | | | | | 2.E-01 | 2.E-01 |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 |
| | | | Trichloroethene | | | | | 1.E-04 | 1.E-04 | | | | | 9.E-02 | 9.E-02 |
| | | | Vinyl chloride | | | | | 3.E-06 | 3.E-06 | | | | | 2.E-02 | 2.E-02 |
| Xylenes (Total) | | | | | NA | 0.E+00 | | | | | 2.E-01 | 2.E-01 | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 2.E-04 | 2.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E-01 | 6.E-01 |
| | | | Exposure Point Total | | | | | 2.E-04 | | | | | | | 6.E-01 |
| | | | Exposure Medium Total | | | | | 2.E-04 | | | | | | | 6.E-01 |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 |
| | | | 1,1,2-Trichloroethane | 2.E-06 | 2.E-06 | | | | 5.E-06 | 3.E-02 | 3.E-02 | | | | 6.E-02 |
| | | | 1,1-Dichloroethane | NA | NA | | | | 0.E+00 | 2.E-02 | 2.E-02 | | | | 4.E-02 |
| | | | 1,1-Dichloroethene | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 |
| | | | 1,2,4-Trichlorobenzene | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 |
| | | | 1,2-Dichlorobenzene | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | 1.E-03 | 1.E-03 | | | | 3.E-03 | NA | NA | | | | 0.E+00 |
| | | | 1,4-Dichlorobenzene | 4.E-06 | 4.E-06 | | | | 7.E-06 | 1.E-02 | 1.E-02 | | | | 3.E-02 |
| | | | 2-Chlorophenol | NA | NA | | | | 0.E+00 | 5.E-02 | 5.E-02 | | | | 1.E-01 |
| | | | 4-Methyl-2-pentanone | NA | NA | | | | 0.E+00 | 9.E-02 | 9.E-02 | | | | 2.E-01 |
| | | | Benzene | 2.E-05 | 2.E-05 | | | | 3.E-05 | 2.E-01 | 2.E-01 | | | | 4.E-01 |
| | | | Bis(2-ethylhexyl)phthalate | 3.E-07 | 3.E-07 | | | | 6.E-07 | 3.E-03 | 3.E-03 | | | | 6.E-03 |
| | | | Bromodichloromethane | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 |
| | | | Chlorobenzene | NA | NA | | | | 0.E+00 | 7.E-02 | 7.E-02 | | | | 1.E-01 |
| | | | Chloroethane | 2.E-06 | 2.E-06 | | | | 4.E-06 | 5.E-03 | 5.E-03 | | | | 9.E-03 |
| | | | Chloroform | 1.E-06 | 1.E-06 | | | | 3.E-06 | 4.E-02 | 4.E-02 | | | | 7.E-02 |
| | | | cis-1,2-Dichloroethene | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 3.E+00 |
| | | | Ethylbenzene | NA | NA | | | | 0.E+00 | 2.E-01 | 2.E-01 | | | | 4.E-01 |
| | | | Iron | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 |
| | | | Isopropylbenzene | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 3.E-01 |
| | | | Manganese | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 6.E-01 |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Methyl tert butyl ether | 6.E-07 | 6.E-07 | | | | 1.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 1.E-05 | 1.E-05 | | | | 2.E-05 | 7.E-02 | 7.E-02 | | | | 1.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 4.E-03 | 4.E-03 | | | | 9.E-03 |
| | | | Tetrachloroethene | 2.E-03 | 2.E-03 | | | | 4.E-03 | 9.E-01 | 9.E-01 | | | | 2.E+00 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 6.E-01 | 6.E-01 | | | | 1.E+00 |
| | | | Trichloroethene | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+01 | 3.E+01 | | | | 5.E+01 |
| | | | Vinyl chloride | 3.E-04 | 3.E-04 | | | | 6.E-04 | 4.E-01 | 4.E-01 | | | | 8.E-01 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 |
| | | | Chemical Total | 5.E-03 | 5.E-03 | 0.E+00 | 0.E+00 | 0.E+00 | 9.E-03 | 3.E+01 | 3.E+01 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E+01 |
| | | | Exposure Point Total | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Exposure Medium Total | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Groundwater Total | | | | | | 9.E-03 | | | | | | 6.E+01 |

Total Risk Across All Media = 9.E-03

Total Hazard Across All Media = 62

Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Subsurface Soil - Hot Spot RISB-25

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

- where:
- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
 - IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
 - AE_i = absorption efficiency (unitless)
 - EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
 - ED = exposure duration: the typical duration of each exposure event (years)
 - BW = body weight (kg)
 - AT_n = averaging Time (years)
 - C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient (mg/kg-day) | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|-----------------------------------|-------------------------------------------|
| Arsenic | 2.8 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.4E-06 | 3.0E-04 | 4.6E-03 | 2% |
| Iron | 22000 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.1E-02 | 7.0E-01 | 1.5E-02 | 7% |
| Manganese | 340 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.7E-04 | 2.0E-02 | 8.3E-03 | 4% |
| Thallium | 25 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.2E-05 | 7.0E-05 | 1.7E-01 | 74% |
| Vanadium | 63 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 3.1E-05 | 1.0E-03 | 3.1E-02 | 13% |
| 1,2-Dichloroethane | 45 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.2E-05 | NA | NA | 0% |
| Chloroform | 0.69 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 3.4E-07 | 1.0E-02 | 3.4E-05 | 0% |
| cis-1,2-Dichloroethene | 4.1 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.0E-06 | 1.0E-02 | 2.0E-04 | 0% |
| Tetrachloroethene | 0.30 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.5E-07 | 1.0E-02 | 1.5E-05 | 0% |
| Toluene | 0.31 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.5E-07 | 8.0E-02 | 1.9E-06 | 0% |
| Trichloroethene | 0.47 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.3E-07 | 3.0E-04 | 7.7E-04 | 0% |
| Xylenes (total) | 0.17 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 8.3E-08 | 2.0E-01 | 4.2E-07 | 0% |

Hazard Index = 2.3E-01

Notes:
 (1): Soil EPCs (see Appendix H-3)

**Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Dermal Contact
Subsurface Soil - Hot Spot RISB-25**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} Absorption Efficiency ⁽³⁾ (unitless) | RFD _{dermal-adj} Chronic Dermal Adj. RFD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 2.8 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 5.4E-07 | 9.5E-01 | 2.9E-04 | 1.9E-03 | 1% |
| Iron | 22000 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.4E-03 | 2.0E-01 | 1.4E-01 | 1.0E-02 | 7% |
| Manganese | 340 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.2E-05 | 2.0E-01 | 4.0E-03 | 5.5E-03 | 4% |
| Thallium | 25 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.6E-06 | 2.0E-01 | 1.4E-05 | 1.2E-01 | 75% |
| Vanadium | 63 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 4.1E-06 | 2.0E-01 | 2.0E-04 | 2.0E-02 | 13% |
| 1,2-Dichloroethane | 45 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 8.7E-06 | 8.0E-01 | NA | NA | 0% |
| Chloroform | 0.69 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.2E-09 | 8.0E-01 | 8.0E-03 | 2.8E-07 | 0% |
| cis-1,2-Dichloroethene | 4.1 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.3E-08 | 8.0E-01 | 8.0E-03 | 1.7E-06 | 0% |
| Tetrachloroethene | 0.30 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 5.8E-08 | 8.0E-01 | 8.0E-03 | 7.3E-06 | 0% |
| Toluene | 0.31 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 6.0E-08 | 8.0E-01 | 6.4E-02 | 9.4E-07 | 0% |
| Trichloroethene | 0.47 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 9.1E-08 | 8.0E-01 | 2.4E-04 | 3.8E-04 | 0% |
| Xylenes (total) | 0.17 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 3.3E-08 | 8.0E-01 | 1.6E-01 | 2.1E-07 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 1.5E-01

**Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Subsurface Soil - Hot Spot RISB-25**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)
 PEF = particulate emission factor (m^3/kg)
 VF = volatilization factor (m^3/kg)
 $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m^3/hr)
 EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
 ED = exposure duration: the typical duration of each exposure event (year)
 ET_{inh} = exposure time (hr/day)
 BW = body weight (kg)
 AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m^3/kg) | VF Volatilization Factor ⁽³⁾ (m^3/kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m^3/hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | RfD_i Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------|---------------------------------------------------|---------------------------------------------------|---------------------------------------|----------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 2.8 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 3.2E-10 | NA | NA | 0% |
| Iron | 22000 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 2.5E-06 | NA | NA | 0% |
| Manganese | 340 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 3.9E-08 | 1.43E-05 | 2.7E-03 | 29% |
| Thallium | 25 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 2.9E-09 | NA | NA | 0% |
| Vanadium | 63 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 9125 | 7.3E-09 | NA | NA | 0% |
| 1,2-Dichloroethane | 45 | NA | 3.91E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 9.0E-04 | 7.00E-01 | 1.3E-03 | 13% |
| Chloroform | 0.69 | NA | 2.66E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 2.0E-05 | 1.40E-02 | 1.5E-03 | 15% |
| cis-1,2-Dichloroethene | 4.1 | NA | 2.90E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 1.1E-04 | 5.71E-02 | 1.9E-03 | 20% |
| Tetrachloroethene | 0.30 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 9.2E-06 | 1.00E-02 | 9.2E-04 | 10% |
| Toluene | 0.31 | NA | 3.98E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 6.1E-06 | 1.43E+00 | 4.3E-06 | 0% |
| Trichloroethene | 0.47 | NA | 3.26E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 1.1E-05 | 1.0E-02 | 1.1E-03 | 12% |
| Xylenes (total) | 0.17 | NA | 6.10E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 2.2E-06 | 2.9E-02 | 7.6E-05 | 1% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Hazard Index = 9.5E-03

Future Industrial Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Subsurface Soil - Hot Spot RISB-25

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 2.8 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 4.9E-07 | 1.5E+00 | 7.3E-07 | 92% |
| Iron | 22000 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 3.8E-03 | NA | NA | 0% |
| Manganese | 340 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 5.9E-05 | NA | NA | 0% |
| Thallium | 25 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 4.4E-06 | NA | NA | 0% |
| Vanadium | 63 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.1E-05 | NA | NA | 0% |
| 1,2-Dichloroethane | 45 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 7.9E-06 | 9.1E-02 | NA | 0% |
| Chloroform | 0.69 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.2E-07 | 1.0E-02 | 1.2E-09 | 0% |
| cis-1,2-Dichloroethene | 4.1 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 7.2E-07 | NA | NA | 0% |
| Tetrachloroethene | 0.30 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 5.2E-08 | 5.4E-01 | 2.8E-08 | 4% |
| Toluene | 0.31 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 5.4E-08 | NA | NA | 0% |
| Trichloroethene | 0.47 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 8.2E-08 | 4.0E-01 | 3.3E-08 | 4% |
| Xylenes (total) | 0.17 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 3.0E-08 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 8.0E-07

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

Future Industrial Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Subsurface Soil - Hot Spot RISB-25

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | $SF_{dermal-adj}$ Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 2.8 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.9E-07 | 9.5E-01 | 1.6E+00 | 3.1E-07 | 91% |
| Iron | 22000 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 5.1E-04 | 2.0E-01 | NA | NA | 0% |
| Manganese | 340 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 7.8E-06 | 2.0E-01 | NA | NA | 0% |
| Thallium | 25 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 5.8E-07 | 2.0E-01 | NA | NA | 0% |
| Vanadium | 63 | 3,300 | 0.2 | 0.01 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.5E-06 | 2.0E-01 | NA | NA | 0% |
| 1,2-Dichloroethane | 45 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 3.1E-06 | 8.0E-01 | NA | NA | 0% |
| Chloroform | 0.69 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 8.0E-10 | 8.0E-01 | 1.3E-02 | 9.9E-12 | 0% |
| cis-1,2-Dichloroethene | 4.1 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 4.7E-09 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 0.30 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.1E-08 | 8.0E-01 | 6.8E-01 | 1.4E-08 | 4% |
| Toluene | 0.31 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.1E-08 | 8.0E-01 | NA | NA | 0% |
| Trichloroethene | 0.47 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 3.3E-08 | 8.0E-01 | 5.0E-01 | 1.6E-08 | 5% |
| Xylenes (total) | 0.17 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.2E-08 | 8.0E-01 | NA | NA | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

"NA" = Not applicable

| | |
|--------------------------------------|----------------|
| Excess Lifetime Cancer Risk = | 3.4E-07 |
|--------------------------------------|----------------|

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Subsurface Soil - Hot Spot RISB-25**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m^3/kg)

VF = volatilization factor (m^3/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m^3/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m^3/kg) | VF Volatilization Factor ⁽³⁾ (m^3/kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m^3/hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | CSF_{inh} Cancer Slope Factor ($\text{mg}/(\text{kg}/\text{day}))^{-1}$ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 2.8 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 1.2E-10 | 1.51E+01 | 1.7E-09 | 0% |
| Iron | 22000 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 9.0E-07 | NA | NA | 0% |
| Manganese | 340 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 1.4E-08 | NA | NA | 0% |
| Thallium | 25 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 1.0E-09 | NA | NA | 0% |
| Vanadium | 63 | 6.80E+08 | NA | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.6E-09 | NA | NA | 0% |
| 1,2-Dichloroethane | 45 | NA | 3.91E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.2E-04 | 9.10E-02 | 2.9E-05 | 93% |
| Chloroform | 0.69 | NA | 2.66E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 7.3E-06 | 8.10E-02 | 5.9E-07 | 2% |
| cis-1,2-Dichloroethene | 4.1 | NA | 2.90E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.9E-05 | NA | NA | 0% |
| Tetrachloroethene | 0.30 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 3.3E-06 | 2.10E-02 | 6.9E-08 | 0% |
| Toluene | 0.31 | NA | 3.98E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.2E-06 | NA | NA | 0% |
| Trichloroethene | 0.47 | NA | 3.26E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 4.0E-06 | 3.85E-01 | 1.6E-06 | 5% |
| Xylenes (total) | 0.17 | NA | 6.10E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 7.8E-07 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 3.1E-05

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Appendix H-5.31
Subsurface Soil
Hot Spot RISB-25
Future Resident

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Exposure Route Total | Non-Carcinogenic Hazard Quotient | | | | | Exposure Route Total | | | |
|-----------------------|---------------------|--------------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|----------------------------------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|--------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | | | | |
| Soil | Subsurface Soil | Hot Spot - RISB-25 | Arsenic | 7.E-06 | 7.E-07 | 6.E-09 | | | 7.E-06 | 1.E-01 | 1.E-02 | NA | | | | 1.E-01 | | |
| | | | Iron | NA | NA | NA | | | 0.E+00 | 4.E-01 | 6.E-02 | NA | | | | | 5.E-01 | |
| | | | Manganese | NA | NA | NA | | | 0.E+00 | 2.E-01 | 3.E-02 | 9.E-03 | | | | | 3.E-01 | |
| | | | Thallium | NA | NA | NA | | | 0.E+00 | 5.E+00 | 6.E-01 | NA | | | | | 5.E+00 | |
| | | | Vanadium | NA | NA | NA | | | 0.E+00 | 8.E-01 | 1.E-01 | NA | | | | | 9.E-01 | |
| | | | 1,2-Dichloroethane | 3.E-05 | 7.E-05 | 2.E-04 | | | 3.E-04 | NA | NA | 4.E-03 | | | | | 4.E-03 | |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | | | 0.E+00 | |
| | | | Benzene | | | | | | 0.E+00 | | | | | | | | 0.E+00 | |
| | | | Chloroform | 1.E-08 | 2.E-11 | 2.E-06 | | | 2.E-06 | 9.E-04 | 2.E-06 | 5.E-03 | | | | | 6.E-03 | |
| | | | cis-1,2-Dichloroethene | NA | NA | NA | | | 0.E+00 | 5.E-03 | 9.E-06 | 7.E-03 | | | | | 1.E-02 | |
| | | | Tetrachloroethene | 3.E-07 | 3.E-08 | 2.E-07 | | | 5.E-07 | 4.E-04 | 4.E-05 | 3.E-03 | | | | | 4.E-03 | |
| | | | Toluene | NA | NA | NA | | | 0.E+00 | 5.E-05 | 5.E-06 | 1.E-05 | | | | | 7.E-05 | |
| | | | Trichloroethene | 3.E-07 | 3.E-08 | 5.E-06 | | | 6.E-06 | 2.E-02 | 2.E-03 | 4.E-03 | | | | | 3.E-02 | |
| | | | Vinyl chloride | | | | | | 0.E+00 | | | | | | | | 0.E+00 | |
| | | | Xylenes | NA | NA | NA | | | 0.E+00 | 1.E-05 | 1.E-06 | 3.E-04 | | | | | 3.E-04 | |
| | | | | | | Chemical Total | 4.E-05 | 7.E-05 | 2.E-04 | 0.E+00 | 0.E+00 | 4.E-04 | 6.E+00 | 9.E-01 | 3.E-02 | 0.E+00 | 0.E+00 | 7.E+00 |
| | | | | | | Exposure Point Total | | | | | | 4.E-04 | | | | | | 7.E+00 |
| | | | Exposure Medium Total | | | | | | 4.E-04 | | | | | | 7.E+00 | | | |
| | | | Soil Total | | | | | | 4.E-04 | | | | | | 7.E+00 | | | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 6.E-03 | 6.E-03 | | | |
| | | | 1,1,2-Trichloroethane | | | | | 4.E-08 | 4.E-08 | | | | | 4.E-04 | 4.E-04 | | | |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | 3.E-03 | 3.E-03 | | | |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | 5.E-02 | 5.E-02 | | | |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | 5.E-04 | 5.E-04 | | | |
| | | | 1,2-Dichloroethane | | | | | 3.E-05 | 3.E-05 | | | | | 1.E-03 | 1.E-03 | | | |
| | | | 1,4-Dichlorobenzene | | | | | 1.E-07 | 1.E-07 | | | | | 6.E-05 | 6.E-05 | | | |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | 3.E-04 | 3.E-04 | | | |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | 2.E-05 | 2.E-05 | | | |
| | | | Benzene | | | | | 1.E-06 | 1.E-06 | | | | | 1.E-02 | 1.E-02 | | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | 0.E+00 | 0.E+00 | | | | | 0.E+00 | 0.E+00 | | | |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | 6.E-03 | 6.E-03 | | | |
| | | | Chloroethane | | | | | 5.E-07 | 5.E-07 | | | | | 1.E-03 | 1.E-03 | | | |
| | | | Chloroform | | | | | 9.E-07 | 9.E-07 | | | | | 2.E-03 | 2.E-03 | | | |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | 2.E-02 | 2.E-02 | | | |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | 8.E-03 | 8.E-03 | | | |
| | | | Iron | | | | | 0.E+00 | 0.E+00 | | | | | 0.E+00 | 0.E+00 | | | |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | | 2.E-02 | 2.E-02 | | | |
| | | | Manganese | | | | | 0.E+00 | 0.E+00 | | | | | 0.E+00 | 0.E+00 | | | |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | | 6.E-06 | 6.E-06 | | | |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 | | | |
| | | | Methylene chloride | | | | | 1.E-07 | 1.E-07 | | | | | 5.E-04 | 5.E-04 | | | |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | 7.E-04 | 7.E-04 | | | |
| | | | Tetrachloroethene | | | | | 2.E-05 | 2.E-05 | | | | | 2.E-01 | 2.E-01 | | | |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | 3.E-03 | 3.E-03 | | | |
| | | | Trichloroethene | | | | | 2.E-04 | 2.E-04 | | | | | 1.E-01 | 1.E-01 | | | |
| | | | Vinyl chloride | | | | | 5.E-06 | 5.E-06 | | | | | 2.E-02 | 2.E-02 | | | |
| Xylenes (Total) | | | | | NA | 0.E+00 | | | | | 3.E-01 | 3.E-01 | | | | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-04 | 3.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 8.E-01 | 8.E-01 | | | |
| | | | Exposure Point Total | | | | | | 3.E-04 | | | | | | 8.E-01 | | | |
| | | | Exposure Medium Total | | | | | | 3.E-04 | | | | | | 8.E-01 | | | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | | 0.E+00 | 4.E-01 | 4.E-01 | | | | 8.E-01 | | | |
| | | | 1,1,2-Trichloroethane | 4.E-06 | 4.E-06 | | | | 7.E-06 | 1.E-01 | 1.E-01 | | | | 2.E-01 | | | |
| | | | 1,1-Dichloroethane | NA | NA | | | | 0.E+00 | 7.E-02 | 7.E-02 | | | | 1.E-01 | | | |
| | | | 1,1-Dichloroethene | NA | NA | | | | 0.E+00 | 4.E-01 | 4.E-01 | | | | 7.E-01 | | | |
| | | | 1,2,4-Trichlorobenzene | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 | | | |
| | | | 1,2-Dichlorobenzene | NA | NA | | | | 0.E+00 | 6.E-02 | 6.E-02 | | | | 1.E-01 | | | |
| | | | 1,2-Dichloroethane | 1.E-02 | 1.E-02 | | | | 2.E-02 | NA | NA | | | | 0.E+00 | | | |
| | | | 1,4-Dichlorobenzene | 6.E-06 | 6.E-06 | | | | 1.E-05 | 9.E-02 | 9.E-02 | | | | 2.E-01 | | | |
| | | | 2-Chlorophenol | NA | NA | | | | 0.E+00 | 2.E-01 | 2.E-01 | | | | 3.E-01 | | | |
| | | | 4-Methyl-2-pentanone | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 6.E-01 | | | |
| | | | Benzene | 3.E-05 | 3.E-05 | | | | 5.E-05 | 1.E+00 | 1.E+00 | | | | 3.E+00 | | | |
| | | | Bis(2-ethylhexyl)phthalate | 5.E-07 | 5.E-07 | | | | 1.E-06 | 1.E-02 | 1.E-02 | | | | 2.E-02 | | | |
| | | | Bromodichloromethane | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 | | | |
| | | | Chlorobenzene | NA | NA | | | | 0.E+00 | 5.E-01 | 5.E-01 | | | | 1.E+00 | | | |
| | | | Chloroethane | 3.E-04 | 3.E-04 | | | | 7.E-04 | 3.E-02 | 3.E-02 | | | | 6.E-02 | | | |
| | | | Chloroform | 2.E-06 | 2.E-06 | | | | 4.E-06 | 2.E-01 | 2.E-01 | | | | 5.E-01 | | | |
| | | | cis-1,2-Dichloroethene | NA | NA | | | | 0.E+00 | 9.E+00 | 9.E+00 | | | | 2.E+01 | | | |
| | | | Ethylbenzene | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 2.E+00 | | | |
| | | | Iron | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 | | | |
| | | | Isopropylbenzene | NA | NA | | | | 0.E+00 | 9.E-01 | 9.E-01 | | | | 2.E+00 | | | |
| | | | Manganese | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 2.E+00 | | | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Methyl tert butyl ether | 1.E-06 | 1.E-06 | | | | 2.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 9.E-05 | 9.E-05 | | | | 2.E-04 | 4.E-01 | 4.E-01 | | | | 9.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 1.E-02 | 1.E-02 | | | | 3.E-02 |
| | | | Tetrachloroethene | 3.E-03 | 3.E-03 | | | | 6.E-03 | 6.E+00 | 6.E+00 | | | | 1.E+01 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 4.E+00 | 4.E+00 | | | | 8.E+00 |
| | | | Trichloroethene | 2.E-03 | 2.E-03 | | | | 3.E-03 | 2.E+02 | 2.E+02 | | | | 3.E+02 |
| | | | Vinyl chloride | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+00 | 3.E+00 | | | | 5.E+00 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 2.E+00 | 2.E+00 | | | | 4.E+00 |
| | | | Chemical Total | 2.E-02 | 2.E-02 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-02 | 2.E+02 | 2.E+02 | 0.E+00 | 0.E+00 | 0.E+00 | 4.E+02 |
| | | | Exposure Point Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| | | | Exposure Medium Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| | | | Groundwater Total | | | | | | 3.E-02 | | | | | | 4.E+02 |

Total Risk Across All Media = 3.E-02

Total Hazard Across All Media = 402

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Subsurface Soil - RISB-25

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|-------------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 2.8 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 3.6E-05 | 3.0E-04 | 1.2E-01 | 2% |
| Iron | 22000 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 2.8E-01 | 7.0E-01 | 4.0E-01 | 7% |
| Manganese | 340 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 4.3E-03 | 2.0E-02 | 2.2E-01 | 4% |
| Thallium | 25 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 3.2E-04 | 7.0E-05 | 4.6E+00 | 74% |
| Vanadium | 63 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 8.1E-04 | 1.0E-03 | 8.1E-01 | 13% |
| 1,2-Dichloroethane | 45 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 5.8E-04 | NA | NA | 0% |
| Chloroform | 0.69 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 8.8E-06 | 1.0E-02 | 8.8E-04 | 0% |
| cis-1,2-Dichloroethene | 4.1 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 5.2E-05 | 1.0E-02 | 5.2E-03 | 0% |
| Tetrachloroethene | 0.30 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 3.8E-06 | 1.0E-02 | 3.8E-04 | 0% |
| Toluene | 0.31 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 4.0E-06 | 8.0E-02 | 5.0E-05 | 0% |
| Trichloroethene | 0.47 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 6.0E-06 | 3.0E-04 | 2.0E-02 | 0% |
| Xylenes | 0.17 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 2.2E-06 | 2.0E-01 | 1.1E-05 | 0% |

Hazard Index = 6.1E+00

Notes:

(1): Soil EPCs (see Appendix H-3)

**Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Dermal Contact
Subsurface Soil - RISB-25**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (years) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | $RfD_{dermal-adj}$ Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------|-----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 2.8 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 3.0E-06 | 9.5E-01 | 2.9E-04 | 1.1E-02 | 1% |
| Iron | 22000 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 7.9E-03 | 2.0E-01 | 1.4E-01 | 5.6E-02 | 7% |
| Manganese | 340 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.2E-04 | 2.0E-01 | 4.0E-03 | 3.0E-02 | 4% |
| Thallium | 25 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 8.9E-06 | 2.0E-01 | 1.4E-05 | 6.4E-01 | 75% |
| Vanadium | 63 | 2,800 | 0.2 | 0.01 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 2.3E-05 | 2.0E-01 | 2.0E-04 | 1.1E-01 | 13% |
| 1,2-Dichloroethane | 45 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 4.8E-05 | 8.0E-01 | NA | NA | 0% |
| Chloroform | 0.69 | 2,800 | 0.2 | 0.0005 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.2E-08 | 8.0E-01 | 8.0E-03 | 1.5E-06 | 0% |
| cis-1,2-Dichloroethene | 4.1 | 2,800 | 0.2 | 0.0005 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 7.3E-08 | 8.0E-01 | 8.0E-03 | 9.2E-06 | 0% |
| Tetrachloroethene | 0.30 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 3.2E-07 | 8.0E-01 | 8.0E-03 | 4.0E-05 | 0% |
| Toluene | 0.31 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 3.3E-07 | 8.0E-01 | 6.4E-02 | 5.2E-06 | 0% |
| Trichloroethene | 0.47 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 5.0E-07 | 8.0E-01 | 2.4E-04 | 2.1E-03 | 0% |
| Xylenes | 0.17 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.8E-07 | 8.0E-01 | 1.6E-01 | 1.1E-06 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 8.5E-01

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Subsurface Soil - RISB-25

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = [(C_s / \text{PEF}) + (C_s / \text{VF})] * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_n$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)
 PEF = particulate emission factor (m³/kg)
 VF = volatilization factor (m³/kg)
 $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
 EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
 ED = exposure duration: the typical duration of each exposure event (year)
 ET_{inh} = exposure time (hr/day)
 BW = body weight (kg)
 AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|--------------------|-------------------------------------------|
| Arsenic | 2.8 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 1.1E-09 | NA | NA | 0% |
| Iron | 22000 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 8.6E-06 | NA | NA | 0% |
| Manganese | 340 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 1.3E-07 | 1.43E-05 | 9.3E-03 | 29% |
| Thallium | 25 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 9.8E-09 | NA | NA | 0% |
| Vanadium | 63 | 6.80E+08 | NA | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.5E-08 | NA | NA | 0% |
| 1,2-Dichloroethane | 45 | NA | 3.91E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 3.1E-03 | 7.00E-01 | 4.4E-03 | 13% |
| Chloroform | 0.69 | NA | 2.66E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 6.9E-05 | 1.40E-02 | 4.9E-03 | 15% |
| cis-1,2-Dichloroethene | 4.1 | NA | 2.90E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 3.8E-04 | 5.71E-02 | 6.6E-03 | 20% |
| Tetrachloroethene | 0.30 | NA | 2.55E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 3.1E-05 | 1.00E-02 | 3.1E-03 | 10% |
| Toluene | 0.31 | NA | 3.98E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.1E-05 | 1.43E+00 | 1.4E-05 | 0% |
| Trichloroethene | 0.47 | NA | 3.26E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 3.8E-05 | 1.0E-02 | 3.8E-03 | 12% |
| Xylenes | 0.17 | NA | 6.10E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 7.4E-06 | 2.9E-02 | 2.6E-04 | 1% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Hazard Index = 3.2E-02

Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Incidental Ingestion
Subsurface Soil - RISB-25

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Age Adjusted Soil Ingestion Factor (mg-year/kg-day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | C_1 Conv. Factor (mass) (kg/mg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------|-----------------------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 2.8 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 4.4E-06 | 1.5E+00 | 6.6E-06 | 17% |
| Iron | 22000 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 3.4E-02 | NA | NA | 0% |
| Manganese | 340 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 5.3E-04 | NA | NA | 0% |
| Thallium | 25 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 3.9E-05 | NA | NA | 0% |
| Vanadium | 63 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 9.8E-05 | NA | NA | 0% |
| 1,2-Dichloroethane | 45 | | chemical is considered mutagenic, see Table xx for risk calculation | | | | | | 3.23E-05 | 82% |
| Chloroform | 0.69 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 1.1E-06 | 1.0E-02 | 1.1E-08 | 0% |
| cis-1,2-Dichloroethene | 4.1 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 6.4E-06 | NA | NA | 0% |
| Tetrachloroethene | 0.30 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 4.7E-07 | 5.4E-01 | 2.5E-07 | 1% |
| Toluene | 0.31 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 4.8E-07 | NA | NA | 0% |
| Trichloroethene | 0.47 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 7.3E-07 | 4.0E-01 | 2.9E-07 | 1% |
| Xylenes | 0.17 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 2.7E-07 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 3.9E-05

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Dermal Contact
Subsurface Soil - RISB-25

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SFS Age-Adjusted Dermal Factor (mg-year/kg-event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | $SF_{dermal-adj}$ Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) | |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|------------|
| Arsenic | 2.8 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 4.1E-07 | 9.5E-01 | 1.6E+00 | 6.5E-07 | 1% | |
| Iron | 22000 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 1.1E-03 | 2.0E-01 | NA | NA | 0% | |
| Manganese | 340 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 1.7E-05 | 2.0E-01 | NA | NA | 0% | |
| Thallium | 25 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 1.2E-06 | 2.0E-01 | NA | NA | 0% | |
| Vanadium | 63 | 360 | 0.01 | 350 | 1 | 1.0E-06 | 25,550 | 3.1E-06 | 8.0E-01 | NA | NA | 0% | |
| 1,2-Dichloroethane | 45 | | chemical is considered mutagenic, see Table xx for risk calculation | | | | | | | | | 7.1E-05 | 99% |
| Chloroform | 0.69 | 360 | 0.0005 | 350 | 1 | 1.0E-06 | 25,550 | 1.7E-09 | 8.0E-01 | 1.3E-02 | 2.1E-11 | 0% | |
| cis-1,2-Dichloroethene | 4.1 | 360 | 0.0005 | 350 | 1 | 1.0E-06 | 25,550 | 1.0E-08 | 8.0E-01 | NA | NA | 0% | |
| Tetrachloroethene | 0.30 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 4.4E-08 | 8.0E-01 | 6.8E-01 | 3.0E-08 | 0% | |
| Toluene | 0.31 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 4.6E-08 | 8.0E-01 | NA | NA | 0% | |
| Trichloroethene | 0.47 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 7.0E-08 | 8.0E-01 | 5.0E-01 | 3.5E-08 | 0% | |
| Xylenes | 0.17 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 2.5E-08 | 8.0E-01 | NA | NA | 0% | |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004

"NA" = Not applicable

| | |
|--------------------------------------|----------------|
| Excess Lifetime Cancer Risk = | 7.2E-05 |
|--------------------------------------|----------------|

Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Inhalation Exposure
Subsurface Soil - RISB-25

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = [(C_s / \text{PEF}) + (C_s / \text{VF})] * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_c$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Arsenic | 2.8 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 3.9E-10 | 1.51E+01 | 5.8E-09 | 0% |
| Iron | 22000 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 3.0E-06 | NA | NA | 0% |
| Manganese | 340 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 4.7E-08 | NA | NA | 0% |
| Thallium | 25 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 3.5E-09 | NA | NA | 0% |
| Vanadium | 63 | 6.80E+08 | NA | 1 | 350 | 30 | 16 | 70 | 25,550 | 8.7E-09 | NA | NA | 0% |
| 1,2-Dichloroethane | 45 | | | | | | | | | | | | |
| Chloroform | 0.69 | NA | 2.66E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 2.4E-05 | 8.10E-02 | 2.0E-06 | 1% |
| cis-1,2-Dichloroethene | 4.1 | NA | 2.90E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.3E-04 | NA | NA | 0% |
| Tetrachloroethene | 0.30 | NA | 2.55E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.1E-05 | 2.10E-02 | 2.3E-07 | 0% |
| Toluene | 0.31 | NA | 3.98E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 7.3E-06 | NA | NA | 0% |
| Trichloroethene | 0.47 | NA | 3.26E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.4E-05 | 3.85E-01 | 5.2E-06 | 2% |
| Xylenes | 0.17 | NA | 6.10E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 2.6E-06 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 2.4E-04

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
- (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

| Parameter | CS (mg/kg) | 0-2 Years Child Mult. (1/day) | 2-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | CSF (mg/kg*day) ⁻¹ | CSF adjustment factor | | | | ED | | | | EP | Risk | | | | Total Risk | |
|--------------------|---------------|-------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------|-----------------------|-----|------|-------|-----|-----|------|-------|----|----------|----------|----------|----------|---------------|------------------------|
| | | | | | | | 0-2 | 2-6 | 6-15 | 15-30 | 0-2 | 2-6 | 6-15 | 15-30 | | 0-2 | 2-6 | 6-15 | 15-30 | | |
| 1,2-Dichloroethane | 45 | 3.31E-05 | 2.30E-05 | 7.06E-06 | 5.92E-06 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 3.88E-05 | 1.62E-05 | 1.11E-05 | 5.20E-06 | 7.13E-05 | Dermal Risk |
| 1,2-Dichloroethane | 45 | 1.74E-05 | 9.59E-06 | 2.46E-06 | 1.41E-06 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 2.04E-05 | 6.73E-06 | 3.88E-06 | 1.24E-06 | 3.23E-05 | Ingestion risk |
| 1,2-Dichloroethane | 45 | 5.36E-05 | 5.11E-05 | 5.25E-05 | 5.79E-05 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 6.28E-05 | 3.59E-05 | 8.28E-05 | 5.08E-05 | 2.32E-04 | inhalation risk |

| Parameter | CS (mg/kg) | 0-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | Child CSF (mg/kg*day) ⁻¹ | Adult CSF (mg/kg*day) ⁻¹ | ED | | | EP | Risk | | | Total Risk | |
|----------------|---------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|-----|------|-------|----|----------|----------|----------|------------|------------------|
| | | | | | | | 0-6 | 6-15 | 15-30 | | 0-6 | 6-15 | 15-30 | | |
| Vinyl chloride | 0.00 | 1.28E-05 | 2.46E-06 | 1.41E-06 | 1.5E+00 | 7.20E-01 | 6 | 9 | 15 | 70 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | ingestion |
| Vinyl chloride | 0.00 | 2.76E-05 | 7.06E-06 | 5.92E-06 | 1.5E+00 | 7.20E-01 | 6 | 9 | 15 | 70 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | dermal |
| Vinyl chloride | 0.00 | 2.49E-04 | 2.05E-04 | 2.26E-04 | 1.5E+00 | 7.20E-01 | 6 | 9 | 15 | 70 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | dermal |

Appendix H-5.32
Subsurface Soil
Hot Spot RISB-64
Future Excavation Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Excavation Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Exposure Route Total | Non-Carcinogenic Hazard Quotient | | | | | Exposure Route Total | | | |
|-----------------------|---------------------|--------------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|----------------------------------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|--------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | | | | |
| Soil | Subsurface Soil | Hot Spot - RISB-64 | Arsenic | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Thallium | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Vanadium | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,2-Dichloroethane | NA | NA | 3.E-07 | | | | 3.E-07 | NA | NA | 3.E-04 | | | 3.E-04 | | |
| | | | 1,4-Dichlorobenzene | 7.E-10 | 5.E-11 | 1.E-09 | | | | 2.E-09 | 2.E-06 | 2.E-07 | 5.E-06 | | | 8.E-06 | | |
| | | | Benzene | 5.E-09 | 7.E-12 | 2.E-08 | | | | 3.E-08 | 2.E-03 | 2.E-06 | 7.E-03 | | | 9.E-03 | | |
| | | | Chloroform | 3.E-10 | 4.E-13 | 3.E-08 | | | | 3.E-08 | 2.E-04 | 3.E-07 | 2.E-03 | | | 2.E-03 | | |
| | | | cis-1,2-Dichloroethene | NA | NA | NA | | | | 0.E+00 | 2.E-03 | 2.E-06 | 3.E-02 | | | 3.E-02 | | |
| | | | Tetrachloroethene | 2.E-06 | 1.E-07 | 7.E-07 | | | | 3.E-06 | 2.E-03 | 2.E-04 | 2.E-01 | | | 2.E-01 | | |
| | | | Toluene | NA | NA | NA | | | | 0.E+00 | 6.E-04 | 4.E-05 | 5.E-03 | | | 6.E-03 | | |
| | | | Trichloroethene | 3.E-06 | 2.E-07 | 2.E-05 | | | | 2.E-05 | 2.E+00 | 1.E-01 | 4.E-01 | | | 2.E+00 | | |
| | | | Vinyl chloride | 3.E-09 | 4.E-12 | 1.E-09 | | | | 4.E-09 | 9.E-05 | 1.E-07 | 2.E-04 | | | 3.E-04 | | |
| | | | Xylenes | NA | NA | NA | | | | 0.E+00 | 3.E-03 | 2.E-04 | 7.E-02 | | | 7.E-02 | | |
| | | | Chemical Total | 5.E-06 | 3.E-07 | 2.E-05 | 0.E+00 | 0.E+00 | 3.E-05 | 2.E+00 | 1.E-01 | 7.E-01 | 0.E+00 | 0.E+00 | 2.E+00 | | | |
| | | | Exposure Point Total | | | | | | 3.E-05 | | | | | 2.E+00 | | | | |
| | | | Exposure Medium Total | | | | | | 3.E-05 | | | | | 2.E+00 | | | | |
| | | | Soil Total | | | | | | 3.E-05 | | | | | 2.E+00 | | | | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | NA | | 0.E+00 | | | | 9.E-05 | | 9.E-05 | | | |
| | | | 1,1,2-Trichloroethane | | | | 2.E-11 | | 2.E-11 | | | | 6.E-06 | | 6.E-06 | | | |
| | | | 1,1-Dichloroethane | | | | NA | | 0.E+00 | | | | 1.E-06 | | 1.E-06 | | | |
| | | | 1,1-Dichloroethene | | | | NA | | 0.E+00 | | | | 7.E-04 | | 7.E-04 | | | |
| | | | 1,2-Dichlorobenzene | | | | NA | | 0.E+00 | | | | 8.E-06 | | 8.E-06 | | | |
| | | | 1,2-Dichloroethane | | | | NA | | 0.E+00 | | | | 2.E-05 | | 2.E-05 | | | |
| | | | 1,4-Dichlorobenzene | | | | 7.E-11 | | 7.E-11 | | | | 3.E-07 | | 3.E-07 | | | |
| | | | 2-Chlorophenol | | | | NA | | 0.E+00 | | | | NA | | 0.E+00 | | | |
| | | | 4-Methyl-2-pentanone | | | | NA | | 0.E+00 | | | | 3.E-07 | | 3.E-07 | | | |
| | | | Benzene | | | | 5.E-10 | | 5.E-10 | | | | 2.E-04 | | 2.E-04 | | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | NA | | 0.E+00 | | | | NA | | 0.E+00 | | | |
| | | | Chlorobenzene | | | | NA | | 0.E+00 | | | | 9.E-05 | | 9.E-05 | | | |
| | | | Chloroethane | | | | NA | | 0.E+00 | | | | 5.E-06 | | 5.E-06 | | | |
| | | | Chloroform | | | | 5.E-10 | | 5.E-10 | | | | 3.E-05 | | 3.E-05 | | | |
| | | | cis-1,2-Dichloroethene | | | | NA | | 0.E+00 | | | | 2.E-04 | | 2.E-04 | | | |
| | | | Ethylbenzene | | | | NA | | 0.E+00 | | | | 1.E-04 | | 1.E-04 | | | |
| | | | Iron | | | | NA | | 0.E+00 | | | | NA | | 0.E+00 | | | |
| | | | Isopropylbenzene | | | | NA | | 0.E+00 | | | | 3.E-02 | | 3.E-02 | | | |
| | | | Manganese | | | | NA | | 0.E+00 | | | | NA | | 0.E+00 | | | |
| | | | Methyl tert butyl ether | | | | NA | | 0.E+00 | | | | NA | | 0.E+00 | | | |
| | | | Methylcyclohexane | | | | NA | | 0.E+00 | | | | NA | | 0.E+00 | | | |
| | | | Methylene chloride | | | | NA | | 0.E+00 | | | | 3.E-06 | | 3.E-06 | | | |
| | | | Naphthalene | | | | NA | | 0.E+00 | | | | 8.E-06 | | 8.E-06 | | | |
| | | | Tetrachloroethene | | | | 1.E-08 | | 1.E-08 | | | | 4.E-03 | | 4.E-03 | | | |
| | | | Toluene | | | | NA | | 0.E+00 | | | | 6.E-05 | | 6.E-05 | | | |
| | | | Trichloroethene | | | | 1.E-07 | | 1.E-07 | | | | 2.E-03 | | 2.E-03 | | | |
| | | | Vinyl chloride | | | | NA | | 0.E+00 | | | | 4.E-04 | | 4.E-04 | | | |
| | | | Xylenes (Total) | | | | NA | | 0.E+00 | | | | 4.E-03 | | 4.E-03 | | | |
| | | | | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 1.E-07 | 0.E+00 | 1.E-07 | 0.E+00 | 0.E+00 | 0.E+00 | 4.E-02 | 0.E+00 | 4.E-02 |
| | | | | | | Exposure Point Total | | | | | | 1.E-07 | | | | | 4.E-02 | |
| | | | Exposure Medium Total | | | | | | 1.E-07 | | | | | 4.E-02 | | | | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,1,2-Trichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,1-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,1-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,2,4-Trichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,2-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,2-Dichloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,4-Dichlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 2-Chlorophenol | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 4-Methyl-2-pentanone | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Benzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Bromodichloromethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chlorobenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chloroethane | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Chloroform | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | cis-1,2-Dichloroethene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Ethylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Isopropylbenzene | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 | | | | | | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Excavation Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Methyl tert butyl ether | | | | | | | | | | | | |
| | | | Methylcyclohexane | | | | | | | | | | | | |
| | | | Methylene chloride | | | | | | | | | | | | |
| | | | Naphthalene | | | | | | | | | | | | |
| | | | Tetrachloroethene | | | | | | | | | | | | |
| | | | Toluene | | | | | | | | | | | | |
| | | | Trichloroethene | | | | | | | | | | | | |
| | | | Vinyl chloride | | | | | | | | | | | | |
| | | | Xylenes (Total) | | | | | | | | | | | | |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 |
| | | | Exposure Point Total | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Exposure Medium Total | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Groundwater Total | | | | | | 1.E-07 | | | | | | 4.E-02 |

Total Risk Across All Media = **3.E-05**

Total Hazard Across All Media = **2.478857**

Future Excavation Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Subsurface Soil - Hot Spot RISB-64

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

- where:
- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
 - IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
 - AE_i = absorption efficiency (unitless)
 - EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
 - ED = exposure duration: the typical duration of each exposure event (years)
 - BW = body weight (kg)
 - AT_n = averaging Time (years)
 - C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Subchronic Oral RfD ⁽²⁾ (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------|----------------------------------------------------------------|
| 1,2-Dichloroethane | 11 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 3.6E-05 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.64 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 2.1E-06 | 9.0E-01 | 2.3E-06 | 0% |
| Benzene | 2.1 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 6.8E-06 | 4.0E-03 | 1.7E-03 | 0% |
| Chloroform | 0.75 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 2.4E-06 | 1.0E-02 | 2.4E-04 | 0% |
| cis-1,2-Dichloroethene | 58 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.9E-04 | 1.0E-01 | 1.9E-03 | 0% |
| Tetrachloroethene | 72 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 2.3E-04 | 1.0E-01 | 2.3E-03 | 0% |
| Toluene | 370 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 1.2E-03 | 2.0E+00 | 6.0E-04 | 0% |
| Trichloroethene | 150 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 4.8E-04 | 3.0E-04 | 1.6E+00 | 99% |
| Vinyl Chloride | 0.086 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 2.8E-07 | 3.0E-03 | 9.3E-05 | 0% |
| Xylenes (total) | 160 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 365 | 5.2E-04 | 2.0E-01 | 2.6E-03 | 0% |

Hazard Index = 1.6E+00

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): Subchronic RfDs were not available for iron, thallium, benzene, trichloroethene, vinyl chloride or xylenes, therefore, chronic values were implemented.

**Future Excavation Worker Scenario
Estimation of Noncancer Hazard from Dermal Contact
Subsurface Soil - Hot Spot RISB-64**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} Absorption Efficiency ⁽³⁾ (unitless) | $RfD_{dermal-adj}$ Subchronic Dermal Adj. RfD ⁽⁴⁾ (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------------|--------------------|------------------------------------|
| 1,2-Dichloroethane | 11 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 2.1E-06 | 8.0E-01 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.64 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 1.2E-07 | 8.0E-01 | 7.2E-01 | 1.7E-07 | 0% |
| Benzene | 2.1 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 6.8E-09 | 8.0E-01 | 3.2E-03 | 2.1E-06 | 0% |
| Chloroform | 0.75 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 2.4E-09 | 8.0E-01 | 8.0E-03 | 3.0E-07 | 0% |
| cis-1,2-Dichloroethene | 58 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 1.9E-07 | 8.0E-01 | 8.0E-02 | 2.3E-06 | 0% |
| Tetrachloroethene | 72 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 1.4E-05 | 8.0E-01 | 8.0E-02 | 1.7E-04 | 0% |
| Toluene | 370 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 7.2E-05 | 8.0E-01 | 1.6E+00 | 4.5E-05 | 0% |
| Trichloroethene | 150 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 2.9E-05 | 8.0E-01 | 2.4E-04 | 1.2E-01 | 100% |
| Vinyl Chloride | 0.086 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 2.8E-10 | 8.0E-01 | 2.4E-03 | 1.2E-07 | 0% |
| Xylenes (total) | 160 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 365 | 3.1E-05 | 8.0E-01 | 1.6E-01 | 1.9E-04 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online
- (4): Subchronic RfDs were not available for iron, thallium, benzene, trichloroethene, vinyl chloride or xylenes, therefore, chronic values were implemented.

Hazard Index = 1.2E-01

**Future Excavation Worker Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Subsurface Soil - Hot Spot RISB-64**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m^3/kg)

VF = volatilization factor (m^3/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m^3/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m^3/kg) | VF Volatilization Factor ⁽³⁾ (m^3/kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m^3/hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | RfD _i Subchronic Inhalation RfD ⁽⁴⁾ (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|----------------------------------------------------------|------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------|-------------------------------------------|
| 1,2-Dichloroethane | 11 | NA | 3.91E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 2.2E-04 | 7.00E-01 | 3.1E-04 | 0% |
| 1,4-Dichlorobenzene | 0.64 | NA | 1.29E+04 | 1 | 250 | 1 | 8 | 70 | 365 | 3.9E-06 | 7.14E-01 | 5.4E-06 | 0% |
| Benzene | 2.1 | NA | 2.73E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 6.0E-05 | 8.57E-03 | 7.0E-03 | 1% |
| Chloroform | 0.75 | NA | 2.66E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 2.2E-05 | 1.40E-02 | 1.6E-03 | 0% |
| cis-1,2-Dichloroethene | 58 | NA | 2.90E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 1.6E-03 | 5.71E-02 | 2.7E-02 | 4% |
| Tetrachloroethene | 72 | NA | 2.55E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 2.2E-03 | 1.00E-02 | 2.2E-01 | 32% |
| Toluene | 370 | NA | 3.98E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 7.3E-03 | 1.43E+00 | 5.1E-03 | 1% |
| Trichloroethene | 150 | NA | 3.26E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 3.6E-03 | 1.0E-02 | 3.6E-01 | 52% |
| Vinyl Chloride | 0.086 | NA | 1.04E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 6.5E-06 | 2.9E-02 | 2.3E-04 | 0% |
| Xylenes (total) | 160 | NA | 6.10E+03 | 1 | 250 | 1 | 8 | 70 | 365 | 2.1E-03 | 2.9E-02 | 7.2E-02 | 10% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

(4): A subchronic RfD was only available for 1,4-dichlorobenzene, therefore, chronic values were implemented for the remainder of the chemicals.

Hazard Index = 6.9E-01

Future Excavation Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Subsurface Soil - Hot Spot RISB-64

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 11 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 5.1E-07 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.64 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 3.0E-08 | 2.4E-02 | 7.1E-10 | 0% |
| Benzene | 2.1 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 9.7E-08 | 5.5E-02 | 5.3E-09 | 0% |
| Chloroform | 0.75 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 3.5E-08 | 1.0E-02 | 3.5E-10 | 0% |
| cis-1,2-Dichloroethene | 58 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 2.7E-06 | NA | NA | 0% |
| Tetrachloroethene | 72 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 3.3E-06 | 5.4E-01 | 1.8E-06 | 39% |
| Toluene | 370 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 1.7E-05 | NA | NA | 0% |
| Trichloroethene | 150 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 6.9E-06 | 4.0E-01 | 2.8E-06 | 61% |
| Vinyl Chloride | 0.086 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 4.0E-09 | 7.2E-01 | 2.9E-09 | 0% |
| Xylenes (total) | 160 | 330 | 1 | 250 | 1 | 1.0E-06 | 70 | 25,550 | 7.4E-06 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 4.6E-06

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Future Excavation Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Subsurface Soil - Hot Spot RISB-64**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 11 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 3.0E-08 | 8.0E-01 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.64 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.8E-09 | 8.0E-01 | 3.0E-02 | 5.3E-11 | 0% |
| Benzene | 2.1 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 9.7E-11 | 8.0E-01 | 6.9E-02 | 6.7E-12 | 0% |
| Chloroform | 0.75 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 3.5E-11 | 8.0E-01 | 1.3E-02 | 4.3E-13 | 0% |
| cis-1,2-Dichloroethene | 58 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 2.7E-09 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 72 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 2.0E-07 | 8.0E-01 | 6.8E-01 | 1.3E-07 | 39% |
| Toluene | 370 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 1.0E-06 | 8.0E-01 | NA | NA | 0% |
| Trichloroethene | 150 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 4.2E-07 | 8.0E-01 | 5.0E-01 | 2.1E-07 | 61% |
| Vinyl Chloride | 0.086 | 3,300 | 0.2 | 0.0005 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 4.0E-12 | 8.0E-01 | 9.0E-01 | 3.6E-12 | 0% |
| Xylenes (total) | 160 | 3,300 | 0.2 | 0.03 | 250 | 1 | 1 | 1.0E-06 | 70 | 25,550 | 4.4E-07 | 8.0E-01 | NA | NA | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
 - (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
 - (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online
- "NA" = Not applicable

Excess Lifetime Cancer Risk = 3.4E-07

Future Excavation Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Subsurface Soil - Hot Spot RISB-64

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 11 | NA | 3.91E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 3.1E-06 | 9.10E-02 | 2.9E-07 | 1% |
| 1,4-Dichlorobenzene | 0.64 | NA | 1.29E+04 | 1 | 250 | 1 | 8 | 70 | 25,550 | 5.5E-08 | 2.20E-02 | 1.2E-09 | 0% |
| Benzene | 2.1 | NA | 2.73E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 8.6E-07 | 2.70E-02 | 2.3E-08 | 0% |
| Chloroform | 0.75 | NA | 2.66E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 3.2E-07 | 8.10E-02 | 2.6E-08 | 0% |
| cis-1,2-Dichloroethene | 58 | NA | 2.90E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 2.2E-05 | NA | NA | 0% |
| Tetrachloroethene | 72 | NA | 2.55E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 3.2E-05 | 2.10E-02 | 6.6E-07 | 3% |
| Toluene | 370 | NA | 3.98E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 1.0E-04 | NA | NA | 0% |
| Trichloroethene | 150 | NA | 3.26E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 5.1E-05 | 3.85E-01 | 2.0E-05 | 95% |
| Vinyl Chloride | 0.086 | NA | 1.04E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 9.3E-08 | 1.54E-02 | 1.4E-09 | 0% |
| Xylenes (total) | 160 | NA | 6.10E+03 | 1 | 250 | 1 | 8 | 70 | 25,550 | 2.9E-05 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 2.1E-05

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
- (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

Appendix H-5.33
Subsurface Soil
Hot Spot RISB-64
Future Industrial Worker

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Exposure Route Total | Non-Carcinogenic Hazard Quotient | | | | | Exposure Route Total | | | |
|-----------------------|---------------------|--------------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|----------------------------------|--------|-------------------------------|------------------------|-----------------------|----------------------|--------|--------|--------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | | | | |
| Soil | Subsurface Soil | Hot Spot - RISB-64 | Arsenic | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Thallium | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | Vanadium | | | | | | 0.E+00 | | | | | | 0.E+00 | | | |
| | | | 1,2-Dichloroethane | NA | NA | 7.E-06 | | | | 7.E-06 | NA | NA | 3.E-04 | | | 3.E-04 | | |
| | | | 1,4-Dichlorobenzene | 3.E-09 | 1.E-09 | 3.E-08 | | | | 3.E-08 | 1.E-05 | 5.E-06 | 2.E-05 | | | 3.E-05 | | |
| | | | Benzene | 2.E-08 | 2.E-10 | 6.E-07 | | | | 6.E-07 | 3.E-04 | 2.E-06 | 7.E-03 | | | 7.E-03 | | |
| | | | Chloroform | 1.E-09 | 1.E-11 | 6.E-07 | | | | 6.E-07 | 4.E-05 | 3.E-07 | 2.E-03 | | | 2.E-03 | | |
| | | | cis-1,2-Dichloroethene | NA | NA | NA | | | | 0.E+00 | 3.E-03 | 2.E-05 | 3.E-02 | | | 3.E-02 | | |
| | | | Tetrachloroethene | 7.E-06 | 3.E-06 | 2.E-05 | | | | 3.E-05 | 4.E-03 | 2.E-03 | 2.E-01 | | | 2.E-01 | | |
| | | | Toluene | NA | NA | NA | | | | 0.E+00 | 2.E-03 | 1.E-03 | 5.E-03 | | | 8.E-03 | | |
| | | | Trichloroethene | 1.E-05 | 5.E-06 | 5.E-04 | | | | 5.E-04 | 2.E-01 | 1.E-01 | 4.E-01 | | | 7.E-01 | | |
| | | | Vinyl chloride | 1.E-08 | 9.E-11 | 4.E-08 | | | | 5.E-08 | 1.E-05 | 1.E-07 | 2.E-04 | | | 2.E-04 | | |
| Xylenes | NA | NA | NA | | | | 0.E+00 | 4.E-04 | 2.E-04 | 7.E-02 | | | 7.E-02 | | | | | |
| | | | Chemical Total | 2.E-05 | 9.E-06 | 5.E-04 | 0.E+00 | 0.E+00 | 5.E-04 | 3.E-01 | 1.E-01 | 7.E-01 | 0.E+00 | 0.E+00 | 1.E+00 | | | |
| | | | Exposure Point Total | | | | | | 5.E-04 | | | | | | 1.E+00 | | | |
| | | | Exposure Medium Total | | | | | | 5.E-04 | | | | | | 1.E+00 | | | |
| | | | Soil Total | | | | | | 5.E-04 | | | | | | 1.E+00 | | | |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 | | | |
| | | | 1,1,2-Trichloroethane | | | | | 2.E-08 | 2.E-08 | | | | | 3.E-04 | 3.E-04 | | | |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 | | | |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | 3.E-02 | 3.E-02 | | | |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | 4.E-04 | 4.E-04 | | | |
| | | | 1,2-Dichloroethane | | | | | 2.E-05 | 2.E-05 | | | | | 7.E-04 | 7.E-04 | | | |
| | | | 1,4-Dichlorobenzene | | | | | 8.E-08 | 8.E-08 | | | | | 4.E-05 | 4.E-05 | | | |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | 2.E-04 | 2.E-04 | | | |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | 1.E-05 | 1.E-05 | | | |
| | | | Benzene | | | | | 6.E-07 | 6.E-07 | | | | | 7.E-03 | 7.E-03 | | | |
| | | | Bis(2-ethylhexyl)phthalate | | | | | NA | 0.E+00 | | | | | 0.E+00 | 0.E+00 | | | |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | 4.E-03 | 4.E-03 | | | |
| | | | Chloroethane | | | | | 3.E-07 | 3.E-07 | | | | | 1.E-03 | 1.E-03 | | | |
| | | | Chloroform | | | | | 5.E-07 | 5.E-07 | | | | | 1.E-03 | 1.E-03 | | | |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 | | | |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | 5.E-03 | 5.E-03 | | | |
| | | | Iron | | | | | NA | 0.E+00 | | | | | 0.E+00 | 0.E+00 | | | |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 | | | |
| | | | Manganese | | | | | NA | 0.E+00 | | | | | 0.E+00 | 0.E+00 | | | |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | | 4.E-06 | 4.E-06 | | | |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 | | | |
| | | | Methylene chloride | | | | | 7.E-08 | 7.E-08 | | | | | 4.E-04 | 4.E-04 | | | |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | 5.E-04 | 5.E-04 | | | |
| | | | Tetrachloroethene | | | | | 1.E-05 | 1.E-05 | | | | | 2.E-01 | 2.E-01 | | | |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | 2.E-03 | 2.E-03 | | | |
| | | | Trichloroethene | | | | | 1.E-04 | 1.E-04 | | | | | 9.E-02 | 9.E-02 | | | |
| | | | Vinyl chloride | | | | | 3.E-06 | 3.E-06 | | | | | 2.E-02 | 2.E-02 | | | |
| | | | Xylenes (Total) | | | | | NA | 0.E+00 | | | | | 2.E-01 | 2.E-01 | | | |
| | | | | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 2.E-04 | 2.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E-01 | 6.E-01 |
| | | | | | | Exposure Point Total | | | | | | 2.E-04 | | | | | 6.E-01 | |
| | | | Exposure Medium Total | | | | | | 2.E-04 | | | | | 6.E-01 | | | | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 | | | |
| | | | 1,1,2-Trichloroethane | 2.E-06 | 2.E-06 | | | | 5.E-06 | 3.E-02 | 3.E-02 | | | | 6.E-02 | | | |
| | | | 1,1-Dichloroethane | NA | NA | | | | 0.E+00 | 2.E-02 | 2.E-02 | | | | 4.E-02 | | | |
| | | | 1,1-Dichloroethene | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 | | | |
| | | | 1,2,4-Trichlorobenzene | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 | | | |
| | | | 1,2-Dichlorobenzene | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 | | | |
| | | | 1,2-Dichloroethane | 1.E-03 | 1.E-03 | | | | 3.E-03 | NA | NA | | | | 0.E+00 | | | |
| | | | 1,4-Dichlorobenzene | 4.E-06 | 4.E-06 | | | | 7.E-06 | 1.E-02 | 1.E-02 | | | | 3.E-02 | | | |
| | | | 2-Chlorophenol | NA | NA | | | | 0.E+00 | 5.E-02 | 5.E-02 | | | | 1.E-01 | | | |
| | | | 4-Methyl-2-pentanone | NA | NA | | | | 0.E+00 | 9.E-02 | 9.E-02 | | | | 2.E-01 | | | |
| | | | Benzene | 2.E-05 | 2.E-05 | | | | 3.E-05 | 2.E-01 | 2.E-01 | | | | 4.E-01 | | | |
| | | | Bis(2-ethylhexyl)phthalate | 3.E-07 | 3.E-07 | | | | 6.E-07 | 3.E-03 | 3.E-03 | | | | 6.E-03 | | | |
| | | | Bromodichloromethane | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | | 0.E+00 | | | |
| | | | Chlorobenzene | NA | NA | | | | 0.E+00 | 7.E-02 | 7.E-02 | | | | 1.E-01 | | | |
| | | | Chloroethane | 2.E-06 | 2.E-06 | | | | 4.E-06 | 5.E-03 | 5.E-03 | | | | 9.E-03 | | | |
| | | | Chloroform | 1.E-06 | 1.E-06 | | | | 3.E-06 | 4.E-02 | 4.E-02 | | | | 7.E-02 | | | |
| | | | cis-1,2-Dichloroethene | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | | 3.E+00 | | | |
| | | | Ethylbenzene | NA | NA | | | | 0.E+00 | 2.E-01 | 2.E-01 | | | | 4.E-01 | | | |
| | | | Iron | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 2.E-01 | | | |
| | | | Isopropylbenzene | NA | NA | | | | 0.E+00 | 1.E-01 | 1.E-01 | | | | 3.E-01 | | | |
| | | | Manganese | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 6.E-01 | | | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Industrial Worker |
| Receptor: | Adult |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Methyl tert butyl ether | 6.E-07 | 6.E-07 | | | | 1.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 1.E-05 | 1.E-05 | | | | 2.E-05 | 7.E-02 | 7.E-02 | | | | 1.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 4.E-03 | 4.E-03 | | | | 9.E-03 |
| | | | Tetrachloroethene | 2.E-03 | 2.E-03 | | | | 4.E-03 | 9.E-01 | 9.E-01 | | | | 2.E+00 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 6.E-01 | 6.E-01 | | | | 1.E+00 |
| | | | Trichloroethene | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+01 | 3.E+01 | | | | 5.E+01 |
| | | | Vinyl chloride | 3.E-04 | 3.E-04 | | | | 6.E-04 | 4.E-01 | 4.E-01 | | | | 8.E-01 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | | 7.E-01 |
| | | | Chemical Total | 5.E-03 | 5.E-03 | 0.E+00 | 0.E+00 | 0.E+00 | 9.E-03 | 3.E+01 | 3.E+01 | 0.E+00 | 0.E+00 | 0.E+00 | 6.E+01 |
| | | | Exposure Point Total | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Exposure Medium Total | | | | | | 9.E-03 | | | | | | 6.E+01 |
| | | | Groundwater Total | | | | | | 9.E-03 | | | | | | 6.E+01 |

Total Risk Across All Media = 1.E-02

Total Hazard Across All Media = 63

Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Subsurface Soil - Hot Spot RISB-64

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

- where:
- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
 - IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
 - AE_i = absorption efficiency (unitless)
 - EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
 - ED = exposure duration: the typical duration of each exposure event (years)
 - BW = body weight (kg)
 - AT_n = averaging Time (years)
 - C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient (mg/kg-day) | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|------------------------------------------------|-------------------------------------------|----------------------------------------------------|
| 1,2-Dichloroethane | 11 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 5.4E-06 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.64 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 3.1E-07 | 3.0E-02 | 1.0E-05 | 0% |
| Benzene | 2.1 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.0E-06 | 4.0E-03 | 2.6E-04 | 0% |
| Chloroform | 0.75 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 3.7E-07 | 1.0E-02 | 3.7E-05 | 0% |
| cis-1,2-Dichloroethene | 58 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 2.8E-05 | 1.0E-02 | 2.8E-03 | 1% |
| Tetrachloroethene | 72 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 3.5E-05 | 1.0E-02 | 3.5E-03 | 1% |
| Toluene | 370 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 1.8E-04 | 8.0E-02 | 2.3E-03 | 1% |
| Trichloroethene | 150 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 7.3E-05 | 3.0E-04 | 2.4E-01 | 96% |
| Vinyl Chloride | 0.086 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 4.2E-08 | 3.0E-03 | 1.4E-05 | 0% |
| Xylenes (total) | 160 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 9125 | 7.8E-05 | 2.0E-01 | 3.9E-04 | 0% |

Hazard Index = 2.5E-01

Notes:
 (1): Soil EPCs (see Appendix H-3)

**Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Dermal Contact
Subsurface Soil - Hot Spot RISB-64**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | RD _{dermal-adj} Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------|-------------------------------------------|
| 1,2-Dichloroethane | 11 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.1E-06 | 8.0E-01 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.64 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.2E-07 | 8.0E-01 | 2.4E-02 | 5.2E-06 | 0% |
| Benzene | 2.1 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 6.8E-09 | 8.0E-01 | 3.2E-03 | 2.1E-06 | 0% |
| Chloroform | 0.75 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.4E-09 | 8.0E-01 | 8.0E-03 | 3.0E-07 | 0% |
| cis-1,2-Dichloroethene | 58 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.9E-07 | 8.0E-01 | 8.0E-03 | 2.3E-05 | 0% |
| Tetrachloroethene | 72 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 1.4E-05 | 8.0E-01 | 8.0E-03 | 1.7E-03 | 1% |
| Toluene | 370 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 7.2E-05 | 8.0E-01 | 6.4E-02 | 1.1E-03 | 1% |
| Trichloroethene | 150 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.9E-05 | 8.0E-01 | 2.4E-04 | 1.2E-01 | 98% |
| Vinyl Chloride | 0.086 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 2.8E-10 | 8.0E-01 | 2.4E-03 | 1.2E-07 | 0% |
| Xylenes (total) | 160 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 9125 | 3.1E-05 | 8.0E-01 | 1.6E-01 | 1.9E-04 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

Hazard Index = 1.2E-01

**Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Subsurface Soil - Hot Spot RISB-64**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_c \text{ (VOCs)}$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)

PEF = particulate emission factor (m³/kg)

VF = volatilization factor (m³/kg)

$IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)

EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)

ED = exposure duration: the typical duration of each exposure event (year)

ET_{inh} = exposure time (hr/day)

BW = body weight (kg)

AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | RfD_i Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------|--------------------|-------------------------------------------|
| 1,2-Dichloroethane | 11 | NA | 3.91E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 2.2E-04 | 7.00E-01 | 3.1E-04 | 0% |
| 1,4-Dichlorobenzene | 0.64 | NA | 1.29E+04 | 1 | 250 | 25 | 8 | 70 | 9125 | 3.9E-06 | 2.29E-01 | 1.7E-05 | 0% |
| Benzene | 2.1 | NA | 2.73E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 6.0E-05 | 8.57E-03 | 7.0E-03 | 1% |
| Chloroform | 0.75 | NA | 2.66E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 2.2E-05 | 1.40E-02 | 1.6E-03 | 0% |
| cis-1,2-Dichloroethene | 58 | NA | 2.90E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 1.6E-03 | 5.71E-02 | 2.7E-02 | 4% |
| Tetrachloroethene | 72 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 2.2E-03 | 1.00E-02 | 2.2E-01 | 32% |
| Toluene | 370 | NA | 3.98E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 7.3E-03 | 1.43E+00 | 5.1E-03 | 1% |
| Trichloroethene | 150 | NA | 3.26E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 3.6E-03 | 1.0E-02 | 3.6E-01 | 52% |
| Vinyl Chloride | 0.086 | NA | 1.04E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 6.5E-06 | 2.9E-02 | 2.3E-04 | 0% |
| Xylenes (total) | 160 | NA | 6.10E+03 | 1 | 250 | 25 | 8 | 70 | 9125 | 2.1E-03 | 2.9E-02 | 7.2E-02 | 10% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Hazard Index = 6.9E-01

Future Industrial Worker Scenario
Estimation of Cancer Risk from Incidental Ingestion
Subsurface Soil - Hot Spot RISB-64

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 11 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.9E-06 | 9.1E-02 | NA | 0% |
| 1,4-Dichlorobenzene | 0.64 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.1E-07 | 2.4E-02 | 2.7E-09 | 0% |
| Benzene | 2.1 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 3.7E-07 | 5.5E-02 | 2.0E-08 | 0% |
| Chloroform | 0.75 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.3E-07 | 1.0E-02 | 1.3E-09 | 0% |
| cis-1,2-Dichloroethene | 58 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.0E-05 | NA | NA | 0% |
| Tetrachloroethene | 72 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.3E-05 | 5.4E-01 | 6.8E-06 | 39% |
| Toluene | 370 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 6.5E-05 | NA | NA | 0% |
| Trichloroethene | 150 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 2.6E-05 | 4.0E-01 | 1.0E-05 | 61% |
| Vinyl Chloride | 0.086 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 1.5E-08 | 7.2E-01 | 1.1E-08 | 0% |
| Xylenes (total) | 160 | 50 | 1 | 250 | 25 | 1.0E-06 | 70 | 25,550 | 2.8E-05 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 1.7E-05

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Dermal Contact
Subsurface Soil - Hot Spot RISB-64**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 11 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 7.6E-07 | 8.0E-01 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.64 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 4.4E-08 | 8.0E-01 | 3.0E-02 | 1.3E-09 | 0% |
| Benzene | 2.1 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.4E-09 | 8.0E-01 | 6.9E-02 | 1.7E-10 | 0% |
| Chloroform | 0.75 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 8.6E-10 | 8.0E-01 | 1.3E-02 | 1.1E-11 | 0% |
| cis-1,2-Dichloroethene | 58 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 6.7E-08 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 72 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 5.0E-06 | 8.0E-01 | 6.8E-01 | 3.4E-06 | 39% |
| Toluene | 370 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 2.6E-05 | 8.0E-01 | NA | NA | 0% |
| Trichloroethene | 150 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.0E-05 | 8.0E-01 | 5.0E-01 | 5.2E-06 | 61% |
| Vinyl Chloride | 0.086 | 3,300 | 0.2 | 0.0005 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 9.9E-11 | 8.0E-01 | 9.0E-01 | 8.9E-11 | 0% |
| Xylenes (total) | 160 | 3,300 | 0.2 | 0.03 | 250 | 25 | 1 | 1.0E-06 | 70 | 25,550 | 1.1E-05 | 8.0E-01 | NA | NA | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

"NA" = Not applicable

Excess Lifetime Cancer Risk = 8.6E-06

Future Industrial Worker Scenario
Estimation of Cancer Risk from Inhalation Exposure
Subsurface Soil - Hot Spot RISB-64

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = (C_s / \text{PEF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (non-VOCs)}$$

$$ADD_{\text{inhal lung}} = (C_s / \text{VF}) * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c \text{ (VOCs)}$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m³/kg)
- VF = volatilization factor (m³/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD _{inhal} Average Daily Dose (mg/kg-day) | CSF _{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 11 | NA | 3.91E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 7.9E-05 | 9.10E-02 | 7.2E-06 | 1% |
| 1,4-Dichlorobenzene | 0.64 | NA | 1.29E+04 | 1 | 250 | 25 | 8 | 70 | 25,550 | 1.4E-06 | 2.20E-02 | 3.0E-08 | 0% |
| Benzene | 2.1 | NA | 2.73E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.1E-05 | 2.70E-02 | 5.8E-07 | 0% |
| Chloroform | 0.75 | NA | 2.66E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 7.9E-06 | 8.10E-02 | 6.4E-07 | 0% |
| cis-1,2-Dichloroethene | 58 | NA | 2.90E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 5.6E-04 | NA | NA | 0% |
| Tetrachloroethene | 72 | NA | 2.55E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 7.9E-04 | 2.10E-02 | 1.7E-05 | 3% |
| Toluene | 370 | NA | 3.98E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.6E-03 | NA | NA | 0% |
| Trichloroethene | 150 | NA | 3.26E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 1.3E-03 | 3.85E-01 | 5.0E-04 | 95% |
| Vinyl Chloride | 0.086 | NA | 1.04E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 2.3E-06 | 1.54E-02 | 3.6E-08 | 0% |
| Xylenes (total) | 160 | NA | 6.10E+03 | 1 | 250 | 25 | 8 | 70 | 25,550 | 7.3E-04 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 5.2E-04

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
- (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

Appendix H-5.34
Subsurface Soil
Hot Spot RISB-64
Future Resident

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Exposure Route Total | Non-Carcinogenic Hazard Quotient | | | | | Exposure Route Total |
|-----------------------|---------------------|--------------------|----------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|----------------------------------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | |
| Soil | Subsurface Soil | Hot Spot - RISB-64 | Arsenic | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Iron | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Manganese | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Thallium | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | Vanadium | | | | | | 0.E+00 | | | | | | 0.E+00 |
| | | | 1,2-Dichloroethane | 8.E-06 | 2.E-05 | 6.E-05 | | | 8.E-05 | NA | NA | 1.E-03 | | | 1.E-03 |
| | | | 1,4-Dichlorobenzene | 2.E-08 | 3.E-09 | 1.E-07 | | | 1.E-07 | 3.E-04 | 3.E-05 | 6.E-05 | | | 4.E-04 |
| | | | Benzene | 2.E-07 | 4.E-10 | 2.E-06 | | | 2.E-06 | 7.E-03 | 1.E-05 | 2.E-02 | | | 3.E-02 |
| | | | Chloroform | 1.E-08 | 2.E-11 | 2.E-06 | | | 2.E-06 | 1.E-03 | 2.E-06 | 5.E-03 | | | 6.E-03 |
| | | | cis-1,2-Dichloroethene | NA | NA | NA | | | 0.E+00 | 7.E-02 | 1.E-04 | 9.E-02 | | | 2.E-01 |
| | | | Tetrachloroethene | 6.E-05 | 7.E-06 | 6.E-05 | | | 1.E-04 | 9.E-02 | 1.E-02 | 8.E-01 | | | 9.E-01 |
| | | | Toluene | NA | NA | NA | | | 0.E+00 | 6.E-02 | 6.E-03 | 2.E-02 | | | 8.E-02 |
| | | | Trichloroethene | 9.E-05 | 1.E-05 | 2.E-03 | | | 2.E-03 | 6.E+00 | 7.E-01 | 1.E+00 | | | 8.E+00 |
| | | | Vinyl chloride | 2.E-07 | 5.E-07 | 9.E-06 | | | 1.E-05 | 4.E-04 | 6.E-07 | 8.E-04 | | | 1.E-03 |
| | | | Xylenes | NA | NA | NA | | | 0.E+00 | 1.E-02 | 1.E-03 | 2.E-01 | | | 3.E-01 |
| | | | Chemical Total | 2.E-04 | 4.E-05 | 2.E-03 | 0.E+00 | 0.E+00 | 2.E-03 | 7.E+00 | 7.E-01 | 2.E+00 | 0.E+00 | 0.E+00 | 1.E+01 |
| | | | Exposure Point Total | | | | | | 2.E-03 | | | | | | 1.E+01 |
| | | | Exposure Medium Total | | | | | | 2.E-03 | | | | | | 1.E+01 |
| | | | Soil Total | | | | | | 2.E-03 | | | | | | 1.E+01 |
| Groundwater | Shallow | Air | 1,1,1-Trichloroethane | | | | | NA | 0.E+00 | | | | | 6.E-03 | 6.E-03 |
| | | | 1,1,2-Trichloroethane | | | | | 4.E-08 | 4.E-08 | | | | | 4.E-04 | 4.E-04 |
| | | | 1,1-Dichloroethane | | | | | NA | 0.E+00 | | | | | 3.E-03 | 3.E-03 |
| | | | 1,1-Dichloroethene | | | | | NA | 0.E+00 | | | | | 5.E-02 | 5.E-02 |
| | | | 1,2-Dichlorobenzene | | | | | NA | 0.E+00 | | | | | 5.E-04 | 5.E-04 |
| | | | 1,2-Dichloroethane | | | | | 3.E-05 | 3.E-05 | | | | | 1.E-03 | 1.E-03 |
| | | | 1,4-Dichlorobenzene | | | | | 1.E-07 | 1.E-07 | | | | | 6.E-05 | 6.E-05 |
| | | | 2-Chlorophenol | | | | | NA | 0.E+00 | | | | | 3.E-04 | 3.E-04 |
| | | | 4-Methyl-2-pentanone | | | | | NA | 0.E+00 | | | | | 2.E-05 | 2.E-05 |
| | | | Benzene | | | | | 1.E-06 | 1.E-06 | | | | | 1.E-02 | 1.E-02 |
| | | | Bis(2-ethylhexyl)phthalate | | | | | 0.E+00 | 0.E+00 | | | | | 0.E+00 | 0.E+00 |
| | | | Chlorobenzene | | | | | NA | 0.E+00 | | | | | 6.E-03 | 6.E-03 |
| | | | Chloroethane | | | | | 5.E-07 | 5.E-07 | | | | | 1.E-03 | 1.E-03 |
| | | | Chloroform | | | | | 9.E-07 | 9.E-07 | | | | | 2.E-03 | 2.E-03 |
| | | | cis-1,2-Dichloroethene | | | | | NA | 0.E+00 | | | | | 2.E-02 | 2.E-02 |
| | | | Ethylbenzene | | | | | NA | 0.E+00 | | | | | 8.E-03 | 8.E-03 |
| | | | Iron | | | | | 0.E+00 | 0.E+00 | | | | | 0.E+00 | 0.E+00 |
| | | | Isopropylbenzene | | | | | NA | 0.E+00 | | | | | 2.E-02 | 2.E-02 |
| | | | Manganese | | | | | 0.E+00 | 0.E+00 | | | | | 0.E+00 | 0.E+00 |
| | | | Methyl tert butyl ether | | | | | NA | 0.E+00 | | | | | 6.E-06 | 6.E-06 |
| | | | Methylcyclohexane | | | | | NA | 0.E+00 | | | | | 1.E-02 | 1.E-02 |
| | | | Methylene chloride | | | | | 1.E-07 | 1.E-07 | | | | | 5.E-04 | 5.E-04 |
| | | | Naphthalene | | | | | NA | 0.E+00 | | | | | 7.E-04 | 7.E-04 |
| | | | Tetrachloroethene | | | | | 2.E-05 | 2.E-05 | | | | | 2.E-01 | 2.E-01 |
| | | | Toluene | | | | | NA | 0.E+00 | | | | | 3.E-03 | 3.E-03 |
| | | | Trichloroethene | | | | | 2.E-04 | 2.E-04 | | | | | 1.E-01 | 1.E-01 |
| | | | Vinyl chloride | | | | | 5.E-06 | 5.E-06 | | | | | 2.E-02 | 2.E-02 |
| | | | Xylenes (Total) | | | | | NA | 0.E+00 | | | | | 3.E-01 | 3.E-01 |
| | | | Chemical Total | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-04 | 3.E-04 | 0.E+00 | 0.E+00 | 0.E+00 | 0.E+00 | 8.E-01 | 8.E-01 |
| | | | Exposure Point Total | | | | | | 3.E-04 | | | | | 8.E-01 | |
| | | | Exposure Medium Total | | | | | | 3.E-04 | | | | | 8.E-01 | |
| Groundwater Continued | Shallow and Bedrock | Potable Use | 1,1,1-Trichloroethane | NA | NA | | | | 0.E+00 | 4.E-01 | 4.E-01 | | | 8.E-01 | |
| | | | 1,1,2-Trichloroethane | 4.E-06 | 4.E-06 | | | | 7.E-06 | 1.E-01 | 1.E-01 | | | 2.E-01 | |
| | | | 1,1-Dichloroethane | NA | NA | | | | 0.E+00 | 7.E-02 | 7.E-02 | | | 1.E-01 | |
| | | | 1,1-Dichloroethene | NA | NA | | | | 0.E+00 | 4.E-01 | 4.E-01 | | | 7.E-01 | |
| | | | 1,2,4-Trichlorobenzene | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | 0.E+00 | |
| | | | 1,2-Dichlorobenzene | NA | NA | | | | 0.E+00 | 6.E-02 | 6.E-02 | | | 1.E-01 | |
| | | | 1,2-Dichloroethane | 1.E-02 | 1.E-02 | | | | 2.E-02 | NA | NA | | | 0.E+00 | |
| | | | 1,4-Dichlorobenzene | 6.E-06 | 6.E-06 | | | | 1.E-05 | 9.E-02 | 9.E-02 | | | 2.E-01 | |
| | | | 2-Chlorophenol | NA | NA | | | | 0.E+00 | 2.E-01 | 2.E-01 | | | 3.E-01 | |
| | | | 4-Methyl-2-pentanone | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | 6.E-01 | |
| | | | Benzene | 3.E-05 | 3.E-05 | | | | 5.E-05 | 1.E+00 | 1.E+00 | | | 3.E+00 | |
| | | | Bis(2-ethylhexyl)phthalate | 5.E-07 | 5.E-07 | | | | 1.E-06 | 1.E-02 | 1.E-02 | | | 2.E-02 | |
| | | | Bromodichloromethane | 0.E+00 | 0.E+00 | | | | 0.E+00 | 0.E+00 | 0.E+00 | | | 0.E+00 | |
| | | | Chlorobenzene | NA | NA | | | | 0.E+00 | 5.E-01 | 5.E-01 | | | 1.E+00 | |
| | | | Chloroethane | 3.E-04 | 3.E-04 | | | | 7.E-04 | 3.E-02 | 3.E-02 | | | 6.E-02 | |
| | | | Chloroform | 2.E-06 | 2.E-06 | | | | 4.E-06 | 2.E-01 | 2.E-01 | | | 5.E-01 | |
| | | | cis-1,2-Dichloroethene | NA | NA | | | | 0.E+00 | 9.E+00 | 9.E+00 | | | 2.E+01 | |
| | | | Ethylbenzene | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | 2.E+00 | |
| | | | Iron | NA | NA | | | | 0.E+00 | 3.E-01 | 3.E-01 | | | 7.E-01 | |
| | | | Isopropylbenzene | NA | NA | | | | 0.E+00 | 9.E-01 | 9.E-01 | | | 2.E+00 | |
| | | | Manganese | NA | NA | | | | 0.E+00 | 1.E+00 | 1.E+00 | | | 2.E+00 | |

Summary of Receptor Risks and Hazards for COPCs

PSC Site
Rock Hill, South Carolina

| | |
|----------------------|-------------|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | COPC | Cancer | | | | | Non-Carcinogenic Hazard Quotient | | | | | | |
|--------|-----------------|----------------|-------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------------------|-----------|--------|-------------------------------|------------------------|-----------------------|----------------------|
| | | | | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total | Ingestion | Dermal | Inhalation of Dust and Vapors | Inhalation Ambient Air | Inhalation Indoor Air | Exposure Route Total |
| | | | Methyl tert butyl ether | 1.E-06 | 1.E-06 | | | | 2.E-06 | NA | NA | | | | 0.E+00 |
| | | | Methylcyclohexane | NA | NA | | | | 0.E+00 | NA | NA | | | | 0.E+00 |
| | | | Methylene chloride | 9.E-05 | 9.E-05 | | | | 2.E-04 | 4.E-01 | 4.E-01 | | | | 9.E-01 |
| | | | Naphthalene | NA | NA | | | | 0.E+00 | 1.E-02 | 1.E-02 | | | | 3.E-02 |
| | | | Tetrachloroethene | 3.E-03 | 3.E-03 | | | | 6.E-03 | 6.E+00 | 6.E+00 | | | | 1.E+01 |
| | | | Toluene | NA | NA | | | | 0.E+00 | 4.E+00 | 4.E+00 | | | | 8.E+00 |
| | | | Trichloroethene | 2.E-03 | 2.E-03 | | | | 3.E-03 | 2.E+02 | 2.E+02 | | | | 3.E+02 |
| | | | Vinyl chloride | 1.E-03 | 1.E-03 | | | | 2.E-03 | 3.E+00 | 3.E+00 | | | | 5.E+00 |
| | | | Xylenes (Total) | NA | NA | | | | 0.E+00 | 2.E+00 | 2.E+00 | | | | 4.E+00 |
| | | | Chemical Total | 2.E-02 | 2.E-02 | 0.E+00 | 0.E+00 | 0.E+00 | 3.E-02 | 2.E+02 | 2.E+02 | 0.E+00 | 0.E+00 | 0.E+00 | 4.E+02 |
| | | | Exposure Point Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| | | | Exposure Medium Total | | | | | | 3.E-02 | | | | | | 4.E+02 |
| | | | Groundwater Total | | | | | | 3.E-02 | | | | | | 4.E+02 |

Total Risk Across All Media = 4.E-02

Total Hazard Across All Media = 405

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Incidental Ingestion
Subsurface Soil - RISB-64

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_n = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Ingestion Rate (mg/day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|--------------------------------------------|-----------------------------------------------|--------------------------------|----------------------------------------------------|---------------------------------------------------------|------------------------------------------------|----------------------------|----------------------------------------------------|
| 1,2-Dichloroethane | 11 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 1.4E-04 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.64 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 8.2E-06 | 3.0E-02 | 2.7E-04 | 0% |
| Benzene | 2.1 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 2.7E-05 | 4.0E-03 | 6.7E-03 | 0% |
| Chloroform | 0.75 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 9.6E-06 | 1.0E-02 | 9.6E-04 | 0% |
| cis-1,2-Dichloroethene | 58 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 7.4E-04 | 1.0E-02 | 7.4E-02 | 1% |
| Tetrachloroethene | 72 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 9.2E-04 | 1.0E-02 | 9.2E-02 | 1% |
| Toluene | 370 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 4.7E-03 | 8.0E-02 | 5.9E-02 | 1% |
| Trichloroethene | 150 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 1.9E-03 | 3.0E-04 | 6.4E+00 | 96% |
| Vinyl chloride | 0.086 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 1.1E-06 | 3.0E-03 | 3.7E-04 | 0% |
| Xylenes | 160 | 200 | 1 | 350 | 6 | 1.0E-06 | 15 | 2190 | 2.0E-03 | 2.0E-01 | 1.0E-02 | 0% |

Hazard Index = 6.6E+00

Notes:
 (1): Soil EPCs (see Appendix H-3)

**Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Dermal Contact
Subsurface Soil - RISB-64**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_n$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_n = averaging time (days)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | SA Skin Surface Area Exposed (cm ²) | AF Skin-soil Adherence Factor (mg/cm ² -event) | AE_d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | ED Exposure Duration (years) | EV Event Frequency (events/day) | C_1 Conv. Factor (mass) (kg/mg) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (years) | ADD_{soil} Average Daily Dose (mg/kg-day) | ABS_{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | $RfD_{dermal-adj}$ Chronic Dermal Adj. RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------|---------------------------------------|------------------------------------------|-----------------------------------------------|------------------------------|-----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------|--------------------|-------------------------------------------|
| 1,2-Dichloroethane | 11 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.2E-05 | 8.0E-01 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.64 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 6.9E-07 | 8.0E-01 | 2.4E-02 | 2.9E-05 | 0% |
| Benzene | 2.1 | 2,800 | 0.2 | 0.0005 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 3.8E-08 | 8.0E-01 | 3.2E-03 | 1.2E-05 | 0% |
| Chloroform | 0.75 | 2,800 | 0.2 | 0.0005 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.3E-08 | 8.0E-01 | 8.0E-03 | 1.7E-06 | 0% |
| cis-1,2-Dichloroethene | 58 | 2,800 | 0.2 | 0.0005 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.0E-06 | 8.0E-01 | 8.0E-03 | 1.3E-04 | 0% |
| Tetrachloroethene | 72 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 7.7E-05 | 8.0E-01 | 8.0E-03 | 9.7E-03 | 1% |
| Toluene | 370 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 4.0E-04 | 8.0E-01 | 6.4E-02 | 6.2E-03 | 1% |
| Trichloroethene | 150 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.6E-04 | 8.0E-01 | 2.4E-04 | 6.7E-01 | 98% |
| Vinyl chloride | 0.086 | 2,800 | 0.2 | 0.0005 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.5E-09 | 8.0E-01 | 2.4E-03 | 6.4E-07 | 0% |
| Xylenes | 160 | 2,800 | 0.2 | 0.03 | 350 | 6 | 1 | 1.0E-06 | 15 | 2190 | 1.7E-04 | 8.0E-01 | 1.6E-01 | 1.1E-03 | 0% |

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004
- (3): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004 or U.S. EPA Region 4 RAGS Supplement, online

| |
|-------------------------------|
| Hazard Index = 6.9E-01 |
|-------------------------------|

Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Inhalation Exposure
Subsurface Soil - RISB-64

PSC Site
 Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = [(C_s / \text{PEF}) + (C_s / \text{VF})] * IR_{\text{air-hourly}} * \text{EF} * \text{ED} * \text{ET}_{\text{inh}} / \text{BW} * \text{AT}_n$$

where:

C_s = concentration of contaminant in the airborne particulates (mg/kg)
 PEF = particulate emission factor (m³/kg)
 VF = volatilization factor (m³/kg)
 $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m³/hr)
 EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
 ED = exposure duration: the typical duration of each exposure event (year)
 ET_{inh} = exposure time (hr/day)
 BW = body weight (kg)
 AT_n = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m ³ /kg) | VF Volatilization Factor ⁽³⁾ (m ³ /kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m ³ /hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|---------------------------------------------------|------------------------------|----------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|--------------------|-------------------------------------------|
| 1,2-Dichloroethane | 11 | NA | 3.91E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 7.5E-04 | 7.00E-01 | 1.1E-03 | 0% |
| 1,4-Dichlorobenzene | 0.64 | NA | 1.29E+04 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 1.3E-05 | 2.29E-01 | 5.7E-05 | 0% |
| Benzene | 2.1 | NA | 2.73E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.0E-04 | 8.57E-03 | 2.4E-02 | 1% |
| Chloroform | 0.75 | NA | 2.66E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 7.5E-05 | 1.40E-02 | 5.4E-03 | 0% |
| cis-1,2-Dichloroethene | 58 | NA | 2.90E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 5.3E-03 | 5.71E-02 | 9.3E-02 | 4% |
| Tetrachloroethene | 72 | NA | 2.55E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 7.5E-03 | 1.00E-02 | 7.5E-01 | 32% |
| Toluene | 370 | NA | 3.98E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.5E-02 | 1.43E+00 | 1.7E-02 | 1% |
| Trichloroethene | 150 | NA | 3.26E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 1.2E-02 | 1.0E-02 | 1.2E+00 | 52% |
| Vinyl chloride | 0.086 | NA | 1.04E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 2.2E-05 | 2.9E-02 | 7.7E-04 | 0% |
| Xylenes | 160 | NA | 6.10E+03 | 0.26 | 350 | 6 | 16 | 15 | 2190 | 7.0E-03 | 2.9E-02 | 2.4E-01 | 10% |

Notes:

Hazard Index = 2.4E+00

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)

(3): U.S. EPA Region 9 PRG Tables (online)

"NA" = Not applicable

Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Incidental Ingestion
Subsurface Soil - RISB-64

PSC Site
 Rock Hill, South Carolina

$$ADD_{soil} = C_s * IR_{soil} * AE_i * EF * ED * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- IR_{soil} = daily soil ingestion rate on days exposed during the exposure period (mg/day)
- AE_i = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)
- C_1 = conversion factor (mass) (kg/mg)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | IR_{soil} Age Adjusted Soil Ingestion Factor (mg-year/kg-day) | AE_i Ingestion Absorption Efficiency (unitless) | EF Exposure Frequency (day/year) | C_1 Conv. Factor (mass) (kg/mg) | AT_c Averaging Time Carcinogens (days) | ADD_{soil} Average Daily Dose (mg/kg-day) | SF_o Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------|-----------------------------------------------|------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 11 | | | | | | | | 7.88E-06 | 5% |
| 1,4-Dichlorobenzene | 0.64 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 1.0E-06 | 2.4E-02 | 2.4E-08 | 0% |
| Benzene | 2.1 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 3.3E-06 | 5.5E-02 | 1.8E-07 | 0% |
| Chloroform | 0.75 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 1.2E-06 | 1.0E-02 | 1.2E-08 | 0% |
| cis-1,2-Dichloroethene | 58 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 9.1E-05 | NA | NA | 0% |
| Tetrachloroethene | 72 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 1.1E-04 | 5.4E-01 | 6.1E-05 | 37% |
| Toluene | 370 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 5.8E-04 | NA | NA | 0% |
| Trichloroethene | 150 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 2.3E-04 | 4.0E-01 | 9.4E-05 | 58% |
| Vinyl chloride | 0.086 | | | | | | | | 2.0E-07 | 0% |
| Xylenes | 160 | 114 | 1 | 350 | 1.0E-06 | 25,550 | 2.5E-04 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 1.6E-04

Notes:

(1): Soil EPCs (see Appendix H-3)

"NA" = Not applicable

**Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Dermal Contact
Subsurface Soil - RISB-64**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_s * SA * AF * AE_d * EF * ED * EV * C_1 / BW * AT_c$$

where:

- C_s = representative concentration of contamination in the soil at the exposure point during the period of exposure (mg/kg)
- SA = skin surface area in contact with soil on days exposed (cm²)
- AF = mass of soil in contact with the unit surface area of skin (mg/cm²-event)
- AE_d = absorption efficiency (unitless)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (years)
- EV = event frequency (events/day)
- BW = body weight (kg)
- AT_c = averaging time (days)
- C₁ = conversion factor (mass) (kg/mg)

| Chemical | C _s Conc. in Soil ⁽¹⁾ (mg/kg) | SFS Age-Adjusted Dermal Factor (mg-year/kg-event) | AE _d Dermal Absorption Efficiency ⁽²⁾ (unitless) | EF Exposure Frequency (days/year) | EV Event Frequency (events/day) | C ₁ Conv. Factor (mass) (kg/mg) | AT _c Averaging Time Carcinogens (days) | ADD _{soil} Average Daily Dose (mg/kg-day) | ABS _{GI} GI Absorption Efficiency ⁽³⁾ (unitless) | SF _{dermal-adj} Dermal Adj. Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|--------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 11 | | | | | | | | | | 1.7E-05 | 48% |
| 1,4-Dichlorobenzene | 0.64 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 9.5E-08 | 8.0E-01 | 3.0E-02 | 2.8E-09 | 0% |
| Benzene | 2.1 | 360 | 0.0005 | 350 | 1 | 1.0E-06 | 25,550 | 5.2E-09 | 8.0E-01 | 6.9E-02 | 3.6E-10 | 0% |
| Chloroform | 0.75 | 360 | 0.0005 | 350 | 1 | 1.0E-06 | 25,550 | 1.8E-09 | 8.0E-01 | 1.3E-02 | 2.3E-11 | 0% |
| cis-1,2-Dichloroethene | 58 | 360 | 0.0005 | 350 | 1 | 1.0E-06 | 25,550 | 1.4E-07 | 8.0E-01 | NA | NA | 0% |
| Tetrachloroethene | 72 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 1.1E-05 | 8.0E-01 | 6.8E-01 | 7.2E-06 | 20% |
| Toluene | 370 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 5.5E-05 | 8.0E-01 | NA | NA | 0% |
| Trichloroethene | 150 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 2.2E-05 | 8.0E-01 | 5.0E-01 | 1.1E-05 | 31% |
| Vinyl chloride | 0.086 | | | | | | | | | | 5.0E-07 | 1% |
| Xylenes | 160 | 360 | 0.03 | 350 | 1 | 1.0E-06 | 25,550 | 2.4E-05 | 8.0E-01 | NA | NA | 0% |

Notes:

(1): Soil EPCs (see Appendix H-3)

(2): U.S. EPA RAGS, Part E, Supplemental Guidance for Dermal Risk Assessment, 2004

"NA" = Not applicable

Excess Lifetime Cancer Risk = 3.6E-05

**Future Adult (1-31) Resident Scenario
Estimation of Cancer Risk from Inhalation Exposure
Subsurface Soil - RISB-64**

PSC Site
Rock Hill, South Carolina

$$ADD_{\text{inhal lung}} = [(C_s / \text{PEF}) + (C_s / \text{VF})] * IR_{\text{air-hourly}} * EF * ED * ET_{\text{inh}} / \text{BW} * AT_c$$

where:

- C_s = concentration of contaminant in the airborne particulates (mg/kg)
- PEF = particulate emission factor (m^3/kg)
- VF = volatilization factor (m^3/kg)
- $IR_{\text{air-hourly}}$ = inhalation rate for the receptor of concern during exposure period (m^3/hr)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure event (year)
- ET_{inh} = exposure time (hr/day)
- BW = body weight (kg)
- AT_c = averaging time (days)

| Chemical | C_s Conc. in Soil ⁽¹⁾ (mg/kg) | PEF Particulate Emission Factor ⁽²⁾ (m^3/kg) | VF Volatilization Factor ⁽³⁾ (m^3/kg) | $IR_{\text{air-hourly}}$ Hourly Inhalation Rate (m^3/hr) | EF Exposure Frequency (day/year) | ED Duration of Exposure Period (years) | ET_{inh} Exposure Time (hr/day) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD_{inhal} Average Daily Dose (mg/kg-day) | CSF_{inh} Cancer Slope Factor (mg/(kg/day)) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|---------------------------------------------------|------------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| 1,2-Dichloroethane | 11 | | | | | | | | | | | 5.7E-05 | 3% |
| 1,4-Dichlorobenzene | 0.64 | NA | 1.29E+04 | 1 | 350 | 30 | 16 | 70 | 25,550 | 4.6E-06 | 2.20E-02 | 1.0E-07 | 0% |
| Benzene | 2.1 | NA | 2.73E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 7.2E-05 | 2.70E-02 | 1.9E-06 | 0% |
| Chloroform | 0.75 | NA | 2.66E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 2.6E-05 | 8.10E-02 | 2.1E-06 | 0% |
| cis-1,2-Dichloroethene | 58 | NA | 2.90E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 1.9E-03 | NA | NA | 0% |
| Tetrachloroethene | 72 | NA | 2.55E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 2.7E-03 | 2.10E-02 | 5.6E-05 | 3% |
| Toluene | 370 | NA | 3.98E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 8.7E-03 | NA | NA | 0% |
| Trichloroethene | 150 | NA | 3.26E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 4.3E-03 | 3.85E-01 | 1.7E-03 | 93% |
| Vinyl chloride | 0.086 | | | | | | | | | | | 9.1E-06 | 1% |
| Xylenes | 160 | NA | 6.10E+03 | 1 | 350 | 30 | 16 | 70 | 25,550 | 2.5E-03 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 1.8E-03

Notes:

- (1): Soil EPCs (see Appendix H-3)
- (2): U.S. EPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002)
- (3): U.S. EPA Region 9 PRG Tables (online)
- "NA" = Not applicable

| Parameter | CS (mg/kg) | 0-2 Years Child Mult. (1/day) | 2-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | CSF (mg/kg*day) ⁻¹ | CSF adjustment factor | | | | ED | | | | EP | Risk | | | | Total Risk | |
|--------------------|---------------|-------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------|-----------------------|-----|------|-------|-----|-----|------|-------|----|----------|----------|----------|----------|---------------|------------------------|
| | | | | | | | 0-2 | 2-6 | 6-15 | 15-30 | 0-2 | 2-6 | 6-15 | 15-30 | | 0-2 | 2-6 | 6-15 | 15-30 | | |
| 1,2-Dichloroethane | 11 | 3.31E-05 | 2.30E-05 | 7.06E-06 | 5.92E-06 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 9.47E-06 | 3.95E-06 | 2.72E-06 | 1.27E-06 | 1.74E-05 | Dermal Risk |
| 1,2-Dichloroethane | 11 | 1.74E-05 | 9.59E-06 | 2.46E-06 | 1.41E-06 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 4.99E-06 | 1.65E-06 | 9.49E-07 | 3.02E-07 | 7.88E-06 | Ingestion risk |
| 1,2-Dichloroethane | 11 | 5.36E-05 | 5.11E-05 | 5.25E-05 | 5.79E-05 | 9.1E-02 | 10 | 3 | 3 | 1 | 2 | 4 | 9 | 15 | 70 | 1.53E-05 | 8.78E-06 | 2.03E-05 | 1.24E-05 | 5.68E-05 | inhalation risk |

| Parameter | CS (mg/kg) | 0-6 Years Child Mult. (1/day) | 6-15 Years Child Mult. (1/day) | 15-30 Years Adult Mult. (1/day) | Child CSF (mg/kg*day) ⁻¹ | Adult CSF (mg/kg*day) ⁻¹ | ED | | | EP | Risk | | | Total Risk | |
|----------------|---------------|-------------------------------------|--------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|-----|------|-------|----|----------|----------|----------|------------|------------------|
| | | | | | | | 0-6 | 6-15 | 15-30 | | 0-6 | 6-15 | 15-30 | | |
| Vinyl chloride | 0.086 | 1.28E-05 | 2.46E-06 | 1.41E-06 | 1.5E+00 | 7.20E-01 | 6 | 9 | 15 | 70 | 1.41E-07 | 4.08E-08 | 1.87E-08 | 2.01E-07 | ingestion |
| Vinyl chloride | 0.086 | 2.76E-05 | 7.06E-06 | 5.92E-06 | 1.5E+00 | 7.20E-01 | 6 | 9 | 15 | 70 | 3.05E-07 | 1.17E-07 | 7.86E-08 | 5.00E-07 | dermal |
| Vinyl chloride | 0.086 | 2.49E-04 | 2.05E-04 | 2.26E-04 | 1.5E+00 | 7.20E-01 | 6 | 9 | 15 | 70 | 2.76E-06 | 3.39E-06 | 2.99E-06 | 9.14E-06 | dermal |

Appendix H-5.35
Groundwater Inhalation Calculations
Current O&M Worker

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------|
| 71556 | 1.64E+03 | 1,1,1-Trichloroethane |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.80E-02 | 8.80E-06 | 1.72E-02 | 25 | 7,136 | 347.24 | 545.00 | 1.10E+02 | 1.33E+03 | 0.0E+00 | 5.0E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 7,820 | 1.14E-02 | 4.79E-01 | 1.77E-04 | 4.50E-03 | 1.38E-04 | 4.67E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 7.88E+05 | 0.10 | 1.55E+00 | 4.50E-03 | 4.00E+02 | 5.53E+03 | 4.18E-05 | 3.29E+01 | NA | 5.0E+00 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.33E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 2.7E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

| Soil Properties Lookup Table | |
|------------------------------|-----------------------|
| SCS Soil Type | K _s (cm/h) |
| C | 0.61 |
| CL | 0.34 |
| L | 0.50 |
| LS | 4.38 |
| S | 26.78 |
| SC | 0.47 |
| SCL | 0.55 |
| SI | 1.82 |
| SIC | 0.40 |
| SICL | 0.46 |
| SIL | 0.76 |
| SL | 1.60 |

| Chemical Properties Lookup Table | | | | | |
|----------------------------------|--------------------------------------|----------------------------------------------------------|-------------------------------------------|----------------------|----------------------|
| CAS No. | Chemical | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) | URF extrapolated (X) | RfC extrapolated (X) |
| 56235 | Carbon tetrachloride | 1.5E-05 | 0.0E+00 | | |
| 57749 | Chlordane | 1.0E-04 | 7.0E-04 | | |
| 58899 | gamma-HCH (Lindane) | 3.7E-04 | 1.1E-03 | X | X |
| 60297 | Ethyl ether | 0.0E+00 | 7.0E-01 | | X |
| 60571 | Dieldrin | 4.6E-03 | 1.8E-04 | | X |
| 67641 | Acetone | 0.0E+00 | 3.5E-01 | | X |
| 67663 | Chloroform | 2.3E-05 | 4.9E-02 | | |
| 67721 | Hexachloroethane | 4.0E-06 | 3.5E-03 | | X |
| 71432 | Benzene | 7.8E-06 | 3.0E-02 | | |
| 71556 | 1,1,1-Trichloroethane | 0.0E+00 | 5.0E+00 | | |
| 72435 | Methoxychlor | 0.0E+00 | 1.8E-02 | | X |
| 72559 | DDE | 9.7E-05 | 0.0E+00 | X | |
| 74839 | Methyl bromide | 0.0E+00 | 5.0E-03 | | |
| 74873 | Methyl chloride (chloromethane) | 1.0E-06 | 9.0E-02 | | |
| 74908 | Hydrogen cyanide | 0.0E+00 | 3.0E-03 | | |
| 74953 | Methylene bromide | 0.0E+00 | 3.5E-02 | | X |
| 75003 | Chloroethane (ethyl chloride) | 8.3E-07 | 1.0E+00 | X | |
| 75014 | Vinyl chloride (chloroethene) | 4.4E-06 | 1.0E-01 | | |
| 75058 | Acetonitrile | 0.0E+00 | 6.0E-02 | | |
| 75070 | Acetaldehyde | 2.2E-06 | 9.0E-03 | | |
| 75092 | Methylene chloride | 4.7E-07 | 1.1E+00 | | |
| 75150 | Carbon disulfide | 0.0E+00 | 7.0E-01 | | |
| 75218 | Ethylene oxide | 1.0E-04 | 0.0E+00 | | |
| 75252 | Bromoform | 1.1E-06 | 7.0E-02 | | X |
| 75274 | Bromodichloromethane | 1.8E-05 | 7.0E-02 | X | X |
| 75296 | 2-Chloropropane | 0.0E+00 | 1.0E-01 | | |
| 75343 | 1,1-Dichloroethane | 0.0E+00 | 4.9E-01 | | |
| 75354 | 1,1-Dichloroethylene | 0.0E+00 | 2.0E-01 | | |
| 75456 | Chlorodifluoromethane | 0.0E+00 | 5.0E+01 | | |
| 75694 | Trichlorofluoromethane | 0.0E+00 | 7.0E-01 | | |
| 75718 | Dichlorodifluoromethane | 0.0E+00 | 2.0E-01 | | |
| 76131 | 1,1,2-Trichloro-1,2,2-trifluoroethan | 0.0E+00 | 3.0E+01 | | |
| 76448 | Heptachlor | 1.3E-03 | 1.8E-03 | | X |
| 77474 | Hexachlorocyclopentadiene | 0.0E+00 | 2.0E-04 | | |
| 78831 | Isobutanol | 0.0E+00 | 1.1E+00 | | X |
| 78875 | 1,2-Dichloropropane | 1.9E-05 | 4.0E-03 | X | |
| 78933 | Methylethylketone (2-butanone) | 0.0E+00 | 5.0E+00 | | |
| 79005 | 1,1,2-Trichloroethane | 1.6E-05 | 1.4E-02 | | X |
| 79016 | Trichloroethylene | 1.1E-04 | 3.5E-02 | X | |
| 79209 | Methyl acetate | 0.0E+00 | 3.5E+00 | | X |
| 79345 | 1,1,2,2-Tetrachloroethane | 5.8E-05 | 2.1E-01 | | X |
| 79469 | 2-Nitropropane | 2.7E-03 | 2.0E-02 | | |
| 80626 | Methylmethacrylate | 0.0E+00 | 7.0E-01 | | |
| 83329 | Acenaphthene | 0.0E+00 | 2.1E-01 | | X |
| 86737 | Fluorene | 0.0E+00 | 1.4E-01 | | X |
| 87683 | Hexachloro-1,3-butadiene | 2.2E-05 | 7.0E-04 | | X |
| 88722 | o-Nitrotoluene | 0.0E+00 | 3.5E-02 | | X |
| 91203 | Naphthalene | 0.0E+00 | 3.0E-03 | | |

DATA ENTRY SHEET

| | | | | | | |
|---------|-----------------------------------|---------|---------|---|--|---|
| 91576 | 2-Methylnaphthalene | 0.0E+00 | 7.0E-02 | | | X |
| 92524 | Biphenyl | 0.0E+00 | 1.8E-01 | | | X |
| 95476 | o-Xylene | 0.0E+00 | 1.0E-01 | | | |
| 95501 | 1,2-Dichlorobenzene | 0.0E+00 | 1.4E-01 | | | |
| 95578 | 2-Chlorophenol | 0.0E+00 | 1.8E-02 | | | X |
| 95636 | 1,2,4-Trimethylbenzene | 0.0E+00 | 6.0E-03 | | | |
| 96184 | 1,2,3-Trichloropropane | 5.7E-04 | 4.9E-03 | X | | |
| 96333 | Methyl acrylate | 0.0E+00 | 1.1E-01 | | | X |
| 97632 | Ethylmethacrylate | 0.0E+00 | 3.2E-01 | | | X |
| 98066 | tert-Butylbenzene | 0.0E+00 | 1.4E-01 | | | X |
| 98828 | Cumene | 0.0E+00 | 4.0E-01 | | | |
| 98862 | Acetophenone | 0.0E+00 | 3.5E-01 | | | X |
| 98953 | Nitrobenzene | 0.0E+00 | 2.0E-03 | | | |
| 100414 | Ethylbenzene | 0.0E+00 | 1.0E+00 | | | |
| 100425 | Styrene | 0.0E+00 | 1.0E+00 | | | |
| 100447 | Benzylchloride | 4.9E-05 | 0.0E+00 | X | | |
| 100527 | Benzaldehyde | 0.0E+00 | 3.5E-01 | | | X |
| 103651 | n-Propylbenzene | 0.0E+00 | 1.4E-01 | | | X |
| 104518 | n-Butylbenzene | 0.0E+00 | 1.4E-01 | | | X |
| 106423 | p-Xylene | 0.0E+00 | 1.0E-01 | | | |
| 106467 | 1,4-Dichlorobenzene | 6.3E-06 | 8.0E-01 | | | |
| 106934 | 1,2-Dibromoethane (ethylene dibr | 2.2E-04 | 2.0E-04 | | | |
| 106990 | 1,3-Butadiene | 3.0E-02 | 2.0E-03 | | | |
| 107028 | Acrolein | 0.0E+00 | 2.0E-05 | | | |
| 107062 | 1,2-Dichloroethane | 2.6E-05 | 2.5E+00 | | | |
| 107131 | Acrylonitrile | 6.8E-05 | 2.0E-03 | | | |
| 108054 | Vinyl acetate | 0.0E+00 | 2.0E-01 | | | |
| 108101 | Methylisobutylketone (4-methyl-2- | 0.0E+00 | 3.0E+00 | | | |
| 108383 | m-Xylene | 0.0E+00 | 1.0E-01 | | | |
| 108678 | 1,3,5-Trimethylbenzene | 0.0E+00 | 6.0E-03 | | | |
| 108872 | Methylcyclohexane | 0.0E+00 | 3.0E+00 | | | |
| 108883 | Toluene | 0.0E+00 | 5.0E+00 | | | |
| 108907 | Chlorobenzene | 0.0E+00 | 4.9E-02 | | | |
| 109693 | 1-Chlorobutane | 0.0E+00 | 1.4E+00 | | | X |
| 110009 | Furan | 0.0E+00 | 3.5E-03 | | | X |
| 110543 | Hexane | 0.0E+00 | 2.0E-01 | | | |
| 111444 | Bis(2-chloroethyl)ether | 3.3E-04 | 0.0E+00 | | | |
| 115297 | Endosulfan | 0.0E+00 | 2.1E-02 | | | X |
| 118741 | Hexachlorobenzene | 4.6E-04 | 2.8E-03 | | | X |
| 120821 | 1,2,4-Trichlorobenzene | 0.0E+00 | 4.0E-03 | | | |
| 123739 | Crotonaldehyde (2-butenal) | 5.4E-04 | 0.0E+00 | X | | |
| 124481 | Chlorodibromomethane | 2.4E-05 | 7.0E-02 | X | | X |
| 126987 | Methacrylonitrile | 0.0E+00 | 7.0E-04 | | | |
| 126998 | 2-Chloro-1,3-butadiene (chloropre | 0.0E+00 | 7.0E-03 | | | |
| 127184 | Tetrachloroethylene | 6.0E-06 | 3.5E-02 | | | |
| 129000 | Pyrene | 0.0E+00 | 1.1E-01 | | | X |
| 132649 | Dibenzofuran | 0.0E+00 | 1.4E-02 | | | X |
| 135988 | sec-Butylbenzene | 0.0E+00 | 1.4E-01 | | | X |
| 141786 | Ethylacetate | 0.0E+00 | 3.2E+00 | | | X |
| 156592 | cis-1,2-Dichloroethylene | 0.0E+00 | 2.0E-01 | | | X |
| 156605 | trans-1,2-Dichloroethylene | 0.0E+00 | 7.0E-02 | | | X |
| 205992 | Benzo(b)fluoranthene | 2.1E-04 | 0.0E+00 | X | | |
| 218019 | Chrysene | 2.1E-06 | 0.0E+00 | X | | |
| 309002 | Aldrin | 4.9E-03 | 1.1E-04 | | | X |
| 319846 | alpha-HCH (alpha-BHC) | 1.8E-03 | 0.0E+00 | | | |
| 541731 | 1,3-Dichlorobenzene | 0.0E+00 | 1.1E-01 | | | X |
| 542756 | 1,3-Dichloropropene | 4.0E-06 | 2.0E-02 | | | |
| 630206 | 1,1,1,2-Tetrachloroethane | 7.4E-06 | 1.1E-01 | | | X |
| 1634044 | MTBE | 0.0E+00 | 3.0E+00 | | | |
| 7439976 | Mercury (elemental) | 0.0E+00 | 3.0E-04 | | | |

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------|
| 79005 | 6.00E+00 | 1,1,2-Trichloroethane |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.80E-02 | 8.80E-06 | 9.11E-04 | 25 | 8,322 | 386.15 | 602.00 | 5.01E+01 | 4.42E+03 | 1.6E-05 | 1.4E-02 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 9,507 | 5.53E-04 | 2.33E-02 | 1.77E-04 | 4.51E-03 | 1.94E-04 | 6.37E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 1.40E+02 | 0.10 | 1.55E+00 | 4.51E-03 | 4.00E+02 | 5.46E+03 | 4.56E-05 | 6.38E-03 | 1.6E-05 | 1.4E-02 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 4.42E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 1.5E-08 | 1.9E-04 |

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------|
| 75343 | 2.16E+02 | 1,1-Dichloroethane |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based groundwater concentration.

CHEMICAL PROPERTIES SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^{\circ}\text{K}$) | Critical temperature, T_C ($^{\circ}\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.42E-02 | 1.05E-05 | 5.61E-03 | 25 | 6,895 | 330.55 | 523.00 | 3.16E+01 | 5.06E+03 | 0.0E+00 | 4.9E-01 |

END

INTERMEDIATE CALCULATIONS SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{ie} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|-------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm·m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|----------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 7,384 | 3.80E-03 | 1.60E-01 | 1.77E-04 | 4.28E-03 | 1.38E-04 | 4.67E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RFC (mg/m ³) |
|--------------------------------------|---------------------------------------|----------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------|
| 250 | 200 | 3.46E+04 | 0.10 | 1.55E+00 | 4.28E-03 | 4.00E+02 | 8.58E+03 | 4.18E-05 | 1.45E+00 | NA | 4.9E-01 |

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 5.06E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 1.2E-03 |

MESSAGE SUMMARY BELOW:

END

VLOOKUP TABLES

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_W ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------|
| 75354 | 2.89E+02 | 1,1-Dichloroethylene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_F (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_S ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3) | ENTER Vadose zone soil total porosity, n^V (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |
| Used to calculate risk-based groundwater concentration. | | | | | |

VLOOKUP TABLES

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 9.00E-02 | 1.04E-05 | 2.60E-02 | 25 | 6,247 | 304.75 | 576.05 | 5.89E+01 | 2.25E+03 | 0.0E+00 | 2.0E-01 |

END

VLOOKUP TABLES

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm·m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm·s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 6,353 | 1.86E-02 | 7.86E-01 | 1.77E-04 | 5.20E-03 | 1.58E-04 | 5.35E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe')$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 2.27E+05 | 0.10 | 1.55E+00 | 5.20E-03 | 4.00E+02 | 1.75E+03 | 4.35E-05 | 9.89E+00 | NA | 2.0E-01 |

VLOOKUP TABLES

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 2.25E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 2.0E-02 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------|
| 107062 | 2.07E+03 | 1,2-Dichloroethane |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm ² /s) | Diffusivity in water, D_w (cm ² /s) | Henry's law constant at reference temperature, H (atm·m ³ /mol) | Henry's law constant reference temperature, T_R (°C) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B (°K) | Critical temperature, T_C (°K) | Organic carbon partition coefficient, K_{oc} (cm ³ /g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|---------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------|
| 1.04E-01 | 9.90E-06 | 9.77E-04 | 25 | 7,643 | 356.65 | 561.00 | 1.74E+01 | 8.52E+03 | 2.6E-05 | 2.5E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 8,457 | 6.26E-04 | 2.64E-02 | 1.77E-04 | 6.01E-03 | 2.38E-04 | 7.89E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 5.46E+04 | 0.10 | 1.55E+00 | 6.01E-03 | 4.00E+02 | 6.37E+02 | 4.80E-05 | 2.62E+00 | 2.6E-05 | 2.5E+00 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 8.52E+06 | NA |

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-05 | 4.4E-04 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------|
| 95501 | 4.30E+01 | 1,2-Dichlorobenzene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 6.90E-02 | 7.90E-06 | 1.90E-03 | 25 | 9,700 | 453.57 | 705.00 | 6.17E+02 | 1.56E+02 | 0.0E+00 | 1.4E-01 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 11,627 | 1.03E-03 | 4.34E-02 | 1.77E-04 | 3.99E-03 | 1.48E-04 | 4.92E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 1.86E+03 | 0.10 | 1.55E+00 | 3.99E-03 | 4.00E+02 | 1.69E+04 | 4.25E-05 | 7.92E-02 | NA | 1.4E-01 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.56E+05 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 2.3E-04 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------|
| 106467 | 2.20E+01 | 1,4-Dichlorobenzene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based groundwater concentration.

CHEMICAL PROPERTIES SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^{\circ}\text{K}$) | Critical temperature, T_C ($^{\circ}\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 6.90E-02 | 7.90E-06 | 2.39E-03 | 25 | 9,271 | 447.21 | 684.75 | 6.17E+02 | 7.90E+01 | 6.3E-06 | 8.0E-01 |

END

INTERMEDIATE CALCULATIONS SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{ie} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|-------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm·m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|----------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 11,181 | 1.33E-03 | 5.61E-02 | 1.77E-04 | 3.99E-03 | 1.41E-04 | 4.73E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|--------------------------------------|---------------------------------------|----------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------|
| 250 | 200 | 1.23E+03 | 0.10 | 1.55E+00 | 3.99E-03 | 4.00E+02 | 1.69E+04 | 4.19E-05 | 5.17E-02 | 6.3E-06 | 8.0E-01 |

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 7.90E+04 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 4.8E-08 | 2.7E-05 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|--------------------------------------------------------------|---------------------------------------------------------------------------|----------------|
| 95578 | 1.30E+01 | 2-Chlorophenol |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_F (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|----------------------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based
groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^{\circ}\text{K}$) | Critical temperature, T_C ($^{\circ}\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 5.01E-02 | 9.46E-06 | 3.90E-04 | 25 | 9,572 | 447.53 | 675.00 | 3.88E+02 | 2.20E+04 | 0.0E+00 | 1.8E-02 |

END

INTERMEDIATE CALCULATIONS SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{ie} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|-------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm·m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|----------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 11,667 | 2.11E-04 | 8.90E-03 | 1.77E-04 | 2.91E-03 | 2.52E-04 | 7.50E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|--------------------------------------|---------------------------------------|----------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------|
| 250 | 200 | 1.16E+02 | 0.10 | 1.55E+00 | 2.91E-03 | 4.00E+02 | 6.17E+05 | 4.74E-05 | 5.49E-03 | NA | 1.8E-02 |

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 2.20E+07 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 1.3E-04 |

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------|
| 71432 | 4.50E+01 | Benzene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |
| Used to calculate risk-based groundwater concentration. | | | | | |

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 8.80E-02 | 9.80E-06 | 5.54E-03 | 25 | 7,342 | 353.24 | 562.16 | 5.89E+01 | 1.79E+03 | 7.8E-06 | 3.0E-02 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 8,061 | 3.62E-03 | 1.53E-01 | 1.77E-04 | 5.08E-03 | 1.62E-04 | 5.48E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|
| 250 | 200 | 6.87E+03 | 0.10 | 1.55E+00 | 5.08E-03 | 4.00E+02 | 2.07E+03 | 4.38E-05 | 3.01E-01 | 7.8E-06 | 3.0E-02 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.79E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 3.4E-07 | 4.1E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------|
| 108907 | 7.60E+01 | Chlorobenzene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.30E-02 | 8.70E-06 | 3.69E-03 | 25 | 8,410 | 404.87 | 632.40 | 2.19E+02 | 4.72E+02 | 0.0E+00 | 4.9E-02 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 9,743 | 2.21E-03 | 9.32E-02 | 1.77E-04 | 4.22E-03 | 1.41E-04 | 4.74E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 7.09E+03 | 0.10 | 1.55E+00 | 4.22E-03 | 4.00E+02 | 9.94E+03 | 4.20E-05 | 2.97E-01 | NA | 4.9E-02 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 4.72E+05 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 2.5E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------|
| 75003 | 9.60E+01 | Chloroethane (ethyl chloride) |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^{\circ}\text{K}$) | Critical temperature, T_C ($^{\circ}\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 2.71E-01 | 1.15E-05 | 8.80E-03 | 25 | 5,879 | 285.30 | 460.40 | 4.40E+00 | 5.68E+03 | 8.3E-07 | 1.0E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 5,835 | 6.48E-03 | 2.73E-01 | 1.77E-04 | 1.56E-02 | 4.75E-04 | 1.61E-03 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|
| 250 | 200 | 2.62E+04 | 0.10 | 1.55E+00 | 1.56E-02 | 4.00E+02 | 1.19E+01 | 5.82E-05 | 1.52E+00 | 8.3E-07 | 1.0E+00 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 5.68E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 1.9E-07 | 6.3E-04 |

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|------------|
| 67663 | 1.90E+01 | Chloroform |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 1.04E-01 | 1.00E-05 | 3.66E-03 | 25 | 6,988 | 334.32 | 536.40 | 3.98E+01 | 7.92E+03 | 2.3E-05 | 4.9E-02 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 7,492 | 2.47E-03 | 1.04E-01 | 1.77E-04 | 6.00E-03 | 1.95E-04 | 6.57E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|
| 250 | 200 | 1.98E+03 | 0.10 | 1.55E+00 | 6.00E-03 | 4.00E+02 | 6.40E+02 | 4.60E-05 | 9.10E-02 | 2.3E-05 | 4.9E-02 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 7.92E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 3.1E-07 | 7.6E-04 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------|
| 156592 | 7.03E+02 | cis-1,2-Dichloroethylene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.36E-02 | 1.13E-05 | 4.07E-03 | 25 | 7,192 | 333.65 | 544.00 | 3.55E+01 | 3.50E+03 | 0.0E+00 | 2.0E-01 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 7,674 | 2.72E-03 | 1.15E-01 | 1.77E-04 | 4.25E-03 | 1.43E-04 | 4.80E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 8.06E+04 | 0.10 | 1.55E+00 | 4.25E-03 | 4.00E+02 | 9.22E+03 | 4.21E-05 | 3.39E+00 | NA | 2.0E-01 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 3.50E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 7.0E-03 |

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|--------------------------------------------------------------|---------------------------------------------------------------------------|--------------|
| 100414 | 9.72E+02 | Ethylbenzene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|----------------------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^{\circ}\text{K}$) | Critical temperature, T_C ($^{\circ}\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.50E-02 | 7.80E-06 | 7.86E-03 | 25 | 8,501 | 409.34 | 617.20 | 3.63E+02 | 1.69E+02 | 0.0E+00 | 1.0E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3) | Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3) | Vadose zone soil intrinsic permeability, k_i (cm^2) | Vadose zone soil relative air permeability, k_{rg} (cm^2) | Vadose zone soil effective vapor permeability, k_v (cm^2) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm^3/cm^3) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm^3/s) | Area of enclosed space below grade, A_B (cm^2) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm- m^3/mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm^2/s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm^2/s) | Total overall effective diffusion coefficient, D_T^{eff} (cm^2/s) |
|-------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 10,087 | 4.63E-03 | 1.95E-01 | 1.77E-04 | 4.33E-03 | 1.36E-04 | 4.60E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} ($\mu\text{g}/\text{m}^3$) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm^3/s) | Crack effective diffusion coefficient, D^{crack} (cm^2/s) | Area of crack, A_{crack} (cm^2) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ ($\mu\text{g}/\text{m}^3$) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|-----------------------------------------|------------------------------------------|---------------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------|
| 250 | 200 | 1.90E+05 | 0.10 | 1.55E+00 | 4.33E-03 | 4.00E+02 | 7.80E+03 | 4.16E-05 | 7.88E+00 | NA | 1.0E+00 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.69E+05 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 3.2E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------|
| 98828 | 6.81E+02 | Cumene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |
| Used to calculate risk-based groundwater concentration. | | | | | |

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 6.50E-02 | 7.10E-06 | 1.46E-02 | 25 | 10,335 | 425.56 | 631.10 | 4.89E+02 | 6.13E+01 | 0.0E+00 | 4.0E-01 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 12,560 | 7.55E-03 | 3.18E-01 | 1.77E-04 | 3.75E-03 | 1.16E-04 | 3.92E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 2.17E+05 | 0.10 | 1.55E+00 | 3.75E-03 | 4.00E+02 | 3.10E+04 | 3.94E-05 | 8.54E+00 | NA | 4.0E-01 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 6.13E+04 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 8.8E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------|
| 108872 | 4.03E+02 | Methylcyclohexane |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |
| Used to calculate risk-based groundwater concentration. | | | | | |

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|
| 7.35E-02 | 8.52E-06 | 1.03E-01 | 25 | 7,474 | 373.90 | 572.20 | 7.85E+01 | 1.40E+01 | 0.0E+00 | 3.0E+00 |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 8,518 | 6.57E-02 | 2.77E+00 | 1.77E-04 | 4.24E-03 | 1.28E-04 | 4.33E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 1.12E+06 | 0.10 | 1.55E+00 | 4.24E-03 | 4.00E+02 | 9.37E+03 | 4.08E-05 | 4.55E+01 | NA | 3.0E+00 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.40E+04 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 6.2E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------|
| 75092 | 2.02E+02 | Methylene chloride |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 1.01E-01 | 1.17E-05 | 2.18E-03 | 25 | 6,706 | 313.00 | 510.00 | 1.17E+01 | 1.30E+04 | 4.7E-07 | 1.1E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 6,970 | 1.51E-03 | 6.38E-02 | 1.77E-04 | 5.83E-03 | 2.03E-04 | 6.81E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 1.29E+04 | 0.10 | 1.55E+00 | 5.83E-03 | 4.00E+02 | 7.74E+02 | 4.64E-05 | 5.99E-01 | 4.7E-07 | 1.1E+00 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.30E+07 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 4.1E-08 | 2.3E-04 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------|
| 108101 | 3.51E+02 | Methylisobutylketone (4-methyl-2- |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|
| 7.50E-02 | 7.80E-06 | 1.38E-04 | 25 | 8,243 | 389.50 | 571.00 | 9.06E+00 | 1.90E+04 | 0.0E+00 | 3.0E+00 |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 9,781 | 8.23E-05 | 3.47E-03 | 1.77E-04 | 4.37E-03 | 4.79E-04 | 1.36E-03 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 1.22E+03 | 0.10 | 1.55E+00 | 4.37E-03 | 4.00E+02 | 7.21E+03 | 5.27E-05 | 6.42E-02 | NA | 3.0E+00 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.90E+07 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 8.8E-06 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------|
| 1634044 | 2.20E+01 | MTBE |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm ² /s) | Diffusivity in water, D_w (cm ² /s) | Henry's law constant at reference temperature, H (atm·m ³ /mol) | Henry's law constant reference temperature, T_R (°C) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B (°K) | Critical temperature, T_C (°K) | Organic carbon partition coefficient, K_{oc} (cm ³ /g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|---------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------|
| 1.02E-01 | 1.05E-05 | 6.23E-04 | 25 | 6,678 | 328.30 | 497.10 | 7.26E+00 | 5.10E+04 | 0.0E+00 | 3.0E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 7,218 | 4.27E-04 | 1.80E-02 | 1.77E-04 | 5.92E-03 | 2.68E-04 | 8.76E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 3.96E+02 | 0.10 | 1.55E+00 | 5.92E-03 | 4.00E+02 | 7.02E+02 | 4.91E-05 | 1.94E-02 | NA | 3.0E+00 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 5.10E+07 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 2.7E-06 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------|
| 91203 | 4.40E+00 | Naphthalene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |
| Used to calculate risk-based groundwater concentration. | | | | | |

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|----|--------|--------|--------|----------|----------|---------|---------|
| 5.90E-02 | 7.50E-06 | 4.82E-04 | 25 | 10,373 | 491.14 | 748.40 | 2.00E+03 | 3.10E+01 | 0.0E+00 | 3.0E-03 |
|----------|----------|----------|----|--------|--------|--------|----------|----------|---------|---------|

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|--------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 12,851 | 2.45E-04 | 1.03E-02 | 1.77E-04 | 3.42E-03 | 2.15E-04 | 6.74E-04 |
|----------|----------|----------|-----|--------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 4.55E+01 | 0.10 | 1.55E+00 | 3.42E-03 | 4.00E+02 | 8.51E+04 | 4.63E-05 | 2.10E-03 | NA | 3.0E-03 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 3.10E+04 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 2.9E-04 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------|
| 127184 | 4.75E+02 | Tetrachloroethylene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |
| Used to calculate risk-based groundwater concentration. | | | | | |

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|
| 7.20E-02 | 8.20E-06 | 1.84E-02 | 25 | 8,288 | 394.40 | 620.20 | 1.55E+02 | 2.00E+02 | 6.0E-06 | 3.5E-02 |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|-------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------|
|-------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|----------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|----------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 9,492 | 1.11E-02 | 4.70E-01 | 1.77E-04 | 4.16E-03 | 1.27E-04 | 4.31E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|--------------------------------------|---------------------------------------|----------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------|
|--------------------------------------|---------------------------------------|----------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|
| 250 | 200 | 2.23E+05 | 0.10 | 1.55E+00 | 4.16E-03 | 4.00E+02 | 1.13E+04 | 4.07E-05 | 9.08E+00 | 6.0E-06 | 3.5E-02 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 2.00E+05 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 8.0E-06 | 1.1E-01 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------|
| 79016 | 3.89E+02 | Trichloroethylene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.90E-02 | 9.10E-06 | 1.03E-02 | 25 | 7,505 | 360.36 | 544.20 | 1.66E+02 | 1.47E+03 | 1.1E-04 | 3.5E-02 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 8,483 | 6.58E-03 | 2.77E-01 | 1.77E-04 | 4.56E-03 | 1.42E-04 | 4.80E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 1.08E+05 | 0.10 | 1.55E+00 | 4.56E-03 | 4.00E+02 | 4.95E+03 | 4.21E-05 | 4.55E+00 | 1.1E-04 | 3.5E-02 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.47E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 7.3E-05 | 5.3E-02 |

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------|
| 108883 | 2.40E+03 | Toluene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^{\circ}\text{K}$) | Critical temperature, T_C ($^{\circ}\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 8.70E-02 | 8.60E-06 | 6.62E-03 | 25 | 7,930 | 383.78 | 591.79 | 1.82E+02 | 5.26E+02 | 0.0E+00 | 5.0E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 9,089 | 4.11E-03 | 1.73E-01 | 1.77E-04 | 5.02E-03 | 1.58E-04 | 5.35E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 4.15E+05 | 0.10 | 1.55E+00 | 5.02E-03 | 4.00E+02 | 2.26E+03 | 4.35E-05 | 1.81E+01 | NA | 5.0E+00 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 5.26E+05 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 1.5E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------|
| 75014 | 6.30E+01 | Vinyl chloride (chloroethene) |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 1.06E-01 | 1.23E-05 | 2.69E-02 | 25 | 5,250 | 259.25 | 432.00 | 1.86E+01 | 8.80E+03 | 4.4E-06 | 1.0E-01 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 4,933 | 2.08E-02 | 8.76E-01 | 1.77E-04 | 6.12E-03 | 1.85E-04 | 6.29E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 5.52E+04 | 0.10 | 1.55E+00 | 6.12E-03 | 4.00E+02 | 5.68E+02 | 4.55E-05 | 2.51E+00 | 4.4E-06 | 1.0E-01 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 8.80E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 1.6E-06 | 1.0E-02 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------|
| 106423 | 3.34E+03 | p-Xylene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 150 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.69E-02 | 8.44E-06 | 7.64E-03 | 25 | 8,525 | 411.52 | 616.20 | 3.89E+02 | 1.85E+02 | 0.0E+00 | 1.0E-01 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 10,178 | 4.48E-03 | 1.89E-01 | 1.77E-04 | 4.44E-03 | 1.40E-04 | 4.73E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 6.30E+05 | 0.10 | 1.55E+00 | 4.44E-03 | 4.00E+02 | 6.25E+03 | 4.20E-05 | 2.64E+01 | NA | 1.0E-01 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.85E+05 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 1.1E-01 |

MESSAGE SUMMARY BELOW:

END

Appendix H-5.36
Groundwater Inhalation Calculations
Future Industrial Worker

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------|
| 71556 | 1.64E+03 | 1,1,1-Trichloroethane |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.80E-02 | 8.80E-06 | 1.72E-02 | 25 | 7,136 | 347.24 | 545.00 | 1.10E+02 | 1.33E+03 | 0.0E+00 | 5.0E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 7,820 | 1.14E-02 | 4.79E-01 | 1.77E-04 | 4.50E-03 | 1.38E-04 | 4.67E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 7.88E+05 | 0.10 | 1.55E+00 | 4.50E-03 | 4.00E+02 | 5.53E+03 | 4.18E-05 | 3.29E+01 | NA | 5.0E+00 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.33E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 4.5E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

| Soil Properties Lookup Table | |
|------------------------------|-----------------------|
| SCS Soil Type | K _s (cm/h) |
| C | 0.61 |
| CL | 0.34 |
| L | 0.50 |
| LS | 4.38 |
| S | 26.78 |
| SC | 0.47 |
| SCL | 0.55 |
| SI | 1.82 |
| SIC | 0.40 |
| SICL | 0.46 |
| SIL | 0.76 |
| SL | 1.60 |

| Chemical Properties Lookup Table | | | | | |
|----------------------------------|---------------------------------|----------------------------------------------------------|-------------------------------------------|----------------------|----------------------|
| CAS No. | Chemical | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) | URF extrapolated (X) | RfC extrapolated (X) |
| 56235 | Carbon tetrachloride | 1.5E-05 | 0.0E+00 | | |
| 57749 | Chlordane | 1.0E-04 | 7.0E-04 | | |
| 58899 | gamma-HCH (Lindane) | 3.7E-04 | 1.1E-03 | X | X |
| 60297 | Ethyl ether | 0.0E+00 | 7.0E-01 | | X |
| 60571 | Dieldrin | 4.6E-03 | 1.8E-04 | | X |
| 67641 | Acetone | 0.0E+00 | 3.5E-01 | | X |
| 67663 | Chloroform | 2.3E-05 | 4.9E-02 | | |
| 67721 | Hexachloroethane | 4.0E-06 | 3.5E-03 | | X |
| 71432 | Benzene | 7.8E-06 | 3.0E-02 | | |
| 71556 | 1,1,1-Trichloroethane | 0.0E+00 | 5.0E+00 | | |
| 72435 | Methoxychlor | 0.0E+00 | 1.8E-02 | | X |
| 72559 | DDE | 9.7E-05 | 0.0E+00 | X | |
| 74839 | Methyl bromide | 0.0E+00 | 5.0E-03 | | |
| 74873 | Methyl chloride (chloromethane) | 1.0E-06 | 9.0E-02 | | |
| 74908 | Hydrogen cyanide | 0.0E+00 | 3.0E-03 | | |
| 74953 | Methylene bromide | 0.0E+00 | 3.5E-02 | | X |
| 75003 | Chloroethane (ethyl chloride) | 8.3E-07 | 1.0E+00 | X | |
| 75014 | Vinyl chloride (chloroethene) | 4.4E-06 | 1.0E-01 | | |
| 75058 | Acetonitrile | 0.0E+00 | 6.0E-02 | | |
| 75070 | Acetaldehyde | 2.2E-06 | 9.0E-03 | | |
| 75092 | Methylene chloride | 4.7E-07 | 1.1E+00 | | |
| 75150 | Carbon disulfide | 0.0E+00 | 7.0E-01 | | |
| 75218 | Ethylene oxide | 1.0E-04 | 0.0E+00 | | |
| 75252 | Bromoform | 1.1E-06 | 7.0E-02 | | X |
| 75274 | Bromodichloromethane | 1.8E-05 | 7.0E-02 | X | X |
| 75296 | 2-Chloropropane | 0.0E+00 | 1.0E-01 | | |
| 75343 | 1,1-Dichloroethane | 0.0E+00 | 4.9E-01 | | |
| 75354 | 1,1-Dichloroethylene | 0.0E+00 | 2.0E-01 | | |
| 75456 | Chlorodifluoromethane | 0.0E+00 | 5.0E+01 | | |
| 75694 | Trichlorofluoromethane | 0.0E+00 | 7.0E-01 | | |
| 75718 | Dichlorodifluoromethane | 0.0E+00 | 2.0E-01 | | |

DATA ENTRY SHEET

| | | | | | |
|--------|-------------------------------------|---------|---------|---|---|
| 76131 | 1,1,2-Trichloro-1,2,2-trifluoroetha | 0.0E+00 | 3.0E+01 | | |
| 76448 | Heptachlor | 1.3E-03 | 1.8E-03 | | X |
| 77474 | Hexachlorocyclopentadiene | 0.0E+00 | 2.0E-04 | | |
| 78831 | Isobutanol | 0.0E+00 | 1.1E+00 | | X |
| 78875 | 1,2-Dichloropropane | 1.9E-05 | 4.0E-03 | X | |
| 78933 | Methylethylketone (2-butanone) | 0.0E+00 | 5.0E+00 | | |
| 79005 | 1,1,2-Trichloroethane | 1.6E-05 | 1.4E-02 | | X |
| 79016 | Trichloroethylene | 1.1E-04 | 3.5E-02 | X | |
| 79209 | Methyl acetate | 0.0E+00 | 3.5E+00 | | X |
| 79345 | 1,1,2,2-Tetrachloroethane | 5.8E-05 | 2.1E-01 | | X |
| 79469 | 2-Nitropropane | 2.7E-03 | 2.0E-02 | | |
| 80626 | Methylmethacrylate | 0.0E+00 | 7.0E-01 | | |
| 83329 | Acenaphthene | 0.0E+00 | 2.1E-01 | | X |
| 86737 | Fluorene | 0.0E+00 | 1.4E-01 | | X |
| 87683 | Hexachloro-1,3-butadiene | 2.2E-05 | 7.0E-04 | | X |
| 88722 | o-Nitrotoluene | 0.0E+00 | 3.5E-02 | | X |
| 91203 | Naphthalene | 0.0E+00 | 3.0E-03 | | |
| 91576 | 2-Methylnaphthalene | 0.0E+00 | 7.0E-02 | | X |
| 92524 | Biphenyl | 0.0E+00 | 1.8E-01 | | X |
| 95476 | o-Xylene | 0.0E+00 | 1.0E-01 | | |
| 95501 | 1,2-Dichlorobenzene | 0.0E+00 | 1.4E-01 | | |
| 95578 | 2-Chlorophenol | 0.0E+00 | 1.8E-02 | | X |
| 95636 | 1,2,4-Trimethylbenzene | 0.0E+00 | 6.0E-03 | | |
| 96184 | 1,2,3-Trichloropropane | 5.7E-04 | 4.9E-03 | X | |
| 96333 | Methyl acrylate | 0.0E+00 | 1.1E-01 | | X |
| 97632 | Ethylmethacrylate | 0.0E+00 | 3.2E-01 | | X |
| 98066 | tert-Butylbenzene | 0.0E+00 | 1.4E-01 | | X |
| 98828 | Cumene | 0.0E+00 | 4.0E-01 | | |
| 98862 | Acetophenone | 0.0E+00 | 3.5E-01 | | X |
| 98953 | Nitrobenzene | 0.0E+00 | 2.0E-03 | | |
| 100414 | Ethylbenzene | 0.0E+00 | 1.0E+00 | | |
| 100425 | Styrene | 0.0E+00 | 1.0E+00 | | |
| 100447 | Benzylchloride | 4.9E-05 | 0.0E+00 | X | |
| 100527 | Benzaldehyde | 0.0E+00 | 3.5E-01 | | X |
| 103651 | n-Propylbenzene | 0.0E+00 | 1.4E-01 | | X |
| 104518 | n-Butylbenzene | 0.0E+00 | 1.4E-01 | | X |
| 106423 | p-Xylene | 0.0E+00 | 1.0E-01 | | |
| 106467 | 1,4-Dichlorobenzene | 6.3E-06 | 8.0E-01 | | |
| 106934 | 1,2-Dibromoethane (ethylene dib | 2.2E-04 | 2.0E-04 | | |
| 106990 | 1,3-Butadiene | 3.0E-02 | 2.0E-03 | | |
| 107028 | Acrolein | 0.0E+00 | 2.0E-05 | | |
| 107062 | 1,2-Dichloroethane | 2.6E-05 | 2.5E+00 | | |
| 107131 | Acrylonitrile | 6.8E-05 | 2.0E-03 | | |
| 108054 | Vinyl acetate | 0.0E+00 | 2.0E-01 | | |
| 108101 | Methylisobutylketone (4-methyl-2 | 0.0E+00 | 3.0E+00 | | |
| 108383 | m-Xylene | 0.0E+00 | 1.0E-01 | | |
| 108678 | 1,3,5-Trimethylbenzene | 0.0E+00 | 6.0E-03 | | |
| 108872 | Methylcyclohexane | 0.0E+00 | 3.0E+00 | | |
| 108883 | Toluene | 0.0E+00 | 5.0E+00 | | |
| 108907 | Chlorobenzene | 0.0E+00 | 4.9E-02 | | |
| 109693 | 1-Chlorobutane | 0.0E+00 | 1.4E+00 | | X |
| 110009 | Furan | 0.0E+00 | 3.5E-03 | | X |
| 110543 | Hexane | 0.0E+00 | 2.0E-01 | | |
| 111444 | Bis(2-chloroethyl)ether | 3.3E-04 | 0.0E+00 | | |
| 115297 | Endosulfan | 0.0E+00 | 2.1E-02 | | X |
| 118741 | Hexachlorobenzene | 4.6E-04 | 2.8E-03 | | X |

DATA ENTRY SHEET

| | | | | | |
|---------|----------------------------------|---------|---------|---|---|
| 120821 | 1,2,4-Trichlorobenzene | 0.0E+00 | 4.0E-03 | | |
| 123739 | Crotonaldehyde (2-butenal) | 5.4E-04 | 0.0E+00 | X | |
| 124481 | Chlorodibromomethane | 2.4E-05 | 7.0E-02 | X | X |
| 126987 | Methacrylonitrile | 0.0E+00 | 7.0E-04 | | |
| 126998 | 2-Chloro-1,3-butadiene (chloropr | 0.0E+00 | 7.0E-03 | | |
| 127184 | Tetrachloroethylene | 6.0E-06 | 3.5E-02 | | |
| 129000 | Pyrene | 0.0E+00 | 1.1E-01 | | X |
| 132649 | Dibenzofuran | 0.0E+00 | 1.4E-02 | | X |
| 135988 | sec-Butylbenzene | 0.0E+00 | 1.4E-01 | | X |
| 141786 | Ethylacetate | 0.0E+00 | 3.2E+00 | | X |
| 156592 | cis-1,2-Dichloroethylene | 0.0E+00 | 2.0E-01 | | X |
| 156605 | trans-1,2-Dichloroethylene | 0.0E+00 | 7.0E-02 | | X |
| 205992 | Benzo(b)fluoranthene | 2.1E-04 | 0.0E+00 | X | |
| 218019 | Chrysene | 2.1E-06 | 0.0E+00 | X | |
| 309002 | Aldrin | 4.9E-03 | 1.1E-04 | | X |
| 319846 | alpha-HCH (alpha-BHC) | 1.8E-03 | 0.0E+00 | | |
| 541731 | 1,3-Dichlorobenzene | 0.0E+00 | 1.1E-01 | | X |
| 542756 | 1,3-Dichloropropene | 4.0E-06 | 2.0E-02 | | |
| 630206 | 1,1,1,2-Tetrachloroethane | 7.4E-06 | 1.1E-01 | | X |
| 1634044 | MTBE | 0.0E+00 | 3.0E+00 | | |
| 7439976 | Mercury (elemental) | 0.0E+00 | 3.0E-04 | | |

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------|
| 79005 | 6.00E+00 | 1,1,2-Trichloroethane |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |
| Used to calculate risk-based groundwater concentration. | | | | | |

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.80E-02 | 8.80E-06 | 9.11E-04 | 25 | 8,322 | 386.15 | 602.00 | 5.01E+01 | 4.42E+03 | 1.6E-05 | 1.4E-02 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 9,507 | 5.53E-04 | 2.33E-02 | 1.77E-04 | 4.51E-03 | 1.94E-04 | 6.37E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|
| 250 | 200 | 1.40E+02 | 0.10 | 1.55E+00 | 4.51E-03 | 4.00E+02 | 5.46E+03 | 4.56E-05 | 6.38E-03 | 1.6E-05 | 1.4E-02 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 4.42E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 2.5E-08 | 3.1E-04 |

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------|
| 75343 | 2.16E+02 | 1,1-Dichloroethane |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |
| Used to calculate risk-based groundwater concentration. | | | | | |

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.42E-02 | 1.05E-05 | 5.61E-03 | 25 | 6,895 | 330.55 | 523.00 | 3.16E+01 | 5.06E+03 | 0.0E+00 | 4.9E-01 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 7,384 | 3.80E-03 | 1.60E-01 | 1.77E-04 | 4.28E-03 | 1.38E-04 | 4.67E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 3.46E+04 | 0.10 | 1.55E+00 | 4.28E-03 | 4.00E+02 | 8.58E+03 | 4.18E-05 | 1.45E+00 | NA | 4.9E-01 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 5.06E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

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

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------|
| 75354 | 2.89E+02 | 1,1-Dichloroethylene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 9.00E-02 | 1.04E-05 | 2.60E-02 | 25 | 6,247 | 304.75 | 576.05 | 5.89E+01 | 2.25E+03 | 0.0E+00 | 2.0E-01 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 6,353 | 1.86E-02 | 7.86E-01 | 1.77E-04 | 5.20E-03 | 1.58E-04 | 5.35E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 2.27E+05 | 0.10 | 1.55E+00 | 5.20E-03 | 4.00E+02 | 1.75E+03 | 4.35E-05 | 9.89E+00 | NA | 2.0E-01 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 2.25E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 3.4E-02 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------|
| 107062 | 2.07E+03 | 1,2-Dichloroethane |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based groundwater concentration.

CHEMICAL PROPERTIES SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^{\circ}\text{K}$) | Critical temperature, T_C ($^{\circ}\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3)^{-1}$ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------------|
| 1.04E-01 | 9.90E-06 | 9.77E-04 | 25 | 7,643 | 356.65 | 561.00 | 1.74E+01 | 8.52E+03 | 2.6E-05 | 2.5E+00 |

END

INTERMEDIATE CALCULATIONS SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{ie} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|-------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm·m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|----------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 8,457 | 6.26E-04 | 2.64E-02 | 1.77E-04 | 6.01E-03 | 2.38E-04 | 7.89E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|--------------------------------------|---------------------------------------|----------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------|
| 250 | 200 | 5.46E+04 | 0.10 | 1.55E+00 | 6.01E-03 | 4.00E+02 | 6.37E+02 | 4.80E-05 | 2.62E+00 | 2.6E-05 | 2.5E+00 |

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 8.52E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 1.7E-05 | 7.3E-04 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------|
| 95501 | 4.30E+01 | 1,2-Dichlorobenzene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 6.90E-02 | 7.90E-06 | 1.90E-03 | 25 | 9,700 | 453.57 | 705.00 | 6.17E+02 | 1.56E+02 | 0.0E+00 | 1.4E-01 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 11,627 | 1.03E-03 | 4.34E-02 | 1.77E-04 | 3.99E-03 | 1.48E-04 | 4.92E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 1.86E+03 | 0.10 | 1.55E+00 | 3.99E-03 | 4.00E+02 | 1.69E+04 | 4.25E-05 | 7.92E-02 | NA | 1.4E-01 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.56E+05 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 3.9E-04 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------|
| 106467 | 2.20E+01 | 1,4-Dichlorobenzene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based
groundwater concentration.

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 11,181 | 1.33E-03 | 5.61E-02 | 1.77E-04 | 3.99E-03 | 1.41E-04 | 4.73E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 1.23E+03 | 0.10 | 1.55E+00 | 3.99E-03 | 4.00E+02 | 1.69E+04 | 4.19E-05 | 5.17E-02 | 6.3E-06 | 8.0E-01 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 7.90E+04 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 8.0E-08 | 4.4E-05 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------|
| 95578 | 1.30E+01 | 2-Chlorophenol |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^{\circ}\text{K}$) | Critical temperature, T_C ($^{\circ}\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 5.01E-02 | 9.46E-06 | 3.90E-04 | 25 | 9,572 | 447.53 | 675.00 | 3.88E+02 | 2.20E+04 | 0.0E+00 | 1.8E-02 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|--------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 11,667 | 2.11E-04 | 8.90E-03 | 1.77E-04 | 2.91E-03 | 2.52E-04 | 7.50E-04 |
|----------|----------|----------|-----|--------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 1.16E+02 | 0.10 | 1.55E+00 | 2.91E-03 | 4.00E+02 | 6.17E+05 | 4.74E-05 | 5.49E-03 | NA | 1.8E-02 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 2.20E+07 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 2.1E-04 |

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------|
| 71432 | 4.50E+01 | Benzene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based
groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|
| 8.80E-02 | 9.80E-06 | 5.54E-03 | 25 | 7,342 | 353.24 | 562.16 | 5.89E+01 | 1.79E+03 | 7.8E-06 | 3.0E-02 |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 8,061 | 3.62E-03 | 1.53E-01 | 1.77E-04 | 5.08E-03 | 1.62E-04 | 5.48E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|
| 250 | 200 | 6.87E+03 | 0.10 | 1.55E+00 | 5.08E-03 | 4.00E+02 | 2.07E+03 | 4.38E-05 | 3.01E-01 | 7.8E-06 | 3.0E-02 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.79E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 5.7E-07 | 6.9E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------|
| 108907 | 7.60E+01 | Chlorobenzene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based
groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^{\circ}\text{K}$) | Critical temperature, T_C ($^{\circ}\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.30E-02 | 8.70E-06 | 3.69E-03 | 25 | 8,410 | 404.87 | 632.40 | 2.19E+02 | 4.72E+02 | 0.0E+00 | 4.9E-02 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 9,743 | 2.21E-03 | 9.32E-02 | 1.77E-04 | 4.22E-03 | 1.41E-04 | 4.74E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 7.09E+03 | 0.10 | 1.55E+00 | 4.22E-03 | 4.00E+02 | 9.94E+03 | 4.20E-05 | 2.97E-01 | NA | 4.9E-02 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 4.72E+05 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 4.2E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|--------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------|
| 75003 | 9.60E+01 | Chloroethane (ethyl chloride) |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|----------------------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based
groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 2.71E-01 | 1.15E-05 | 8.80E-03 | 25 | 5,879 | 285.30 | 460.40 | 4.40E+00 | 5.68E+03 | 8.3E-07 | 1.0E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|-------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------|
|-------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|----------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|----------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 5,835 | 6.48E-03 | 2.73E-01 | 1.77E-04 | 1.56E-02 | 4.75E-04 | 1.61E-03 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|--------------------------------------|---------------------------------------|----------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------|
|--------------------------------------|---------------------------------------|----------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|
| 250 | 200 | 2.62E+04 | 0.10 | 1.55E+00 | 1.56E-02 | 4.00E+02 | 1.19E+01 | 5.82E-05 | 1.52E+00 | 8.3E-07 | 1.0E+00 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 5.68E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 3.1E-07 | 1.0E-03 |

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|------------|
| 67663 | 1.90E+01 | Chloroform |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 1.04E-01 | 1.00E-05 | 3.66E-03 | 25 | 6,988 | 334.32 | 536.40 | 3.98E+01 | 7.92E+03 | 2.3E-05 | 4.9E-02 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 7,492 | 2.47E-03 | 1.04E-01 | 1.77E-04 | 6.00E-03 | 1.95E-04 | 6.57E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|
| 250 | 200 | 1.98E+03 | 0.10 | 1.55E+00 | 6.00E-03 | 4.00E+02 | 6.40E+02 | 4.60E-05 | 9.10E-02 | 2.3E-05 | 4.9E-02 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 7.92E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 5.1E-07 | 1.3E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------|
| 156592 | 7.03E+02 | cis-1,2-Dichloroethylene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.36E-02 | 1.13E-05 | 4.07E-03 | 25 | 7,192 | 333.65 | 544.00 | 3.55E+01 | 3.50E+03 | 0.0E+00 | 2.0E-01 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 7,674 | 2.72E-03 | 1.15E-01 | 1.77E-04 | 4.25E-03 | 1.43E-04 | 4.80E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 8.06E+04 | 0.10 | 1.55E+00 | 4.25E-03 | 4.00E+02 | 9.22E+03 | 4.21E-05 | 3.39E+00 | NA | 2.0E-01 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 3.50E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 1.2E-02 |

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------|
| 100414 | 9.72E+02 | Ethylbenzene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based
groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.50E-02 | 7.80E-06 | 7.86E-03 | 25 | 8,501 | 409.34 | 617.20 | 3.63E+02 | 1.69E+02 | 0.0E+00 | 1.0E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 10,087 | 4.63E-03 | 1.95E-01 | 1.77E-04 | 4.33E-03 | 1.36E-04 | 4.60E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 1.90E+05 | 0.10 | 1.55E+00 | 4.33E-03 | 4.00E+02 | 7.80E+03 | 4.16E-05 | 7.88E+00 | NA | 1.0E+00 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.69E+05 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 5.4E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------|
| 98828 | 6.81E+02 | Cumene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based
groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 6.50E-02 | 7.10E-06 | 1.46E-02 | 25 | 10,335 | 425.56 | 631.10 | 4.89E+02 | 6.13E+01 | 0.0E+00 | 4.0E-01 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 12,560 | 7.55E-03 | 3.18E-01 | 1.77E-04 | 3.75E-03 | 1.16E-04 | 3.92E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 2.17E+05 | 0.10 | 1.55E+00 | 3.75E-03 | 4.00E+02 | 3.10E+04 | 3.94E-05 | 8.54E+00 | NA | 4.0E-01 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 6.13E+04 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 1.5E-02 |

MESSAGE SUMMARY BELOW:

END

CHEMICAL PROPERTIES SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_W ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------|
| 108872 | 4.03E+02 | Methylcyclohexane |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_F (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_S ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type <input type="button" value="Lookup Soil Parameters"/> | ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3) | ENTER Vadose zone soil total porosity, n^V (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based groundwater concentration.

CHEMICAL PROPERTIES SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|
| 7.35E-02 | 8.52E-06 | 1.03E-01 | 25 | 7,474 | 373.90 | 572.20 | 7.85E+01 | 1.40E+01 | 0.0E+00 | 3.0E+00 |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|

END

CHEMICAL PROPERTIES SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3) | Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3) | Vadose zone soil intrinsic permeability, k_i (cm^2) | Vadose zone soil relative air permeability, k_{rg} (cm^2) | Vadose zone soil effective vapor permeability, k_v (cm^2) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm^3/cm^3) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm^3/s) | Area of enclosed space below grade, A_B (cm^2) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm^2/s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm^2/s) | Total overall effective diffusion coefficient, D_T^{eff} (cm^2/s) |
|-------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 8,518 | 6.57E-02 | 2.77E+00 | 1.77E-04 | 4.24E-03 | 1.28E-04 | 4.33E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} ($\mu\text{g}/\text{m}^3$) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm^3/s) | Crack effective diffusion coefficient, D^{crack} (cm^2/s) | Area of crack, A_{crack} (cm^2) | Exponent of equivalent foundation Peclet number, $\exp(Pe')$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ ($\mu\text{g}/\text{m}^3$) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|-----------------------------------|------------------------------------|---------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 1.12E+06 | 0.10 | 1.55E+00 | 4.24E-03 | 4.00E+02 | 9.37E+03 | 4.08E-05 | 4.55E+01 | NA | 3.0E+00 |

CHEMICAL PROPERTIES SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.40E+04 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 1.0E-02 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------|
| 75092 | 2.02E+02 | Methylene chloride |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|
| 1.01E-01 | 1.17E-05 | 2.18E-03 | 25 | 6,706 | 313.00 | 510.00 | 1.17E+01 | 1.30E+04 | 4.7E-07 | 1.1E+00 |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3) | Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3) | Vadose zone soil intrinsic permeability, k_i (cm^2) | Vadose zone soil relative air permeability, k_{rg} (cm^2) | Vadose zone soil effective vapor permeability, k_v (cm^2) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm^3/cm^3) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm^3/s) | Area of enclosed space below grade, A_B (cm^2) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm- m^3/mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm^2/s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm^2/s) | Total overall effective diffusion coefficient, D_T^{eff} (cm^2/s) |
|-------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 6,970 | 1.51E-03 | 6.38E-02 | 1.77E-04 | 5.83E-03 | 2.03E-04 | 6.81E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} ($\mu\text{g}/\text{m}^3$) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm^3/s) | Crack effective diffusion coefficient, D^{crack} (cm^2/s) | Area of crack, A_{crack} (cm^2) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ ($\mu\text{g}/\text{m}^3$) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|-----------------------------------------|------------------------------------------|---------------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------|
| 250 | 200 | 1.29E+04 | 0.10 | 1.55E+00 | 5.83E-03 | 4.00E+02 | 7.74E+02 | 4.64E-05 | 5.99E-01 | 4.7E-07 | 1.1E+00 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.30E+07 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 6.9E-08 | 3.9E-04 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|--------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------|
| 108101 | 3.51E+02 | Methylisobutylketone (4-methyl-2- |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|----------------------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.50E-02 | 7.80E-06 | 1.38E-04 | 25 | 8,243 | 389.50 | 571.00 | 9.06E+00 | 1.90E+04 | 0.0E+00 | 3.0E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 9,781 | 8.23E-05 | 3.47E-03 | 1.77E-04 | 4.37E-03 | 4.79E-04 | 1.36E-03 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 1.22E+03 | 0.10 | 1.55E+00 | 4.37E-03 | 4.00E+02 | 7.21E+03 | 5.27E-05 | 6.42E-02 | NA | 3.0E+00 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.90E+07 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 1.5E-05 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------|
| 1634044 | 2.20E+01 | MTBE |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based
groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^{\circ}\text{K}$) | Critical temperature, T_C ($^{\circ}\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 1.02E-01 | 1.05E-05 | 6.23E-04 | 25 | 6,678 | 328.30 | 497.10 | 7.26E+00 | 5.10E+04 | 0.0E+00 | 3.0E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 7,218 | 4.27E-04 | 1.80E-02 | 1.77E-04 | 5.92E-03 | 2.68E-04 | 8.76E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 3.96E+02 | 0.10 | 1.55E+00 | 5.92E-03 | 4.00E+02 | 7.02E+02 | 4.91E-05 | 1.94E-02 | NA | 3.0E+00 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 5.10E+07 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 4.4E-06 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------|
| 91203 | 4.40E+00 | Naphthalene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based
groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 5.90E-02 | 7.50E-06 | 4.82E-04 | 25 | 10,373 | 491.14 | 748.40 | 2.00E+03 | 3.10E+01 | 0.0E+00 | 3.0E-03 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|--------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 12,851 | 2.45E-04 | 1.03E-02 | 1.77E-04 | 3.42E-03 | 2.15E-04 | 6.74E-04 |
|----------|----------|----------|-----|--------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 4.55E+01 | 0.10 | 1.55E+00 | 3.42E-03 | 4.00E+02 | 8.51E+04 | 4.63E-05 | 2.10E-03 | NA | 3.0E-03 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 3.10E+04 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 4.8E-04 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|--------------------------------------------------------------|---------------------------------------------------------------------------|---------------------|
| 127184 | 4.75E+02 | Tetrachloroethylene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|----------------------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|
| 7.20E-02 | 8.20E-06 | 1.84E-02 | 25 | 8,288 | 394.40 | 620.20 | 1.55E+02 | 2.00E+02 | 6.0E-06 | 3.5E-02 |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 9,492 | 1.11E-02 | 4.70E-01 | 1.77E-04 | 4.16E-03 | 1.27E-04 | 4.31E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|
| 250 | 200 | 2.23E+05 | 0.10 | 1.55E+00 | 4.16E-03 | 4.00E+02 | 1.13E+04 | 4.07E-05 | 9.08E+00 | 6.0E-06 | 3.5E-02 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 2.00E+05 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 1.3E-05 | 1.8E-01 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------|
| 79016 | 3.89E+02 | Trichloroethylene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based
groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.90E-02 | 9.10E-06 | 1.03E-02 | 25 | 7,505 | 360.36 | 544.20 | 1.66E+02 | 1.47E+03 | 1.1E-04 | 3.5E-02 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 8,483 | 6.58E-03 | 2.77E-01 | 1.77E-04 | 4.56E-03 | 1.42E-04 | 4.80E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 1.08E+05 | 0.10 | 1.55E+00 | 4.56E-03 | 4.00E+02 | 4.95E+03 | 4.21E-05 | 4.55E+00 | 1.1E-04 | 3.5E-02 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.47E+06 | NA |

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-04 | 8.9E-02 |

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|--------------------------------------------------------------|---------------------------------------------------------------------------|----------|
| 108883 | 2.40E+03 | Toluene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|----------------------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 8.70E-02 | 8.60E-06 | 6.62E-03 | 25 | 7,930 | 383.78 | 591.79 | 1.82E+02 | 5.26E+02 | 0.0E+00 | 5.0E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 9,089 | 4.11E-03 | 1.73E-01 | 1.77E-04 | 5.02E-03 | 1.58E-04 | 5.35E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 4.15E+05 | 0.10 | 1.55E+00 | 5.02E-03 | 4.00E+02 | 2.26E+03 | 4.35E-05 | 1.81E+01 | NA | 5.0E+00 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 5.26E+05 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 2.5E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------|
| 75014 | 6.30E+01 | Vinyl chloride (chloroethene) |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 1.06E-01 | 1.23E-05 | 2.69E-02 | 25 | 5,250 | 259.25 | 432.00 | 1.86E+01 | 8.80E+03 | 4.4E-06 | 1.0E-01 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 4,933 | 2.08E-02 | 8.76E-01 | 1.77E-04 | 6.12E-03 | 1.85E-04 | 6.29E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 5.52E+04 | 0.10 | 1.55E+00 | 6.12E-03 | 4.00E+02 | 5.68E+02 | 4.55E-05 | 2.51E+00 | 4.4E-06 | 1.0E-01 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 8.80E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 2.7E-06 | 1.7E-02 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------|
| 106423 | 3.34E+03 | p-Xylene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 25 | 25 | 250 |

Used to calculate risk-based
groundwater concentration.

CHEMICAL PROPERTIES SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^{\circ}\text{K}$) | Critical temperature, T_C ($^{\circ}\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.69E-02 | 8.44E-06 | 7.64E-03 | 25 | 8,525 | 411.52 | 616.20 | 3.89E+02 | 1.85E+02 | 0.0E+00 | 1.0E-01 |

END

INTERMEDIATE CALCULATIONS SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3) | Vadose zone effective total fluid saturation, S_{ie} (cm^3/cm^3) | Vadose zone soil intrinsic permeability, k_i (cm^2) | Vadose zone soil relative air permeability, k_{rg} (cm^2) | Vadose zone soil effective vapor permeability, k_v (cm^2) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm^3/cm^3) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm^3/s) | Area of enclosed space below grade, A_B (cm^2) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm^2/s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm^2/s) | Total overall effective diffusion coefficient, D_T^{eff} (cm^2/s) |
|-------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 10,178 | 4.48E-03 | 1.89E-01 | 1.77E-04 | 4.44E-03 | 1.40E-04 | 4.73E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} ($\mu\text{g}/\text{m}^3$) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm^3/s) | Crack effective diffusion coefficient, D^{crack} (cm^2/s) | Area of crack, A_{crack} (cm^2) | Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ ($\mu\text{g}/\text{m}^3$) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RFC (mg/m^3) |
|-----------------------------------|------------------------------------|---------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 6.30E+05 | 0.10 | 1.55E+00 | 4.44E-03 | 4.00E+02 | 6.25E+03 | 4.20E-05 | 2.64E+01 | NA | 1.0E-01 |

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.85E+05 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 1.8E-01 |

MESSAGE SUMMARY BELOW:

END

Appendix H-5.37
Groundwater Inhalation Calculations
Future Excavation Worker

Future Construction Worker Scenario
Estimation of Noncancer Hazard from Inhalation of Groundwater Vapors in Ambient Air
from On-site Shallow Groundwater in a Trench

PSC Site
 Rock Hill, South Carolina

$$ADD_w = C_w * VF * IR_a * EF * ED / BW * AT_n$$

where:

- C_w = representative concentration of contaminant in groundwater at the exposure point (mg/L)
- VF = volatilization factor((mg/m³ air / mg/L-H₂O))
- IR_a = daily groundwater ingestion rate (L/day)
- EF = exposure frequency: the number of days per year exposure occurs (day/year)
- ED = exposure duration: the typical duration of each exposure (years)
- BW = body weight (kg)
- AT_n = averaging Time (days)

| Chemical | C _w Conc. in Water ⁽¹⁾ (mg/L) | VF Volatilization Factor (mg/m ³ -air mg/L-H ₂ O) | IR _a Inhalation Rate (m ³ /day) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | BW Body Weight (kg) | AT _n Averaging Time Noncancer (days) | ADD _w Average Daily Dose (mg/kg-day) | Chronic Inhalation RfD (mg/kg-day) | Hazard Quotient (unitless) | Percent Distribution of Risk (%) |
|----------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------|------------------------------------------|------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|---------------------------------------------|----------------------------------|-------------------------------------------|
| Iron | 1.60 | NA | 20 | 250 | 1 | 70 | 365 | NA | NA | NA | 0.0% |
| Manganese | 2.10 | NA | 20 | 250 | 1 | 70 | 365 | NA | NA | NA | 0.0% |
| 2-Chlorophenol | 0.013 | NA | 20 | 250 | 1 | 70 | 365 | NA | NA | NA | 0.0% |
| Bis(2-ethylhexyl)phthalate | 0.003 | NA | 20 | 250 | 1 | 70 | 365 | NA | NA | NA | 0.0% |
| Naphthalene | 0.004 | 8.69E-06 | 20 | 250 | 1 | 70 | 365 | 7.5E-09 | 9.00E-04 | 8.3E-06 | 0.0% |
| 1,1,1-Trichloroethane | 1.64 | 4.02E-04 | 20 | 250 | 1 | 70 | 365 | 1.3E-04 | 1.43E+00 | 9.1E-05 | 0.2% |
| 1,1,2-Trichloroethane | 0.006 | 2.15E-05 | 20 | 250 | 1 | 70 | 365 | 2.5E-08 | 4.00E-03 | 6.3E-06 | 0.0% |
| 1,1-Dichloroethane | 0.22 | 1.25E-04 | 20 | 250 | 1 | 70 | 365 | 5.3E-06 | 5.00E+00 | 1.1E-06 | 0.0% |
| 1,1-Dichloroethene | 0.29 | 7.07E-04 | 20 | 250 | 1 | 70 | 365 | 4.0E-05 | 5.70E-02 | 7.0E-04 | 1.8% |
| 1,2-Dichlorobenzene | 0.043 | 3.95E-05 | 20 | 250 | 1 | 70 | 365 | 3.3E-07 | 4.00E-02 | 8.3E-06 | 0.0% |
| 1,2-Dichloroethane | 2.07 | 3.08E-05 | 20 | 250 | 1 | 70 | 365 | 1.2E-05 | 7.00E-01 | 1.8E-05 | 0.0% |
| 1,4-Dichlorobenzene | 0.02 | 4.98E-05 | 20 | 250 | 1 | 70 | 365 | 2.1E-07 | 7.14E-01 | 3.0E-07 | 0.0% |
| 4-Methyl-2-pentanone | 0.35 | 3.22E-06 | 20 | 250 | 1 | 70 | 365 | 2.2E-07 | 8.57E-01 | 2.6E-07 | 0.0% |
| Benzene | 0.045 | 1.47E-04 | 20 | 250 | 1 | 70 | 365 | 1.3E-06 | 8.57E-03 | 1.5E-04 | 0.4% |
| Chlorobenzene | 0.076 | 8.15E-05 | 20 | 250 | 1 | 70 | 365 | 1.2E-06 | 1.40E-02 | 8.7E-05 | 0.2% |
| Chloroethane | 0.10 | 7.18E-04 | 20 | 250 | 1 | 70 | 365 | 1.3E-05 | 2.90E+00 | 4.6E-06 | 0.0% |
| Chloroform | 0.019 | 1.15E-04 | 20 | 250 | 1 | 70 | 365 | 4.3E-07 | 1.40E-02 | 3.0E-05 | 0.1% |
| cis-1,2-Dichloroethene | 0.70 | 9.04E-05 | 20 | 250 | 1 | 70 | 365 | 1.2E-05 | 5.71E-02 | 2.2E-04 | 0.6% |
| Ethylbenzene | 0.97 | 1.77E-04 | 20 | 250 | 1 | 70 | 365 | 3.4E-05 | 2.90E-01 | 1.2E-04 | 0.3% |
| Isopropylbenzene | 0.68 | 2.26E-02 | 20 | 250 | 1 | 70 | 365 | 3.0E-03 | 1.10E-01 | 2.7E-02 | 70.4% |
| Methyl tert butyl ether | 0.022 | 1.93E-05 | 20 | 250 | 1 | 70 | 365 | 8.3E-08 | 8.57E-01 | NA | 0.0% |
| Methylcyclohexane | 0.40 | 2.28E-03 | 20 | 250 | 1 | 70 | 365 | 1.8E-04 | 8.57E-01 | NA | 0.0% |
| Methylene chloride | 0.20 | 6.67E-05 | 20 | 250 | 1 | 70 | 365 | 2.6E-06 | 8.57E-01 | 3.1E-06 | 0.0% |
| Tetrachloroethene | 0.48 | 3.98E-04 | 20 | 250 | 1 | 70 | 365 | 3.7E-05 | 1.00E-02 | 3.7E-03 | 9.5% |
| Toluene | 2.40 | 1.74E-04 | 20 | 250 | 1 | 70 | 365 | 8.1E-05 | 1.43E+00 | 5.7E-05 | 0.1% |
| Trichloroethene | 0.39 | 2.45E-04 | 20 | 250 | 1 | 70 | 365 | 1.9E-05 | 1.00E-02 | 1.9E-03 | 4.8% |
| Vinyl chloride | 0.063 | 8.63E-04 | 20 | 250 | 1 | 70 | 365 | 1.1E-05 | 2.86E-02 | 3.7E-04 | 1.0% |
| Xylenes (Total) | 3.34 | 1.77E-04 | 20 | 250 | 1 | 70 | 365 | 1.2E-04 | 2.86E-02 | 4.1E-03 | 10.4% |

Hazard Index = 3.9E-02

Notes:

(1): Groundwater EPCs are the maximum observed concentration (see Table 5-3)

"NA" = Not applicable.

**Future Construction Worker Scenario
Estimation of Cancer Risk from Inhalation of Vapors in Ambient Air
from On-Site Shallow Groundwater in a Trench**

PSC Site
Rock Hill, South Carolina

$$ADD_w = C_w * VF * IR_a * EF * ED / BW * AT_c$$

where:

C_w = representative concentration of contaminant in groundwater at the exposure point (mg/L)
 VF = volatilization factor((mg/m³air / mg/L-H₂O))
 IR_a = daily inhalation rate (m³/day)
 EF = exposure frequency: the number of days per year exposure occurs (day/year)
 ED = exposure duration: the typical duration of each exposure (years)
 BW = body weight (kg)
 AT_c = averaging Time (days)

| Chemical | C_w Conc. in Water ⁽¹⁾ (mg/L) | VF Volatilization Factor (mg/m ³ -air mg/L-H ₂ O) | IR_a Inhalation Rate (m ³ /day) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | BW Body Weight (kg) | AT_c Averaging Time Cancer (days) | ADD_w Average Daily Dose (mg/kg-day) | CSF_i Inhalation Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|----------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------|--------------------------------------------|--------------------------------|-------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Iron | 1.60 | NA | 20 | 250 | 1 | 70 | 25550 | NA | NA | NA | 0.0% |
| Manganese | 2.10 | NA | 20 | 250 | 1 | 70 | 25550 | NA | NA | NA | 0.0% |
| 2-Chlorophenol | 0.013 | NA | 20 | 250 | 1 | 70 | 25550 | NA | NA | NA | 0.0% |
| Bis(2-ethylhexyl)phthalate | 0.003 | NA | 20 | 250 | 1 | 70 | 25550 | NA | NA | NA | 0.0% |
| Naphthalene | 0.004 | 8.69E-06 | 20 | 250 | 1 | 70 | 25550 | 1.1E-10 | NA | NA | 0.0% |
| 1,1,1-Trichloroethane | 1.64 | 4.02E-04 | 20 | 250 | 1 | 70 | 25550 | 1.8E-06 | NA | NA | 0.0% |
| 1,1,2-Trichloroethane | 0.006 | 2.15E-05 | 20 | 250 | 1 | 70 | 25550 | 3.6E-10 | 5.60E-02 | 2.0E-11 | 0.0% |
| 1,1-Dichloroethane | 0.22 | 1.25E-04 | 20 | 250 | 1 | 70 | 25550 | 7.6E-08 | NA | NA | 0.0% |
| 1,1-Dichloroethene | 0.29 | 7.07E-04 | 20 | 250 | 1 | 70 | 25550 | 5.7E-07 | NA | NA | 0.0% |
| 1,2-Dichlorobenzene | 0.043 | 3.95E-05 | 20 | 250 | 1 | 70 | 25550 | 4.7E-09 | NA | NA | 0.0% |
| 1,2-Dichloroethane | 2.07 | 3.08E-05 | 20 | 250 | 1 | 70 | 25550 | 1.8E-07 | 9.10E-02 | NA | 0.0% |
| 1,4-Dichlorobenzene | 0.022 | 4.98E-05 | 20 | 250 | 1 | 70 | 25550 | 3.1E-09 | 2.20E-02 | 6.7E-11 | 0.1% |
| 4-Methyl-2-pentanone | 0.35 | 3.22E-06 | 20 | 250 | 1 | 70 | 25550 | 3.2E-09 | NA | NA | 0.0% |
| Benzene | 0.045 | 1.47E-04 | 20 | 250 | 1 | 70 | 25550 | 1.9E-08 | 2.70E-02 | 5.0E-10 | 0.4% |
| Chlorobenzene | 0.076 | 8.15E-05 | 20 | 250 | 1 | 70 | 25550 | 1.7E-08 | NA | NA | 0.0% |
| Chloroethane | 0.10 | 7.18E-04 | 20 | 250 | 1 | 70 | 25550 | 1.9E-07 | NA | NA | 0.0% |
| Chloroform | 0.019 | 1.15E-04 | 20 | 250 | 1 | 70 | 25550 | 6.1E-09 | 8.10E-02 | 4.9E-10 | 0.4% |
| cis-1,2-Dichloroethene | 0.70 | 9.04E-05 | 20 | 250 | 1 | 70 | 25550 | 1.8E-07 | NA | NA | 0.0% |
| Ethylbenzene | 0.97 | 1.77E-04 | 20 | 250 | 1 | 70 | 25550 | 4.8E-07 | NA | NA | 0.0% |
| Isopropylbenzene | 0.68 | 2.26E-02 | 20 | 250 | 1 | 70 | 25550 | 4.3E-05 | NA | NA | 0.0% |
| Methyl tert butyl ether | 0.022 | 1.93E-05 | 20 | 250 | 1 | 70 | 25550 | 1.2E-09 | NA | NA | 0.0% |
| Methylcyclohexane | 0.40 | 2.28E-03 | 20 | 250 | 1 | 70 | 25550 | 2.6E-06 | NA | NA | 0.0% |
| Methylene chloride | 0.20 | 6.67E-05 | 20 | 250 | 1 | 70 | 25550 | 3.8E-08 | 1.65E-03 | NA | 0.0% |
| Tetrachloroethene | 0.48 | 3.98E-04 | 20 | 250 | 1 | 70 | 25550 | 5.3E-07 | 2.10E-02 | 1.1E-08 | 9.7% |
| Toluene | 2.40 | 1.74E-04 | 20 | 250 | 1 | 70 | 25550 | 1.2E-06 | NA | NA | 0.0% |
| Trichloroethene | 0.39 | 2.45E-04 | 20 | 250 | 1 | 70 | 25550 | 2.7E-07 | 3.85E-01 | 1.0E-07 | 89.4% |
| Vinyl chloride | 0.063 | 8.63E-04 | 20 | 250 | 1 | 70 | 25550 | 1.5E-07 | 1.54E-02 | NA | 0.0% |
| Xylenes (Total) | 3.34 | 1.77E-04 | 20 | 250 | 1 | 70 | 25550 | 1.7E-06 | NA | NA | 0.0% |

Excess Lifetime Cancer Risk = 1.1E-07

Notes:

(1): Groundwater EPCs are the maximum observed concentration (see Table 5-3)

"NA" = Not applicable.

Volatilization Calculation for Groundwater to Ambient Air for Construction Workers in a Trench

PCS Site
Rock Hill, SC

$$VF_{wamb} = H * 1000 / (1 + (U_{air} * d_{air} * L_{GW} / (W * D_{ws}^{eff})))$$

$$D_{ws}^{eff} = (h_{cap} + h_v) / (h_{cap} / D_{cap}^{eff} + h_v / D_s^{eff})$$

$$D_{cap}^{eff} = (D^{air} * q_{acap} * 3.33 / q_T^2) + (D^{wat} * q_{wcap} * 3.33 / q_T^2 / H)$$

$$D_s^{eff} = (D^{air} * q_{as} * 3.33 / q_T^2) + (D^{wat} * q_{ws} * 3.33 / q_T^2 / H)$$

| Parameter | Definition | Units | Source | Benzene | Chlorobenzene | Chloroethane | Chloroform | 1,2-Dichlorobenzene | 1,4-Dichlorobenzene | 1,1-Dichloroethane | 1,2-Dichloroethane | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Ethylbenzene | Isopropylbenzene (Cumene) | Methylcyclohexane | Methylene Chloride |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------|-----------|---------------|--------------|------------|---------------------|---------------------|--------------------|--------------------|--------------------|------------------------|--------------|---------------------------|-------------------|--------------------|
| VF_{wamb} | Groundwater @ ambient (outdoor) vapors | (mg/m ³ -air) / (mg/L-H ₂ O) | Calculated | 1.473E-04 | 8.154E-05 | 7.178E-04 | 1.146E-04 | 3.946E-05 | 4.984E-05 | 1.254E-04 | 3.076E-05 | 7.065E-04 | 9.035E-05 | 1.773E-04 | 2.260E-02 | 2.275E-03 | 6.673E-05 |
| D_{ws}^{eff} | Effective diffusion coefficient between groundwater and soil surface | cm ² /s | Calculated | 6.500E-03 | 5.396E-03 | 2.000E-02 | 7.684E-03 | 5.108E-03 | 5.105E-03 | 5.482E-03 | 7.716E-03 | 6.642E-03 | 5.442E-03 | 5.537E-03 | 4.795E-03 | 5.423E-03 | 7.474E-03 |
| D_{cap}^{eff} | Effective diffusion coefficient through capillary fringe | cm ² /s | Calculated | 4.549E-04 | 3.787E-04 | 1.395E-03 | 5.386E-04 | 3.607E-04 | 3.594E-04 | 3.842E-04 | 5.491E-04 | 4.633E-04 | 3.824E-04 | 3.870E-04 | 3.342E-04 | 3.780E-04 | 5.269E-04 |
| D_s^{eff} | Effective diffusion coefficient in soil based on vapor-phase concentration | cm ² /s | Calculated | 8.087E-03 | 6.709E-03 | 2.490E-02 | 9.557E-03 | 6.341E-03 | 6.341E-03 | 6.819E-03 | 9.559E-03 | 8.271E-03 | 6.764E-03 | 6.892E-03 | 5.973E-03 | 6.754E-03 | 9.282E-03 |
| D^{air} | diffusion coefficient in air | cm ² /s | EPA 2004 | 8.80E-02 | 7.30E-02 | 2.71E-01 | 1.04E-01 | 6.90E-02 | 6.90E-02 | 7.42E-02 | 1.04E-01 | 9.00E-02 | 7.36E-02 | 7.50E-02 | 6.50E-02 | 7.35E-02 | 1.01E-01 |
| D^{wat} | diffusion coefficient in water | cm ² /s | EPA 2004 | 9.80E-06 | 8.70E-06 | 1.15E-05 | 1.00E-05 | 7.90E-06 | 7.90E-06 | 1.05E-05 | 9.90E-06 | 1.04E-05 | 1.13E-05 | 7.80E-06 | 7.10E-06 | 8.52E-06 | 1.17E-05 |
| f_{oc} | fraction of organic carbon in soil | g-C/g-soil | EPA, 2004 | 0.0060 | 0.0060 | 0.0060 | 0.0060 | 0.0060 | 0.0060 | 0.0060 | 0.0060 | 0.0060 | 0.0060 | 0.0060 | 0.0060 | 0.0060 | 0.0060 |
| H | Henry's law constant | cm ³ -H ₂ O/cm ³ -air | Chemical Specific, EPA 2004 | 2.28E-01 | 1.52E-01 | 3.61E-01 | 1.50E-01 | 7.77E-02 | 9.82E-02 | 2.30E-01 | 4.01E-02 | 1.07E+00 | 1.67E-01 | 3.22E-01 | 4.74E+01 | 4.22E+00 | 8.98E-02 |
| h_{cap} | thickness of capillary fringe | cm | Site Specific | 4.88 | 4.88 | 4.88 | 4.88 | 4.88 | 4.88 | 4.88 | 4.88 | 4.88 | 4.88 | 4.88 | 4.88 | 4.88 | 4.88 |
| h_v | thickness of vadose zone | cm | Site Specific | 330.4 | 330.4 | 330.4 | 330.4 | 330.4 | 330.4 | 330.4 | 330.4 | 330.4 | 330.4 | 330.4 | 330.4 | 330.4 | 330.4 |
| k_{oc} | carbon-water sorption coefficient | cm ³ -H ₂ O/g-C | EPA 2004 | 5.89E+01 | 2.19E+02 | 4.40E+00 | 3.98E+01 | 6.17E+02 | 6.17E+02 | 3.16E+01 | 1.74E+01 | 5.89E+01 | 3.55E+01 | 3.63E+02 | 4.89E+02 | 7.85E+01 | 1.17E+01 |
| k_s | soil-water sorption coefficient = $f_{oc} * k_{oc}$ | cm ³ -H ₂ O/g-soil | Calculated | 0.35 | 1.31 | 0.03 | 0.24 | | | 0.10 | | | | | | | 0.07 |
| L_{GW} | depth to groundwater = $h_{cap} + h_v$ | cm | Site Specific | 335.28 | 335.28 | 335.28 | 335.28 | 335.28 | 335.28 | 335.28 | 335.28 | 335.28 | 335.28 | 335.28 | 335.28 | 335.28 | 335.28 |
| U_{air} | wind speed above ground surface in ambient mixing zone width of source area parallel to wind, or groundwater flow direction | cm/s | Professional Judgment | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 |
| W | | cm | Site Specific | 457.2 | 457.2 | 457.2 | 457.2 | 457.2 | 457.2 | 457.2 | 457.2 | 457.2 | 457.2 | 457.2 | 457.2 | 457.2 | 457.2 |
| d_{air} | ambient air mixing zone height | cm | Site Specific | 304.8 | 304.8 | 304.8 | 304.8 | 304.8 | 304.8 | 304.8 | 304.8 | 304.8 | 304.8 | 304.8 | 304.8 | 304.8 | 304.8 |
| q_{acap} | volumetric air content in capillary fringe soils | cm ³ -air/cm ³ -soil | EPA 2004 | 0.122 | 0.122 | 0.122 | 0.122 | 0.122 | 0.122 | 0.122 | 0.122 | 0.122 | 0.122 | 0.122 | 0.122 | 0.122 | 0.122 |
| q_{as} | volumetric air content in vadose zone soils | cm ³ -air/cm ³ -soil | EPA 2004 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 |
| q_T | total soil porosity | cm ³ /cm ³ -soil | EPA 2004 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 |
| q_{wcap} | volumetric water content in capillary fringe soils | cm ³ -H ₂ O/cm ³ -soil | EPA 2004 | 0.253 | 0.253 | 0.253 | 0.253 | 0.253 | 0.253 | 0.253 | 0.253 | 0.253 | 0.253 | 0.253 | 0.253 | 0.253 | 0.253 |
| q_{ws} | volumetric water content in vadose zone soils | cm ³ -H ₂ O/cm ³ -soil | EPA 2004 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 |
| ρ_B | soil bulk density | g-soil/cm ³ -soil | EPA 2004 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66 |

Notes:
EPA 2004. User's Guide for Evaluating Subsurface Vapor Intrusion Into Buildings.

Volatilization Calculation for Groundwater to Ambient Air for Construction Workers in a Trench

PCS Site
Rock Hill, SC

$$VF_{wamb} = H * 1000 / (1 + (U_{air} * d_{air} * L_{GW} / (W * D_{ws}^{eff})))$$

$$D_{ws}^{eff} = (h_{cap} + h_v) / (h_{cap} / D_{cap}^{eff} + h_v / D_s^{eff})$$

$$D_{cap}^{eff} = (D_{air} * q_{dcap} * 3.33 / q_T^2) + (D_{wat} * q_{wcap} * 3.33 / q_T^2 / H)$$

$$D_s^{eff} = (D_{air} * q_{sw} * 3.33 / q_T^2) + (D_{wat} * q_{ws} * 3.33 / q_T^2 / H)$$

| Parameter | Definition | Units | Source | 4-Methyl-2-pentanone | Methyl-tert-butyl ether | Naphthalene | Tetrachloroethene | Toluene | 1,1,1-Trichloroethane | 1,1,2-Trichloroethane | Trichloroethylene | Vinyl Chloride | Total Xylenes |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------|----------------------|-------------------------|-------------|-------------------|-----------|-----------------------|-----------------------|-------------------|----------------|---------------|
| VF_{wamb} | Groundwater @ ambient (outdoor) vapors | (mg/m ³ -air) / (mg/L-H ₂ O) | Calculated | 3.222E-06 | 1.933E-05 | 8.695E-06 | 3.983E-04 | 1.737E-04 | 4.023E-04 | 2.149E-05 | 2.447E-04 | 8.632E-04 | 1.773E-04 |
| D_{ws}^{eff} | Effective diffusion coefficient between groundwater and soil surface | cm ² /s | Calculated | 5.747E-03 | 7.596E-03 | 4.417E-03 | 5.314E-03 | 6.424E-03 | 5.757E-03 | 5.796E-03 | 5.832E-03 | 7.822E-03 | 5.678E-03 |
| D_{cap}^{eff} | Effective diffusion coefficient through capillary fringe | cm ² /s | Calculated | 4.663E-04 | 5.483E-04 | 3.254E-04 | 3.708E-04 | 4.491E-04 | 4.018E-04 | 4.148E-04 | 4.074E-04 | 5.456E-04 | 3.969E-04 |
| D_s^{eff} | Effective diffusion coefficient in soil based on vapor-phase concentration | cm ² /s | Calculated | 6.901E-03 | 9.376E-03 | 5.424E-03 | 6.616E-03 | 7.995E-03 | 7.168E-03 | 7.169E-03 | 7.260E-03 | 9.741E-03 | 7.067E-03 |
| D_{air} | diffusion coefficient in air | cm ² /s | EPA 2004 | 7.50E-02 | 1.02E-01 | 5.90E-02 | 7.20E-02 | 8.70E-02 | 7.80E-02 | 7.80E-02 | 7.90E-02 | 1.06E-01 | 7.69E-02 |
| D_{wat} | diffusion coefficient in water | cm ² /s | EPA 2004 | 7.80E-06 | 1.05E-05 | 7.50E-06 | 8.20E-06 | 8.60E-06 | 8.80E-06 | 8.80E-06 | 9.10E-06 | 1.23E-05 | 8.44E-06 |
| f_{oc} | fraction of organic carbon in soil | g-C/g-soil | EPA, 2004 | 0.0060 | 0.0060 | 0.0060 | 0.0060 | 0.0060 | 0.0060 | 0.0060 | 0.0060 | 0.0060 | 0.0060 |
| H | Henry's law constant | cm ³ -H ₂ O/cm ³ -air | Chemical Specific, EPA 2004 | 5.64E-03 | 2.56E-02 | 1.98E-02 | 7.54E-01 | 2.72E-01 | 7.03E-01 | 3.73E-02 | 4.22E-01 | 1.11E+00 | 3.14E-01 |
| h_{cap} | thickness of capillary fringe | cm | Site Specific | 4.88 | 4.88 | 4.88 | 4.88 | 4.88 | 4.88 | 4.88 | 4.88 | 4.88 | 4.88 |
| h_v | thickness of vadose zone | cm | Site Specific | 330.4 | 330.4 | 330.4 | 330.4 | 330.4 | 330.4 | 330.4 | 330.4 | 330.4 | 330.4 |
| k_{oc} | carbon-water sorption coefficient | cm ³ -H ₂ O/g-C | EPA 2004 | 9.06E+00 | 7.26E+00 | 2.00E+03 | 1.55E+02 | 1.82E+02 | 1.10E+02 | 5.01E+01 | 1.66E+02 | 1.86E+01 | 3.89E+02 |
| k_s | soil-water sorption coefficient = $f_{oc} * k_{oc}$ | cm ³ -H ₂ O/g-soil | Calculated | | | | 0.93 | 1.09 | | | 1.00 | 0.11 | 2.33 |
| L_{GW} | depth to groundwater = $h_{cap} + h_v$ | cm | Site Specific | 335.28 | 335.28 | 335.28 | 335.28 | 335.28 | 335.28 | 335.28 | 335.28 | 335.28 | 335.28 |
| U_{air} | wind speed above ground surface in ambient mixing zone width of source area parallel to wind, or groundwater flow direction | cm/s | Professional Judgment | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 |
| W | width of source area parallel to wind, or groundwater flow direction | cm | Site Specific | 457.2 | 457.2 | 457.2 | 457.2 | 457.2 | 457.2 | 457.2 | 457.2 | 457.2 | 457.2 |
| d_{air} | ambient air mixing zone height | cm | Site Specific | 304.8 | 304.8 | 304.8 | 304.8 | 304.8 | 304.8 | 304.8 | 304.8 | 304.8 | 304.8 |
| q_{acap} | volumetric air content in capillary fringe soils | cm ³ -air/cm ³ -soil | EPA 2004 | 0.122 | 0.122 | 0.122 | 0.122 | 0.122 | 0.122 | 0.122 | 0.122 | 0.122 | 0.122 |
| q_{as} | volumetric air content in vadose zone soils | cm ³ -air/cm ³ -soil | EPA 2004 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 |
| q_T | total soil porosity | cm ³ /cm ³ -soil | EPA 2004 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 |
| q_{wcap} | volumetric water content in capillary fringe soils | cm ³ -H ₂ O/cm ³ -soil | EPA 2004 | 0.253 | 0.253 | 0.253 | 0.253 | 0.253 | 0.253 | 0.253 | 0.253 | 0.253 | 0.253 |
| q_{ws} | volumetric water content in vadose zone soils | cm ³ -H ₂ O/cm ³ -soil | EPA 2004 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 |
| ρ_B | soil bulk density | g-soil/cm ³ -soil | EPA 2004 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66 |

Notes:
EPA 2004. User's Guide for Evaluating Subsurface Vapor Intrusion Into Buildings.

Appendix H-5.38
Groundwater Inhalation Calculations
Future Resident

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------|
| 95578 | 1.30E+01 | 2-Chlorophenol |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 5.01E-02 | 9.46E-06 | 3.90E-04 | 25 | 9,572 | 447.53 | 675.00 | 3.88E+02 | 2.20E+04 | 0.0E+00 | 1.8E-02 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3) | Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3) | Vadose zone soil intrinsic permeability, k_i (cm^2) | Vadose zone soil relative air permeability, k_{rg} (cm^2) | Vadose zone soil effective vapor permeability, k_v (cm^2) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm^3/cm^3) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm^3/s) | Area of enclosed space below grade, A_B (cm^2) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm- m^3/mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm^2/s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm^2/s) | Total overall effective diffusion coefficient, D_T^{eff} (cm^2/s) |
|-------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
|-------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|--------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 11,667 | 2.11E-04 | 8.90E-03 | 1.77E-04 | 2.91E-03 | 2.52E-04 | 7.50E-04 |
|----------|----------|----------|-----|--------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} ($\mu\text{g}/\text{m}^3$) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm^3/s) | Crack effective diffusion coefficient, D^{crack} (cm^2/s) | Area of crack, A_{crack} (cm^2) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ ($\mu\text{g}/\text{m}^3$) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|-----------------------------------------|------------------------------------------|---------------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------|
|-----------------------------------------|------------------------------------------|---------------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 1.16E+02 | 0.10 | 1.55E+00 | 2.91E-03 | 4.00E+02 | 6.17E+05 | 4.74E-05 | 5.49E-03 | NA | 1.8E-02 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 2.20E+07 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 3.0E-04 |

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

VLOOKUP TABLES

| Soil Properties Lookup Table | |
|------------------------------|-----------------------|
| SCS Soil Type | K _s (cm/h) |
| C | 0.61 |
| CL | 0.34 |
| L | 0.50 |
| LS | 4.38 |
| S | 26.78 |
| SC | 0.47 |
| SCL | 0.55 |
| SI | 1.82 |
| SIC | 0.40 |
| SICL | 0.46 |
| SIL | 0.76 |
| SL | 1.60 |

| Chemical Properties Lookup Table | | | | | |
|----------------------------------|---------------------------------|----------------------------------------------------------|-------------------------------------------|----------------------|----------------------|
| CAS No. | Chemical | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) | URF extrapolated (X) | RfC extrapolated (X) |
| 56235 | Carbon tetrachloride | 1.5E-05 | 0.0E+00 | | |
| 57749 | Chlordane | 1.0E-04 | 7.0E-04 | | |
| 58899 | gamma-HCH (Lindane) | 3.7E-04 | 1.1E-03 | X | X |
| 60297 | Ethyl ether | 0.0E+00 | 7.0E-01 | | X |
| 60571 | Dieldrin | 4.6E-03 | 1.8E-04 | | X |
| 67641 | Acetone | 0.0E+00 | 3.5E-01 | | X |
| 67663 | Chloroform | 2.3E-05 | 4.9E-02 | | |
| 67721 | Hexachloroethane | 4.0E-06 | 3.5E-03 | | X |
| 71432 | Benzene | 7.8E-06 | 3.0E-02 | | |
| 71556 | 1,1,1-Trichloroethane | 0.0E+00 | 5.0E+00 | | |
| 72435 | Methoxychlor | 0.0E+00 | 1.8E-02 | | X |
| 72559 | DDE | 9.7E-05 | 0.0E+00 | X | |
| 74839 | Methyl bromide | 0.0E+00 | 5.0E-03 | | |
| 74873 | Methyl chloride (chloromethane) | 1.0E-06 | 9.0E-02 | | |
| 74908 | Hydrogen cyanide | 0.0E+00 | 3.0E-03 | | |
| 74953 | Methylene bromide | 0.0E+00 | 3.5E-02 | | X |
| 75003 | Chloroethane (ethyl chloride) | 8.3E-07 | 1.0E+00 | X | |
| 75014 | Vinyl chloride (chloroethene) | 4.4E-06 | 1.0E-01 | | |
| 75058 | Acetonitrile | 0.0E+00 | 6.0E-02 | | |
| 75070 | Acetaldehyde | 2.2E-06 | 9.0E-03 | | |
| 75092 | Methylene chloride | 4.7E-07 | 1.1E+00 | | |
| 75150 | Carbon disulfide | 0.0E+00 | 7.0E-01 | | |
| 75218 | Ethylene oxide | 1.0E-04 | 0.0E+00 | | |
| 75252 | Bromoform | 1.1E-06 | 7.0E-02 | | X |
| 75274 | Bromodichloromethane | 1.8E-05 | 7.0E-02 | X | X |
| 75296 | 2-Chloropropane | 0.0E+00 | 1.0E-01 | | |
| 75343 | 1,1-Dichloroethane | 0.0E+00 | 4.9E-01 | | |
| 75354 | 1,1-Dichloroethylene | 0.0E+00 | 2.0E-01 | | |
| 75456 | Chlorodifluoromethane | 0.0E+00 | 5.0E+01 | | |
| 75694 | Trichlorofluoromethane | 0.0E+00 | 7.0E-01 | | |

VLOOKUP TABLES

| | | | | | |
|--------|-------------------------------------|---------|---------|---|---|
| 75718 | Dichlorodifluoromethane | 0.0E+00 | 2.0E-01 | | |
| 76131 | 1,1,2-Trichloro-1,2,2-trifluoroetha | 0.0E+00 | 3.0E+01 | | |
| 76448 | Heptachlor | 1.3E-03 | 1.8E-03 | | X |
| 77474 | Hexachlorocyclopentadiene | 0.0E+00 | 2.0E-04 | | |
| 78831 | Isobutanol | 0.0E+00 | 1.1E+00 | | X |
| 78875 | 1,2-Dichloropropane | 1.9E-05 | 4.0E-03 | X | |
| 78933 | Methylethylketone (2-butanone) | 0.0E+00 | 5.0E+00 | | |
| 79005 | 1,1,2-Trichloroethane | 1.6E-05 | 1.4E-02 | | X |
| 79016 | Trichloroethylene | 1.1E-04 | 3.5E-02 | X | |
| 79209 | Methyl acetate | 0.0E+00 | 3.5E+00 | | X |
| 79345 | 1,1,2,2-Tetrachloroethane | 5.8E-05 | 2.1E-01 | | X |
| 79469 | 2-Nitropropane | 2.7E-03 | 2.0E-02 | | |
| 80626 | Methylmethacrylate | 0.0E+00 | 7.0E-01 | | |
| 83329 | Acenaphthene | 0.0E+00 | 2.1E-01 | | X |
| 86737 | Fluorene | 0.0E+00 | 1.4E-01 | | X |
| 87683 | Hexachloro-1,3-butadiene | 2.2E-05 | 7.0E-04 | | X |
| 88722 | o-Nitrotoluene | 0.0E+00 | 3.5E-02 | | X |
| 91203 | Naphthalene | 0.0E+00 | 3.0E-03 | | |
| 91576 | 2-Methylnaphthalene | 0.0E+00 | 7.0E-02 | | X |
| 92524 | Biphenyl | 0.0E+00 | 1.8E-01 | | X |
| 95476 | o-Xylene | 0.0E+00 | 1.0E-01 | | |
| 95501 | 1,2-Dichlorobenzene | 0.0E+00 | 1.4E-01 | | |
| 95578 | 2-Chlorophenol | 0.0E+00 | 1.8E-02 | | X |
| 95636 | 1,2,4-Trimethylbenzene | 0.0E+00 | 6.0E-03 | | |
| 96184 | 1,2,3-Trichloropropane | 5.7E-04 | 4.9E-03 | X | |
| 96333 | Methyl acrylate | 0.0E+00 | 1.1E-01 | | X |
| 97632 | Ethylmethacrylate | 0.0E+00 | 3.2E-01 | | X |
| 98066 | tert-Butylbenzene | 0.0E+00 | 1.4E-01 | | X |
| 98828 | Cumene | 0.0E+00 | 4.0E-01 | | |
| 98862 | Acetophenone | 0.0E+00 | 3.5E-01 | | X |
| 98953 | Nitrobenzene | 0.0E+00 | 2.0E-03 | | |
| 100414 | Ethylbenzene | 0.0E+00 | 1.0E+00 | | |
| 100425 | Styrene | 0.0E+00 | 1.0E+00 | | |
| 100447 | Benzylchloride | 4.9E-05 | 0.0E+00 | X | |
| 100527 | Benzaldehyde | 0.0E+00 | 3.5E-01 | | X |
| 103651 | n-Propylbenzene | 0.0E+00 | 1.4E-01 | | X |
| 104518 | n-Butylbenzene | 0.0E+00 | 1.4E-01 | | X |
| 106423 | p-Xylene | 0.0E+00 | 1.0E-01 | | |
| 106467 | 1,4-Dichlorobenzene | 6.3E-06 | 8.0E-01 | | |
| 106934 | 1,2-Dibromoethane (ethylene dib | 2.2E-04 | 2.0E-04 | | |
| 106990 | 1,3-Butadiene | 3.0E-02 | 2.0E-03 | | |
| 107028 | Acrolein | 0.0E+00 | 2.0E-05 | | |
| 107062 | 1,2-Dichloroethane | 2.6E-05 | 2.5E+00 | | |
| 107131 | Acrylonitrile | 6.8E-05 | 2.0E-03 | | |
| 108054 | Vinyl acetate | 0.0E+00 | 2.0E-01 | | |
| 108101 | Methylisobutylketone (4-methyl-2 | 0.0E+00 | 3.0E+00 | | |
| 108383 | m-Xylene | 0.0E+00 | 1.0E-01 | | |
| 108678 | 1,3,5-Trimethylbenzene | 0.0E+00 | 6.0E-03 | | |
| 108872 | Methylcyclohexane | 0.0E+00 | 3.0E+00 | | |
| 108883 | Toluene | 0.0E+00 | 5.0E+00 | | |
| 108907 | Chlorobenzene | 0.0E+00 | 4.9E-02 | | |
| 109693 | 1-Chlorobutane | 0.0E+00 | 1.4E+00 | | X |
| 110009 | Furan | 0.0E+00 | 3.5E-03 | | X |
| 110543 | Hexane | 0.0E+00 | 2.0E-01 | | |
| 111444 | Bis(2-chloroethyl)ether | 3.3E-04 | 0.0E+00 | | |

VLOOKUP TABLES

| | | | | | |
|---------|----------------------------------|---------|---------|---|---|
| 115297 | Endosulfan | 0.0E+00 | 2.1E-02 | | X |
| 118741 | Hexachlorobenzene | 4.6E-04 | 2.8E-03 | | X |
| 120821 | 1,2,4-Trichlorobenzene | 0.0E+00 | 4.0E-03 | | |
| 123739 | Crotonaldehyde (2-butenal) | 5.4E-04 | 0.0E+00 | X | |
| 124481 | Chlorodibromomethane | 2.4E-05 | 7.0E-02 | X | X |
| 126987 | Methacrylonitrile | 0.0E+00 | 7.0E-04 | | |
| 126998 | 2-Chloro-1,3-butadiene (chloropr | 0.0E+00 | 7.0E-03 | | |
| 127184 | Tetrachloroethylene | 6.0E-06 | 3.5E-02 | | |
| 129000 | Pyrene | 0.0E+00 | 1.1E-01 | | X |
| 132649 | Dibenzofuran | 0.0E+00 | 1.4E-02 | | X |
| 135988 | sec-Butylbenzene | 0.0E+00 | 1.4E-01 | | X |
| 141786 | Ethylacetate | 0.0E+00 | 3.2E+00 | | X |
| 156592 | cis-1,2-Dichloroethylene | 0.0E+00 | 2.0E-01 | | X |
| 156605 | trans-1,2-Dichloroethylene | 0.0E+00 | 7.0E-02 | | X |
| 205992 | Benzo(b)fluoranthene | 2.1E-04 | 0.0E+00 | X | |
| 218019 | Chrysene | 2.1E-06 | 0.0E+00 | X | |
| 309002 | Aldrin | 4.9E-03 | 1.1E-04 | | X |
| 319846 | alpha-HCH (alpha-BHC) | 1.8E-03 | 0.0E+00 | | |
| 541731 | 1,3-Dichlorobenzene | 0.0E+00 | 1.1E-01 | | X |
| 542756 | 1,3-Dichloropropene | 4.0E-06 | 2.0E-02 | | |
| 630206 | 1,1,1,2-Tetrachloroethane | 7.4E-06 | 1.1E-01 | | X |
| 1634044 | MTBE | 0.0E+00 | 3.0E+00 | | |
| 7439976 | Mercury (elemental) | 0.0E+00 | 3.0E-04 | | |

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------|
| 71556 | 1.64E+03 | 1,1,1-Trichloroethane |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.80E-02 | 8.80E-06 | 1.72E-02 | 25 | 7,136 | 347.24 | 545.00 | 1.10E+02 | 1.33E+03 | 0.0E+00 | 5.0E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 7,820 | 1.14E-02 | 4.79E-01 | 1.77E-04 | 4.50E-03 | 1.38E-04 | 4.67E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 7.88E+05 | 0.10 | 1.55E+00 | 4.50E-03 | 4.00E+02 | 5.53E+03 | 4.18E-05 | 3.29E+01 | NA | 5.0E+00 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.33E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 6.3E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------|
| 79005 | 6.00E+00 | 1,1,2-Trichloroethane |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.80E-02 | 8.80E-06 | 9.11E-04 | 25 | 8,322 | 386.15 | 602.00 | 5.01E+01 | 4.42E+03 | 1.6E-05 | 1.4E-02 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 9,507 | 5.53E-04 | 2.33E-02 | 1.77E-04 | 4.51E-03 | 1.94E-04 | 6.37E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|
| 250 | 200 | 1.40E+02 | 0.10 | 1.55E+00 | 4.51E-03 | 4.00E+02 | 5.46E+03 | 4.56E-05 | 6.38E-03 | 1.6E-05 | 1.4E-02 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 4.42E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 4.2E-08 | 4.4E-04 |

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------|
| 75343 | 2.16E+02 | 1,1-Dichloroethane |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

CHEMICAL PROPERTIES SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^{\circ}\text{K}$) | Critical temperature, T_C ($^{\circ}\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.42E-02 | 1.05E-05 | 5.61E-03 | 25 | 6,895 | 330.55 | 523.00 | 3.16E+01 | 5.06E+03 | 0.0E+00 | 4.9E-01 |

END

INTERMEDIATE CALCULATIONS SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{ie} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|-------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm·m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|----------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 7,384 | 3.80E-03 | 1.60E-01 | 1.77E-04 | 4.28E-03 | 1.38E-04 | 4.67E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|--------------------------------------|---------------------------------------|----------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------|
| 250 | 200 | 3.46E+04 | 0.10 | 1.55E+00 | 4.28E-03 | 4.00E+02 | 8.58E+03 | 4.18E-05 | 1.45E+00 | NA | 4.9E-01 |

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 5.06E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 2.8E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------|
| 75354 | 2.89E+02 | 1,1-Dichloroethylene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|
| 9.00E-02 | 1.04E-05 | 2.60E-02 | 25 | 6,247 | 304.75 | 576.05 | 5.89E+01 | 2.25E+03 | 0.0E+00 | 2.0E-01 |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 6,353 | 1.86E-02 | 7.86E-01 | 1.77E-04 | 5.20E-03 | 1.58E-04 | 5.35E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 2.27E+05 | 0.10 | 1.55E+00 | 5.20E-03 | 4.00E+02 | 1.75E+03 | 4.35E-05 | 9.89E+00 | NA | 2.0E-01 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 2.25E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 4.7E-02 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------|
| 107062 | 2.07E+03 | 1,2-Dichloroethane |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm ² /s) | Diffusivity in water, D_w (cm ² /s) | Henry's law constant at reference temperature, H (atm·m ³ /mol) | Henry's law constant reference temperature, T_R (°C) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B (°K) | Critical temperature, T_C (°K) | Organic carbon partition coefficient, K_{oc} (cm ³ /g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|---------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------|
| 1.04E-01 | 9.90E-06 | 9.77E-04 | 25 | 7,643 | 356.65 | 561.00 | 1.74E+01 | 8.52E+03 | 2.6E-05 | 2.5E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 8,457 | 6.26E-04 | 2.64E-02 | 1.77E-04 | 6.01E-03 | 2.38E-04 | 7.89E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|
| 250 | 200 | 5.46E+04 | 0.10 | 1.55E+00 | 6.01E-03 | 4.00E+02 | 6.37E+02 | 4.80E-05 | 2.62E+00 | 2.6E-05 | 2.5E+00 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 8.52E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 2.8E-05 | 1.0E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|--------------------------------------------------------------|---------------------------------------------------------------------------|---------------------|
| 95501 | 4.30E+01 | 1,2-Dichlorobenzene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|----------------------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

CHEMICAL PROPERTIES SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^{\circ}\text{K}$) | Critical temperature, T_C ($^{\circ}\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 6.90E-02 | 7.90E-06 | 1.90E-03 | 25 | 9,700 | 453.57 | 705.00 | 6.17E+02 | 1.56E+02 | 0.0E+00 | 1.4E-01 |

END

INTERMEDIATE CALCULATIONS SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{ie} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|-------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm·m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|----------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 11,627 | 1.03E-03 | 4.34E-02 | 1.77E-04 | 3.99E-03 | 1.48E-04 | 4.92E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|--------------------------------------|---------------------------------------|----------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------|
| 250 | 200 | 1.86E+03 | 0.10 | 1.55E+00 | 3.99E-03 | 4.00E+02 | 1.69E+04 | 4.25E-05 | 7.92E-02 | NA | 1.4E-01 |

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.56E+05 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 5.4E-04 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------|
| 106467 | 2.20E+01 | 1,4-Dichlorobenzene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 6.90E-02 | 7.90E-06 | 2.39E-03 | 25 | 9,271 | 447.21 | 684.75 | 6.17E+02 | 7.90E+01 | 6.3E-06 | 8.0E-01 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|--------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 11,181 | 1.33E-03 | 5.61E-02 | 1.77E-04 | 3.99E-03 | 1.41E-04 | 4.73E-04 |
|----------|----------|----------|-----|--------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|
| 250 | 200 | 1.23E+03 | 0.10 | 1.55E+00 | 3.99E-03 | 4.00E+02 | 1.69E+04 | 4.19E-05 | 5.17E-02 | 6.3E-06 | 8.0E-01 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 7.90E+04 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 1.3E-07 | 6.2E-05 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------|
| 71432 | 4.50E+01 | Benzene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 8.80E-02 | 9.80E-06 | 5.54E-03 | 25 | 7,342 | 353.24 | 562.16 | 5.89E+01 | 1.79E+03 | 7.8E-06 | 3.0E-02 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3) | Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3) | Vadose zone soil intrinsic permeability, k_i (cm^2) | Vadose zone soil relative air permeability, k_{rg} (cm^2) | Vadose zone soil effective vapor permeability, k_v (cm^2) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm^3/cm^3) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm^3/s) | Area of enclosed space below grade, A_B (cm^2) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm- m^3/mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm^2/s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm^2/s) | Total overall effective diffusion coefficient, D_T^{eff} (cm^2/s) |
|-------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 8,061 | 3.62E-03 | 1.53E-01 | 1.77E-04 | 5.08E-03 | 1.62E-04 | 5.48E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} ($\mu\text{g}/\text{m}^3$) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm^3/s) | Crack effective diffusion coefficient, D^{crack} (cm^2/s) | Area of crack, A_{crack} (cm^2) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ ($\mu\text{g}/\text{m}^3$) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|-----------------------------------------|------------------------------------------|---------------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------|
| 250 | 200 | 6.87E+03 | 0.10 | 1.55E+00 | 5.08E-03 | 4.00E+02 | 2.07E+03 | 4.38E-05 | 3.01E-01 | 7.8E-06 | 3.0E-02 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.79E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 9.7E-07 | 9.6E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------|
| 108907 | 7.60E+01 | Chlorobenzene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.30E-02 | 8.70E-06 | 3.69E-03 | 25 | 8,410 | 404.87 | 632.40 | 2.19E+02 | 4.72E+02 | 0.0E+00 | 4.9E-02 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 9,743 | 2.21E-03 | 9.32E-02 | 1.77E-04 | 4.22E-03 | 1.41E-04 | 4.74E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 7.09E+03 | 0.10 | 1.55E+00 | 4.22E-03 | 4.00E+02 | 9.94E+03 | 4.20E-05 | 2.97E-01 | NA | 4.9E-02 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 4.72E+05 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 5.8E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------|
| 75003 | 9.60E+01 | Chloroethane (ethyl chloride) |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based
groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 2.71E-01 | 1.15E-05 | 8.80E-03 | 25 | 5,879 | 285.30 | 460.40 | 4.40E+00 | 5.68E+03 | 8.3E-07 | 1.0E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 5,835 | 6.48E-03 | 2.73E-01 | 1.77E-04 | 1.56E-02 | 4.75E-04 | 1.61E-03 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|
| 250 | 200 | 2.62E+04 | 0.10 | 1.55E+00 | 1.56E-02 | 4.00E+02 | 1.19E+01 | 5.82E-05 | 1.52E+00 | 8.3E-07 | 1.0E+00 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 5.68E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 5.2E-07 | 1.5E-03 |

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|--------------------------------------------------------------|---------------------------------------------------------------------------|------------|
| 67663 | 1.90E+01 | Chloroform |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|----------------------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^{\circ}\text{K}$) | Critical temperature, T_C ($^{\circ}\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|
| 1.04E-01 | 1.00E-05 | 3.66E-03 | 25 | 6,988 | 334.32 | 536.40 | 3.98E+01 | 7.92E+03 | 2.3E-05 | 4.9E-02 |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 7,492 | 2.47E-03 | 1.04E-01 | 1.77E-04 | 6.00E-03 | 1.95E-04 | 6.57E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|
| 250 | 200 | 1.98E+03 | 0.10 | 1.55E+00 | 6.00E-03 | 4.00E+02 | 6.40E+02 | 4.60E-05 | 9.10E-02 | 2.3E-05 | 4.9E-02 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 7.92E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 8.6E-07 | 1.8E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------|
| 156592 | 7.03E+02 | cis-1,2-Dichloroethylene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.36E-02 | 1.13E-05 | 4.07E-03 | 25 | 7,192 | 333.65 | 544.00 | 3.55E+01 | 3.50E+03 | 0.0E+00 | 2.0E-01 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 7,674 | 2.72E-03 | 1.15E-01 | 1.77E-04 | 4.25E-03 | 1.43E-04 | 4.80E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 8.06E+04 | 0.10 | 1.55E+00 | 4.25E-03 | 4.00E+02 | 9.22E+03 | 4.21E-05 | 3.39E+00 | NA | 2.0E-01 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 3.50E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 1.6E-02 |

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|--------------------------------------------------------------|---------------------------------------------------------------------------|--------------|
| 100414 | 9.72E+02 | Ethylbenzene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|----------------------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.50E-02 | 7.80E-06 | 7.86E-03 | 25 | 8,501 | 409.34 | 617.20 | 3.63E+02 | 1.69E+02 | 0.0E+00 | 1.0E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 10,087 | 4.63E-03 | 1.95E-01 | 1.77E-04 | 4.33E-03 | 1.36E-04 | 4.60E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 1.90E+05 | 0.10 | 1.55E+00 | 4.33E-03 | 4.00E+02 | 7.80E+03 | 4.16E-05 | 7.88E+00 | NA | 1.0E+00 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.69E+05 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 7.6E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------|
| 98828 | 6.81E+02 | Cumene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 6.50E-02 | 7.10E-06 | 1.46E-02 | 25 | 10,335 | 425.56 | 631.10 | 4.89E+02 | 6.13E+01 | 0.0E+00 | 4.0E-01 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|--------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 12,560 | 7.55E-03 | 3.18E-01 | 1.77E-04 | 3.75E-03 | 1.16E-04 | 3.92E-04 |
|----------|----------|----------|-----|--------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 2.17E+05 | 0.10 | 1.55E+00 | 3.75E-03 | 4.00E+02 | 3.10E+04 | 3.94E-05 | 8.54E+00 | NA | 4.0E-01 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 6.13E+04 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 2.0E-02 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------|
| 108872 | 4.03E+02 | Methylcyclohexane |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |
| Used to calculate risk-based groundwater concentration. | | | | | |

CHEMICAL PROPERTIES SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^{\circ}\text{K}$) | Critical temperature, T_C ($^{\circ}\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.35E-02 | 8.52E-06 | 1.03E-01 | 25 | 7,474 | 373.90 | 572.20 | 7.85E+01 | 1.40E+01 | 0.0E+00 | 3.0E+00 |

END

INTERMEDIATE CALCULATIONS SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{ie} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|-------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm·m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|----------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 8,518 | 6.57E-02 | 2.77E+00 | 1.77E-04 | 4.24E-03 | 1.28E-04 | 4.33E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RFC (mg/m ³) |
|--------------------------------------|---------------------------------------|----------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------|
| 250 | 200 | 1.12E+06 | 0.10 | 1.55E+00 | 4.24E-03 | 4.00E+02 | 9.37E+03 | 4.08E-05 | 4.55E+01 | NA | 3.0E+00 |

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.40E+04 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 1.4E-02 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------|
| 75092 | 2.02E+02 | Methylene chloride |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|
| 1.01E-01 | 1.17E-05 | 2.18E-03 | 25 | 6,706 | 313.00 | 510.00 | 1.17E+01 | 1.30E+04 | 4.7E-07 | 1.1E+00 |
|----------|----------|----------|----|-------|--------|--------|----------|----------|---------|---------|

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 6,970 | 1.51E-03 | 6.38E-02 | 1.77E-04 | 5.83E-03 | 2.03E-04 | 6.81E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 1.29E+04 | 0.10 | 1.55E+00 | 5.83E-03 | 4.00E+02 | 7.74E+02 | 4.64E-05 | 5.99E-01 | 4.7E-07 | 1.1E+00 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.30E+07 | NA |

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-07 | 5.5E-04 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------|
| 108101 | 3.51E+02 | Methylisobutylketone (4-methyl-2- |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.50E-02 | 7.80E-06 | 1.38E-04 | 25 | 8,243 | 389.50 | 571.00 | 9.06E+00 | 1.90E+04 | 0.0E+00 | 3.0E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 9,781 | 8.23E-05 | 3.47E-03 | 1.77E-04 | 4.37E-03 | 4.79E-04 | 1.36E-03 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 1.22E+03 | 0.10 | 1.55E+00 | 4.37E-03 | 4.00E+02 | 7.21E+03 | 5.27E-05 | 6.42E-02 | NA | 3.0E+00 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.90E+07 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 2.1E-05 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------|
| 1634044 | 2.20E+01 | MTBE |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based
groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 1.02E-01 | 1.05E-05 | 6.23E-04 | 25 | 6,678 | 328.30 | 497.10 | 7.26E+00 | 5.10E+04 | 0.0E+00 | 3.0E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 7,218 | 4.27E-04 | 1.80E-02 | 1.77E-04 | 5.92E-03 | 2.68E-04 | 8.76E-04 |
|----------|----------|----------|-----|-------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 3.96E+02 | 0.10 | 1.55E+00 | 5.92E-03 | 4.00E+02 | 7.02E+02 | 4.91E-05 | 1.94E-02 | NA | 3.0E+00 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 5.10E+07 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 6.2E-06 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------|
| 91203 | 4.40E+00 | Naphthalene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 5.90E-02 | 7.50E-06 | 4.82E-04 | 25 | 10,373 | 491.14 | 748.40 | 2.00E+03 | 3.10E+01 | 0.0E+00 | 3.0E-03 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|

| | | | | | | | | | | |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |
|-----|-------|-------|----------|-------|----------|-------|-------|-------|-------|-------|

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

| | | | | | | | | | | |
|----------|----------|----------|-----|--------|----------|----------|----------|----------|----------|----------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 12,851 | 2.45E-04 | 1.03E-02 | 1.77E-04 | 3.42E-03 | 2.15E-04 | 6.74E-04 |
|----------|----------|----------|-----|--------|----------|----------|----------|----------|----------|----------|

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|

| | | | | | | | | | | | |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|
| 250 | 200 | 4.55E+01 | 0.10 | 1.55E+00 | 3.42E-03 | 4.00E+02 | 8.51E+04 | 4.63E-05 | 2.10E-03 | NA | 3.0E-03 |
|-----|-----|----------|------|----------|----------|----------|----------|----------|----------|----|---------|

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 3.10E+04 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 6.7E-04 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------|
| 127184 | 4.75E+02 | Tetrachloroethylene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.20E-02 | 8.20E-06 | 1.84E-02 | 25 | 8,288 | 394.40 | 620.20 | 1.55E+02 | 2.00E+02 | 6.0E-06 | 3.5E-02 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 9,492 | 1.11E-02 | 4.70E-01 | 1.77E-04 | 4.16E-03 | 1.27E-04 | 4.31E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 2.23E+05 | 0.10 | 1.55E+00 | 4.16E-03 | 4.00E+02 | 1.13E+04 | 4.07E-05 | 9.08E+00 | 6.0E-06 | 3.5E-02 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 2.00E+05 | NA |

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-05 | 2.5E-01 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------|
| 79016 | 3.89E+02 | Trichloroethylene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^{\circ}\text{K}$) | Critical temperature, T_C ($^{\circ}\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.90E-02 | 9.10E-06 | 1.03E-02 | 25 | 7,505 | 360.36 | 544.20 | 1.66E+02 | 1.47E+03 | 1.1E-04 | 3.5E-02 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 8,483 | 6.58E-03 | 2.77E-01 | 1.77E-04 | 4.56E-03 | 1.42E-04 | 4.80E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 1.08E+05 | 0.10 | 1.55E+00 | 4.56E-03 | 4.00E+02 | 4.95E+03 | 4.21E-05 | 4.55E+00 | 1.1E-04 | 3.5E-02 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.47E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 2.1E-04 | 1.2E-01 |

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------|
| 108883 | 2.40E+03 | Toluene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 8.70E-02 | 8.60E-06 | 6.62E-03 | 25 | 7,930 | 383.78 | 591.79 | 1.82E+02 | 5.26E+02 | 0.0E+00 | 5.0E+00 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 9,089 | 4.11E-03 | 1.73E-01 | 1.77E-04 | 5.02E-03 | 1.58E-04 | 5.35E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 4.15E+05 | 0.10 | 1.55E+00 | 5.02E-03 | 4.00E+02 | 2.26E+03 | 4.35E-05 | 1.81E+01 | NA | 5.0E+00 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 5.26E+05 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 3.5E-03 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------|
| 75014 | 6.30E+01 | Vinyl chloride (chloroethene) |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |

Used to calculate risk-based groundwater concentration.

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 1.06E-01 | 1.23E-05 | 2.69E-02 | 25 | 5,250 | 259.25 | 432.00 | 1.86E+01 | 8.80E+03 | 4.4E-06 | 1.0E-01 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 4,933 | 2.08E-02 | 8.76E-01 | 1.77E-04 | 6.12E-03 | 1.85E-04 | 6.29E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 5.52E+04 | 0.10 | 1.55E+00 | 6.12E-03 | 4.00E+02 | 5.68E+02 | 4.55E-05 | 2.51E+00 | 4.4E-06 | 1.0E-01 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 8.80E+06 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 4.5E-06 | 2.4E-02 |

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

| ENTER Chemical CAS No. (numbers only, no dashes) | ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$) | Chemical |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------|----------|
| 106423 | 3.34E+03 | p-Xylene |

MORE
↓

| ENTER Depth below grade to bottom of enclosed space floor, L_f (cm) | ENTER Depth below grade to water table, L_{WT} (cm) | ENTER SCS soil type directly above water table | ENTER Average soil/ groundwater temperature, T_s ($^{\circ}\text{C}$) | ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m) |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 200 | 450 | sil | 16 | |

MORE
↓

| ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability) | OR | ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2) | ENTER Vadose zone SCS soil type Lookup Soil Parameters | ENTER Vadose zone soil dry bulk density, ρ_b^v (g/cm^3) | ENTER Vadose zone soil total porosity, n^v (unitless) | ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3) |
|-----------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| sil | | | sil | 1.49 | 0.439 | 0.18 |

MORE
↓

| ENTER Target risk for carcinogens, TR (unitless) | ENTER Target hazard quotient for noncarcinogens, THQ (unitless) | 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) |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1.0E-06 | 1 | 70 | 30 | 30 | 350 |
| Used to calculate risk-based groundwater concentration. | | | | | |

DATA ENTRY SHEET

ABC

| Diffusivity in air, D_a (cm^2/s) | Diffusivity in water, D_w (cm^2/s) | Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$) | Henry's law constant reference temperature, T_R ($^\circ\text{C}$) | Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol) | Normal boiling point, T_B ($^\circ\text{K}$) | Critical temperature, T_C ($^\circ\text{K}$) | Organic carbon partition coefficient, K_{oc} (cm^3/g) | Pure component water solubility, S (mg/L) | Unit risk factor, URF ($\mu\text{g}/\text{m}^3$) ⁻¹ | Reference conc., RfC (mg/m^3) |
|---------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| 7.69E-02 | 8.44E-06 | 7.64E-03 | 25 | 8,525 | 411.52 | 616.20 | 3.89E+02 | 1.85E+02 | 0.0E+00 | 1.0E-01 |

END

DATA ENTRY SHEET

| Source-building separation, L_T (cm) | Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³) | Vadose zone effective total fluid saturation, S_{te} (cm ³ /cm ³) | Vadose zone soil intrinsic permeability, k_i (cm ²) | Vadose zone soil relative air permeability, k_{rg} (cm ²) | Vadose zone soil effective vapor permeability, k_v (cm ²) | Thickness of capillary zone, L_{cz} (cm) | Total porosity in capillary zone, n_{cz} (cm ³ /cm ³) | Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³) | Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³) | Floor-wall seam perimeter, X_{crack} (cm) |
|----------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 250 | 0.259 | 0.307 | 2.85E-09 | 0.798 | 2.27E-09 | 68.18 | 0.439 | 0.090 | 0.349 | 4,000 |

| Bldg. ventilation rate, $Q_{building}$ (cm ³ /s) | Area of enclosed space below grade, A_B (cm ²) | Crack-to-total area ratio, η (unitless) | Crack depth below grade, Z_{crack} (cm) | Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol) | Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol) | Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless) | Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s) | Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s) | Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s) | Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s) |
|-------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2.54E+04 | 1.80E+06 | 2.22E-04 | 200 | 10,178 | 4.48E-03 | 1.89E-01 | 1.77E-04 | 4.44E-03 | 1.40E-04 | 4.73E-04 |

| Diffusion path length, L_d (cm) | Convection path length, L_p (cm) | Source vapor conc., C_{source} (µg/m ³) | Crack radius, r_{crack} (cm) | Average vapor flow rate into bldg., Q_{soil} (cm ³ /s) | Crack effective diffusion coefficient, D^{crack} (cm ² /s) | Area of crack, A_{crack} (cm ²) | Exponent of equivalent foundation Peclet number, $\exp(Pe^d)$ (unitless) | Infinite source indoor attenuation coefficient, α (unitless) | Infinite source bldg. conc., $C_{building}$ (µg/m ³) | Unit risk factor, URF (µg/m ³) ⁻¹ | Reference conc., RfC (mg/m ³) |
|-----------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------|
| 250 | 200 | 6.30E+05 | 0.10 | 1.55E+00 | 4.44E-03 | 4.00E+02 | 6.25E+03 | 4.20E-05 | 2.64E+01 | NA | 1.0E-01 |

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

| Indoor exposure groundwater conc., carcinogen (µg/L) | Indoor exposure groundwater conc., noncarcinogen (µg/L) | Risk-based indoor exposure groundwater conc., (µg/L) | Pure component water solubility, S (µg/L) | Final indoor exposure groundwater conc., (µg/L) |
|------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|-------------------------------------------|-------------------------------------------------|
| NA | NA | NA | 1.85E+05 | NA |

INCREMENTAL RISK CALCULATIONS:

| Incremental risk from vapor intrusion to indoor air, carcinogen (unitless) | Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless) |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| NA | 2.5E-01 |

MESSAGE SUMMARY BELOW:

END

Appendix H-5.39
Groundwater Ingestion Calculations
Future Industrial Worker

**Future Industrial Worker Scenario
Estimation of Noncancer Hazard from Ingestion of
On-site Groundwater**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_w * IR_w * EF * ED / BW * AT_n$$

where:

- C_w = representative concentration of contaminant in groundwater at the exposure point during the period of exposure (mg/kg)
 IR_w = daily groundwater ingestion rate on days exposed during the exposure period (mg/day)
 EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
 ED = exposure duration: the typical duration of each exposure (years)
 BW = body weight (kg)
 AT_n = averaging Time (years)

| Chemical | C_w Conc. in Water ⁽¹⁾ (mg/L) | IR_w Ingestion Rate (L/day) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_w Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient (unitless) | Percent Distribution of Risk (%) |
|-----------------------------|-----------------------------------------------------|----------------------------------------|---------------------------------------------|--------------------------------------------|--------------------------------|----------------------------------------------------|----------------------------------------------------|---------------------------------------|----------------------------------|-------------------------------------------|
| Iron | 1.6 | 2 | 250 | 25 | 70 | 9125 | 3.1E-02 | 3.00E-01 | 1.0E-01 | 0% |
| Manganese | 2.1 | 2 | 250 | 25 | 70 | 9125 | 4.1E-02 | 1.40E-01 | 2.9E-01 | 1% |
| 2-Chlorophenol | 0.013 | 2 | 250 | 25 | 70 | 9125 | 2.5E-04 | 5.00E-03 | 5.1E-02 | 0% |
| Bis(2-ethylhexyl)phthalate | 0.0032 | 2 | 250 | 25 | 70 | 9125 | 6.3E-05 | 2.00E-02 | 3.1E-03 | 0% |
| Naphthalene | 0.0044 | 2 | 250 | 25 | 70 | 9125 | 8.6E-05 | 2.00E-02 | 4.3E-03 | 0% |
| 1,1,1-Trichloroethane | 1.6 | 2 | 250 | 25 | 70 | 9125 | 3.2E-02 | 2.80E-01 | 1.1E-01 | 0% |
| 1,1,2-Trichloroethane | 0.0060 | 2 | 250 | 25 | 70 | 9125 | 1.2E-04 | 4.00E-03 | 2.9E-02 | 0% |
| 1,1-Dichloroethane | 0.22 | 2 | 250 | 25 | 70 | 9125 | 4.2E-03 | 2.00E-01 | 2.1E-02 | 0% |
| 1,1-Dichloroethene | 0.29 | 2 | 250 | 25 | 70 | 9125 | 5.7E-03 | 5.00E-02 | 1.1E-01 | 0% |
| 1,2-Dichlorobenzene | 0.043 | 2 | 250 | 25 | 70 | 9125 | 8.4E-04 | 9.00E-02 | 9.3E-03 | 0% |
| 1,2-Dichloroethane | 2.1 | 2 | 250 | 25 | 70 | 9125 | 4.0E-02 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.022 | 2 | 250 | 25 | 70 | 9125 | 4.3E-04 | 3.00E-02 | 1.4E-02 | 0% |
| 4-Methyl-2-pentanone | 0.35 | 2 | 250 | 25 | 70 | 9125 | 6.9E-03 | 8.00E-02 | 8.6E-02 | 0% |
| Benzene | 0.045 | 2 | 250 | 25 | 70 | 9125 | 8.8E-04 | 4.00E-03 | 2.2E-01 | 1% |
| Chlorobenzene | 0.076 | 2 | 250 | 25 | 70 | 9125 | 1.5E-03 | 2.00E-02 | 7.4E-02 | 0% |
| Chloroethane | 0.10 | 2 | 250 | 25 | 70 | 9125 | 1.9E-03 | 4.00E-01 | 4.7E-03 | 0% |
| Chloroform | 0.019 | 2 | 250 | 25 | 70 | 9125 | 3.7E-04 | 1.00E-02 | 3.7E-02 | 0% |
| cis-1,2-Dichloroethene | 0.70 | 2 | 250 | 25 | 70 | 9125 | 1.4E-02 | 1.00E-02 | 1.4E+00 | 4% |
| Ethylbenzene | 0.97 | 2 | 250 | 25 | 70 | 9125 | 1.9E-02 | 1.00E-01 | 1.9E-01 | 1% |
| Isopropylbenzene | 0.68 | 2 | 250 | 25 | 70 | 9125 | 1.3E-02 | 1.00E-01 | 1.3E-01 | 0% |
| Methyl tert butyl ether | 0.022 | 2 | 250 | 25 | 70 | 9125 | 4.3E-04 | NA | NA | 0% |
| Methylcyclohexane | 0.40 | 2 | 250 | 25 | 70 | 9125 | 7.9E-03 | NA | NA | 0% |
| Methylene chloride | 0.20 | 2 | 250 | 25 | 70 | 9125 | 4.0E-03 | 6.00E-02 | 6.6E-02 | 0% |
| Tetrachloroethene | 0.48 | 2 | 250 | 25 | 70 | 9125 | 9.3E-03 | 1.00E-02 | 9.3E-01 | 3% |
| Toluene | 2.4 | 2 | 250 | 25 | 70 | 9125 | 4.7E-02 | 8.00E-02 | 5.9E-01 | 2% |
| Trichloroethene | 0.39 | 2 | 250 | 25 | 70 | 9125 | 7.6E-03 | 3.00E-04 | 2.5E+01 | 83% |
| Vinyl chloride | 0.063 | 2 | 250 | 25 | 70 | 9125 | 1.2E-03 | 3.00E-03 | 4.1E-01 | 1% |
| Xylenes (Total) | 3.3 | 2 | 250 | 25 | 70 | 9,125 | 6.5E-02 | 2.00E-01 | 3.3E-01 | 1% |

Hazard Index = 3.1E+01

Notes:

(1): Groundwater EPCs are the maximum observed concentration (see Table 5-3)

"NA" = Not applicable.

**Future Industrial Worker Scenario
Estimation of Cancer Risk from Ingestion of
On-site Groundwater**

PSC Site
Rock Hill, South Carolina

$$ADD_w = C_w * IR_w * EF * ED / BW * AT_c$$

where:

- C_w = representative concentration of contaminant in groundwater at the exposure point during the period of exposure (mg/kg)
- IR_w = daily groundwater ingestion rate on days exposed during the exposure period (mg/day)
- EF = exposure frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (day/year)
- ED = exposure duration: the typical duration of each exposure (years)
- BW = body weight (kg)
- AT_c = averaging Time (years)

| Chemical | C_w Conc. in Water ⁽¹⁾ | IR_w Ingestion Rate | EF Exposure Frequency | ED Duration of Exposure | BW Body Weight | AT_c Averaging Time Cancer | ADD _w Average Daily Dose | CSF Oral Cancer Slope Factor | Chemical Specific Cancer Risk | Percent Distribution of Risk |
|----------------------------|-------------------------------------------|-----------------------------|-----------------------------|-------------------------------|----------------------|---------------------------------------|----------------------------------------------|---------------------------------------|----------------------------------------|------------------------------------|
| | (mg/L) | (L/day) | (day/year) | (years) | (kg) | (days) | (mg/kg-day) | (mg/kg-day) ⁻¹ | | (%) |
| Iron | 1.6 | 2 | 250 | 25 | 70 | 25550 | 1.1E-02 | NA | NA | 0% |
| Manganese | 2.1 | 2 | 250 | 25 | 70 | 25550 | 1.5E-02 | NA | NA | 0% |
| 2-Chlorophenol | 0.013 | 2 | 250 | 25 | 70 | 25550 | 9.1E-05 | NA | NA | 0% |
| Bis(2-ethylhexyl)phthalate | 0.0032 | 2 | 250 | 25 | 70 | 25550 | 2.2E-05 | 1.40E-02 | 3.1E-07 | 0% |
| Naphthalene | 0.0044 | 2 | 250 | 25 | 70 | 25550 | 3.1E-05 | NA | NA | 0% |
| 1,1,1-Trichloroethane | 1.6 | 2 | 250 | 25 | 70 | 25550 | 1.1E-02 | NA | NA | 0% |
| 1,1,2-Trichloroethane | 0.0060 | 2 | 250 | 25 | 70 | 25550 | 4.2E-05 | 5.70E-02 | 2.4E-06 | 0% |
| 1,1-Dichloroethane | 0.22 | 2 | 250 | 25 | 70 | 25550 | 1.5E-03 | NA | NA | 0% |
| 1,1-Dichloroethene | 0.29 | 2 | 250 | 25 | 70 | 25550 | 2.0E-03 | NA | NA | 0% |
| 1,2-Dichlorobenzene | 0.043 | 2 | 250 | 25 | 70 | 25550 | 3.0E-04 | NA | NA | 0% |
| 1,2-Dichloroethane | 2.1 | 2 | 250 | 25 | 70 | 25550 | 1.4E-02 | 9.10E-02 | 1.3E-03 | 29% |
| 1,4-Dichlorobenzene | 0.022 | 2 | 250 | 25 | 70 | 25550 | 1.5E-04 | 2.40E-02 | 3.7E-06 | 0% |
| 4-Methyl-2-pentanone | 0.35 | 2 | 250 | 25 | 70 | 25550 | 2.5E-03 | NA | NA | 0% |
| Benzene | 0.045 | 2 | 250 | 25 | 70 | 25550 | 3.1E-04 | 5.50E-02 | 1.7E-05 | 0% |
| Chlorobenzene | 0.076 | 2 | 250 | 25 | 70 | 25550 | 5.3E-04 | NA | NA | 0% |
| Chloroethane | 0.10 | 2 | 250 | 25 | 70 | 25550 | 6.7E-04 | 2.90E-03 | 1.9E-06 | 0% |
| Chloroform | 0.019 | 2 | 250 | 25 | 70 | 25550 | 1.3E-04 | 1.00E-02 | 1.3E-06 | 0% |
| cis-1,2-Dichloroethene | 0.70 | 2 | 250 | 25 | 70 | 25550 | 4.9E-03 | NA | NA | 0% |
| Ethylbenzene | 0.97 | 2 | 250 | 25 | 70 | 25550 | 6.8E-03 | NA | NA | 0% |
| Isopropylbenzene | 0.68 | 2 | 250 | 25 | 70 | 25550 | 4.8E-03 | NA | NA | 0% |
| Methyl tert butyl ether | 0.022 | 2 | 250 | 25 | 70 | 25550 | 1.5E-04 | 4.00E-03 | 6.2E-07 | 0% |
| Methylcyclohexane | 0.40 | 2 | 250 | 25 | 70 | 25550 | 2.8E-03 | NA | NA | 0% |
| Methylene chloride | 0.20 | 2 | 250 | 25 | 70 | 25550 | 1.4E-03 | 7.50E-03 | 1.1E-05 | 0% |
| Tetrachloroethene | 0.48 | 2 | 250 | 25 | 70 | 25550 | 3.3E-03 | 5.40E-01 | 1.8E-03 | 39% |
| Toluene | 2.4 | 2 | 250 | 25 | 70 | 25550 | 1.7E-02 | NA | NA | 0% |
| Trichloroethene | 0.39 | 2 | 250 | 25 | 70 | 25550 | 2.7E-03 | 4.00E-01 | 1.1E-03 | 24% |
| Vinyl chloride | 0.063 | 2 | 250 | 25 | 70 | 25,550 | 4.4E-04 | 7.20E-01 | 3.2E-04 | 7% |
| Xylenes (Total) | 3.3 | 2 | 250 | 25 | 70 | 25,550 | 2.3E-02 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 4.6E-03

Notes:

(1): Groundwater EPCs are the maximum observed concentration (see Table 5-3)

"NA" = Not applicable.

Appendix H-5.40
Groundwater Ingestion Calculations
Future Resident

**Future Child Resident (1-6) Scenario
Estimation of Noncancer Hazard from Ingestion of
On-site Groundwater**

PSC Site
Rock Hill, South Carolina

$$ADD_{soil} = C_w * IR_w * EF * ED / BW * AT_n$$

where:

C_w = representative concentration of contaminant in groundwater at the exposure point (mg/L)
 IR_w = daily groundwater ingestion rate (L/day)
 EF = exposure frequency: the number of days per year exposure occurs (day/year)
 ED = exposure duration: the typical duration of each exposure (years)
 BW = body weight (kg)
 AT_n = averaging Time (days)

| Chemical | C_w Conc. in Water ⁽¹⁾ (mg/L) | IR_w Ingestion Rate (L/day) | EF Exposure Frequency (day/year) | ED Duration of Exposure (years) | BW Body Weight (kg) | AT_n Averaging Time Noncancer (days) | ADD_w Average Daily Dose (mg/kg-day) | Chronic Oral RfD (mg/kg-day) | Hazard Quotient (unitless) | Percent Distribution of Risk (%) |
|----------------------------|-----------------------------------------------------|----------------------------------------|---------------------------------------------|--------------------------------------------|--------------------------------|----------------------------------------------------|----------------------------------------------------|---------------------------------------|----------------------------------|-------------------------------------------|
| Iron | 1.6 | 1 | 350 | 6 | 15 | 2190 | 1.0E-01 | 3.00E-01 | 3.4E-01 | 0% |
| Manganese | 2.1 | 1 | 350 | 6 | 15 | 2190 | 1.3E-01 | 1.40E-01 | 9.6E-01 | 0% |
| 2-Chlorophenol | 0.013 | 1 | 350 | 6 | 15 | 2190 | 8.3E-04 | 5.00E-03 | 1.7E-01 | 0% |
| Bis(2-ethylhexyl)phthalate | 0.0032 | 1 | 350 | 6 | 15 | 2190 | 2.0E-04 | 2.00E-02 | 1.0E-02 | 0% |
| Naphthalene | 0.0044 | 1 | 350 | 6 | 15 | 2190 | 2.8E-04 | 2.00E-02 | 1.4E-02 | 0% |
| 1,1,1-Trichloroethane | 1.6 | 1 | 350 | 6 | 15 | 2190 | 1.1E-01 | 2.80E-01 | 3.8E-01 | 0% |
| 1,1,2-Trichloroethane | 0.0060 | 1 | 350 | 6 | 15 | 2190 | 3.8E-04 | 4.00E-03 | 9.6E-02 | 0% |
| 1,1-Dichloroethane | 0.22 | 1 | 350 | 6 | 15 | 2190 | 1.4E-02 | 2.00E-01 | 6.9E-02 | 0% |
| 1,1-Dichloroethene | 0.29 | 1 | 350 | 6 | 15 | 2190 | 1.8E-02 | 5.00E-02 | 3.7E-01 | 0% |
| 1,2-Dichlorobenzene | 0.043 | 2 | 350 | 6 | 15 | 2190 | 5.5E-03 | 9.00E-02 | 6.1E-02 | 0% |
| 1,2-Dichloroethane | 2.1 | 2 | 350 | 6 | 15 | 2190 | 2.6E-01 | NA | NA | 0% |
| 1,4-Dichlorobenzene | 0.022 | 2 | 350 | 6 | 15 | 2190 | 2.8E-03 | 3.00E-02 | 9.4E-02 | 0% |
| 4-Methyl-2-pentanone | 0.35 | 1 | 350 | 6 | 15 | 2190 | 2.2E-02 | 8.00E-02 | 2.8E-01 | 0% |
| Benzene | 0.045 | 2 | 350 | 6 | 15 | 2190 | 5.8E-03 | 4.00E-03 | 1.4E+00 | 1% |
| Chlorobenzene | 0.076 | 2 | 350 | 6 | 15 | 2190 | 9.7E-03 | 2.00E-02 | 4.9E-01 | 0% |
| Chloroethane | 0.10 | 2 | 350 | 6 | 15 | 2190 | 1.2E-02 | 4.00E-01 | 3.1E-02 | 0% |
| Chloroform | 0.019 | 2 | 350 | 6 | 15 | 2190 | 2.4E-03 | 1.00E-02 | 2.4E-01 | 0% |
| cis-1,2-Dichloroethene | 0.70 | 2 | 350 | 6 | 15 | 2190 | 9.0E-02 | 1.00E-02 | 9.0E+00 | 5% |
| Ethylbenzene | 0.97 | 2 | 350 | 6 | 15 | 2190 | 1.2E-01 | 1.00E-01 | 1.2E+00 | 1% |
| Isopropylbenzene | 0.68 | 2 | 350 | 6 | 15 | 2190 | 8.7E-02 | 1.00E-01 | 8.7E-01 | 0% |
| Methyl tert butyl ether | 0.022 | 2 | 350 | 6 | 15 | 2190 | 2.8E-03 | NA | NA | 0% |
| Methylcyclohexane | 0.40 | 2 | 350 | 6 | 15 | 2190 | 5.2E-02 | NA | NA | 0% |
| Methylene chloride | 0.20 | 2 | 350 | 6 | 15 | 2190 | 2.6E-02 | 6.00E-02 | 4.3E-01 | 0% |
| Tetrachloroethene | 0.48 | 2 | 350 | 6 | 15 | 2190 | 6.1E-02 | 1.00E-02 | 6.1E+00 | 3% |
| Toluene | 2.4 | 2 | 350 | 6 | 15 | 2190 | 3.1E-01 | 8.00E-02 | 3.8E+00 | 2% |
| Trichloroethene | 0.39 | 2 | 350 | 6 | 15 | 2190 | 5.0E-02 | 3.00E-04 | 1.7E+02 | 84% |
| Vinyl chloride | 0.063 | 2 | 350 | 6 | 15 | 2190 | 8.1E-03 | 3.00E-03 | 2.7E+00 | 1% |
| Xylenes (Total) | 3.3 | 2 | 350 | 6 | 15 | 2190 | 4.3E-01 | 2.00E-01 | 2.1E+00 | 1% |

Hazard Index = 2.0E+02

Notes:

(1): Groundwater EPCs are the maximum observed concentration (see Table 5-3)

"NA" = Not applicable.

**Future Adult Resident (1-31) Scenario
Estimation of Cancer Risk from Ingestion of
On-site Groundwater**

PSC Site
Rock Hill, South Carolina

$$ADD_w = C_w * IR_w * EF * ED / BW * AT_c$$

where:

- C_w = representative concentration of contaminant in groundwater at the exposure point (mg/L)
 IR_w = daily groundwater ingestion rate (L/day)
 EF = exposure frequency: the number of days per year exposure occurs (day/year)
 ED = exposure duration: the typical duration of each exposure (years)
 BW = body weight (kg)
 AT_c = averaging Time (days)

| Chemical | C_w Conc. in Water ⁽¹⁾ | IR_w Ingestion Rate | EF Exposure Frequency | ED Duration of Exposure | BW Body Weight | AT_c Averaging Time Cancer (days) | ADD_w Average Daily Dose (mg/kg-day) | CSF Oral Cancer Slope Factor (mg/kg-day) ⁻¹ | Chemical Specific Cancer Risk | Percent Distribution of Risk (%) |
|----------------------------|-------------------------------------------|-----------------------------|-------------------------------|---------------------------------|------------------------|-------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------|----------------------------------------|-------------------------------------------|
| Iron | 1.6 | 2 | 350 | 6 | 15 | 25550 | 1.8E-02 | NA | NA | 0% |
| Manganese | 2.1 | 2 | 350 | 6 | 15 | 25550 | 2.3E-02 | NA | NA | 0% |
| 2-Chlorophenol | 0.013 | 2 | 350 | 6 | 15 | 25550 | 1.4E-04 | NA | NA | 0% |
| Bis(2-ethylhexyl)phthalate | 0.0032 | 2 | 350 | 6 | 15 | 25550 | 3.5E-05 | 1.40E-02 | 4.9E-07 | 0% |
| Naphthalene | 0.0044 | 2 | 350 | 6 | 15 | 25550 | 4.8E-05 | NA | NA | 0% |
| 1,1,1-Trichloroethane | 1.6 | 2 | 350 | 6 | 15 | 25550 | 1.8E-02 | NA | NA | 0% |
| 1,1,2-Trichloroethane | 0.0060 | 2 | 350 | 6 | 15 | 25550 | 6.6E-05 | 5.70E-02 | 3.7E-06 | 0% |
| 1,1-Dichloroethane | 0.22 | 2 | 350 | 6 | 15 | 25550 | 2.4E-03 | NA | NA | 0% |
| 1,1-Dichloroethene | 0.29 | 2 | 350 | 6 | 15 | 25550 | 3.2E-03 | NA | NA | 0% |
| 1,2-Dichlorobenzene | 0.043 | 2 | 350 | 6 | 15 | 25550 | 4.7E-04 | NA | NA | 0% |
| 1,2-Dichloroethane | 2.1 | | | | | | | | | 64% |
| 1,4-Dichlorobenzene | 0.022 | 2 | 350 | 6 | 15 | 25550 | 2.4E-04 | 2.40E-02 | 5.8E-06 | 0% |
| 4-Methyl-2-pentanone | 0.35 | 2 | 350 | 6 | 15 | 25550 | 3.8E-03 | NA | NA | 0% |
| Benzene | 0.045 | 2 | 350 | 6 | 15 | 25550 | 4.9E-04 | 5.50E-02 | 2.7E-05 | 0% |
| Chlorobenzene | 0.076 | 2 | 350 | 6 | 15 | 25550 | 8.3E-04 | NA | NA | 0% |
| Chloroethane | 0.10 | | | | | | | | | 2% |
| Chloroform | 0.019 | 2 | 350 | 6 | 15 | 25550 | 2.1E-04 | 1.00E-02 | 2.1E-06 | 0% |
| cis-1,2-Dichloroethene | 0.70 | 2 | 350 | 6 | 15 | 25550 | 7.7E-03 | NA | NA | 0% |
| Ethylbenzene | 0.97 | 2 | 350 | 6 | 15 | 25550 | 1.1E-02 | NA | NA | 0% |
| Isopropylbenzene | 0.68 | 2 | 350 | 6 | 15 | 25550 | 7.5E-03 | NA | NA | 0% |
| Methyl tert butyl ether | 0.022 | 2 | 350 | 6 | 15 | 25550 | 2.4E-04 | 4.00E-03 | 9.6E-07 | 0% |
| Methylcyclohexane | 0.40 | 2 | 350 | 6 | 15 | 25550 | 4.4E-03 | NA | NA | 0% |
| Methylene chloride | 0.20 | | | | | | | | | 1% |
| Tetrachloroethene | 0.48 | 2 | 350 | 6 | 15 | 25550 | 5.2E-03 | 5.40E-01 | 2.8E-03 | 17% |
| Toluene | 2.4 | 2 | 350 | 6 | 15 | 25550 | 2.6E-02 | NA | NA | 0% |
| Trichloroethene | 0.39 | 2 | 350 | 6 | 15 | 25550 | 4.3E-03 | 4.00E-01 | 1.7E-03 | 10% |
| Vinyl chloride | 0.063 | | | | | | | | | 6% |
| Xylenes (Total) | 3.3 | 2 | 350 | 6 | 15 | 25550 | 3.7E-02 | NA | NA | 0% |

Excess Lifetime Cancer Risk = 1.7E-02

Notes:

(1): Groundwater EPCs are the maximum observed concentration (see Table 5-3)

"NA" = Not applicable.

Appendix I

Surface Contour Maps

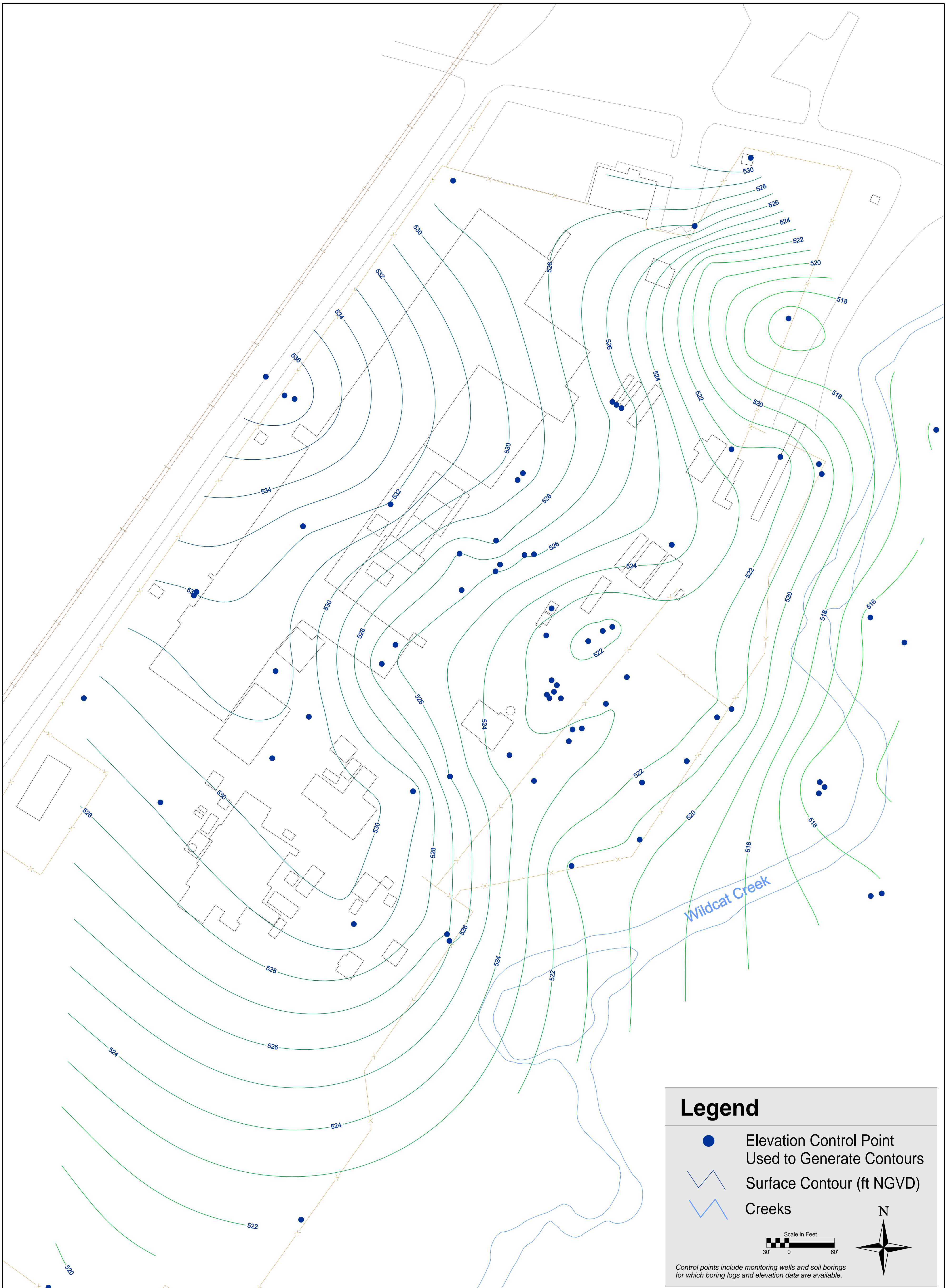


Figure I-1
Ground Surface Contour Map

Remedial Investigation Report
September 2008
Former PSC Site, Rock Hill, South Carolina

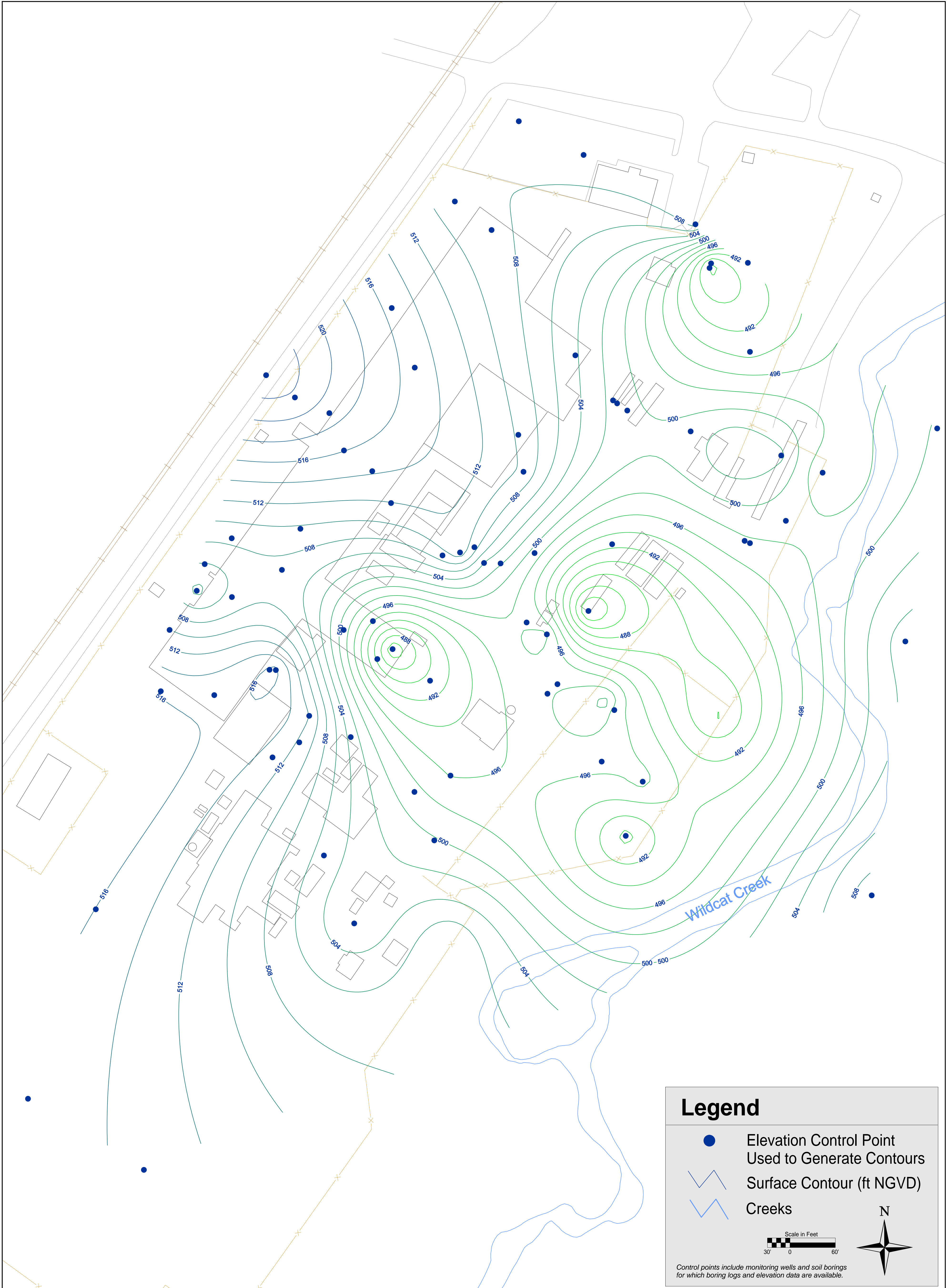
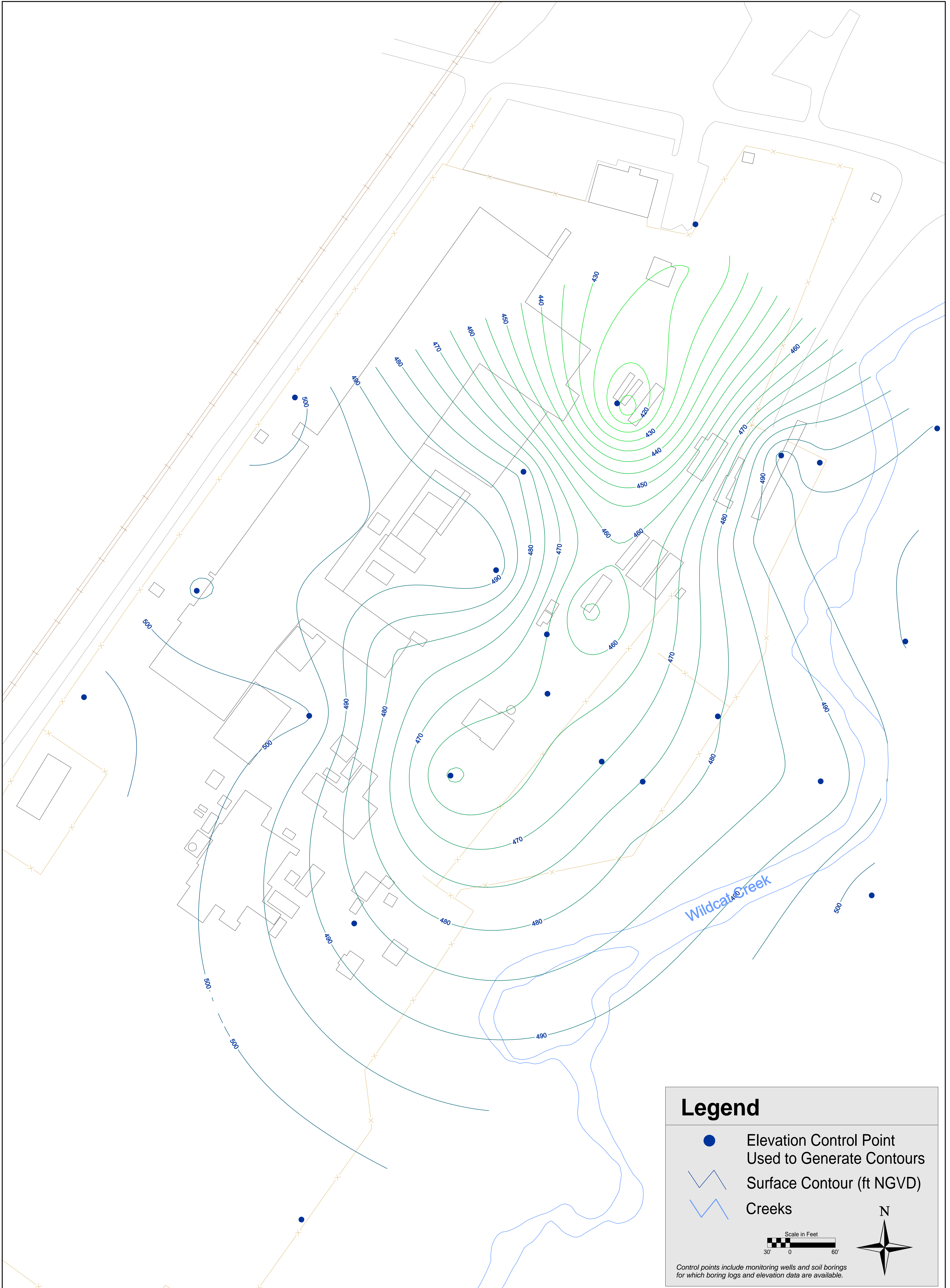


Figure I-2
Partially Weathered Rock Surface Contour Map

Remedial Investigation Report
 September 2008
 Former PSC Site, Rock Hill, South Carolina



**Figure I-3
Bedrock Surface Contour Map**

Remedial Investigation Report
September 2008
Former PSC Site, Rock Hill, South Carolina

CD-ROM

Analytical Laboratory Reports
Data Validation Form I's